MCGUIRE ENGINEERS

MCGUIRE ENGINEERS, INC. COVID-19 GUIDANCE

As a courtesy to our clients, McGuire Engineers, Inc. has compiled guidance provided by ASHRAE and the CDC, combined with our own experience with commercial buildings, to make operations of commercial buildings safer when occupants begin returning to work.

Please contact info@mepcinc.com to be connected with one of our engineers.

WHAT WE KNOW ABOUT COVID-19

On the recommendation of the ASHRAE Epidemic Task Force, ASHRAE leadership has approved the following two statements regarding transmission of SARS-CoV-2 and the operation of HVAC systems during the COVID-19 pandemic:

Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning systems, can reduce airborne exposures.

OSHA states that SARS-CoV-2 is thought to spread mainly from person- to-person, including: between people who are in close contact with one another (within about 6 feet), and through respiratory droplets produced when an infected person coughs or sneezes. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.

Ventilation and filtration provided by heating, ventilating, and air-conditioning systems can reduce the airborne concentration of SARS-CoV-2 and thus the risk of transmission through the air. Unconditioned spaces can cause thermal stress to people that may be directly life threatening and that may also lower resistance to infection. In general, disabling of heating, ventilating, and air-conditioning systems is not a recommended measure to reduce the transmission of the virus.

WHAT WE DO NOT KNOW ABOUT COVID-19

Currently we do not know the specific level of efficacy that each technology will have with respect to SARS-CoV-2. Many of the technologies developed for commercial buildings have proven effective with various viruses, mold spores, and bacteria. However, we are not aware of any laboratory tests with the SARS-CoV-2 specifically.

MCGUIRE ENGINEERS

WHAT IS MOST IMPORTANT TO KNOW ABOUT COVID-19

According to ***ASHRAE Journal Newsletter March 24, 2020***:

SARS-CoV-2 has been detected as an aerosol in hospitals, and there is evidence that at least some strains of it remain suspended and infectious for three hours, suggesting the possibility of aerosol transmission. However, other mechanisms of virus dissemination are likely to be more significant, namely:

- direct person to person contact
- indirect contact through inanimate objects like doorknobs
- through the hands to mucous membranes, such as those in the nose, mouth, and eyes
- droplets and possibly particles spread between people in close proximity.

For this reason, basic principles of social distancing (3 to 6.5 ft), surface cleaning and disinfection, handwashing and other strategies of good hygiene are far more important than anything related to the HVAC system.

VENTILATION CONSIDERATIONS

While employees and tenants are quarantined to homes, many building owners and managers have elected to reduce their financial burden by reducing operating costs through controlling ventilation rates and HVAC availability.

It is important to note that this strategy should **NOT** be continued once occupants begin returning to their offices. In fact, to the extent feasible, we are recommending that buildings employ 100% fresh air, or run their HVAC systems in economizer cycle, 24 hours per day, during the initial return to work period. Depending on the exact date for return to work, the weather may cooperate with temperatures below 65 degrees F, which are generally acceptable for economizer operation.

FILTRATION CONSIDERATIONS

It is widely understood that HEPA filtration is the most effective solution in healthcare environments for the removal of pathogens from HVAC systems. However, HEPA filtration is usually not a practical, or even feasible, solution for most commercial office buildings.

Most commercial building HVAC systems do not have the fan power, or space, for HEPA filtration systems. For that reason, there are alternatives to HEPA filtration that, while not as effective, are more effective than conventional filtrations solutions.

Most filtration systems are specified and identified today using a MERV (Minimum Efficiency Reporting Value) designation. MERV 17 (HEPA) and MERV 18 (ULPA) ratings are considered the highest ratings that are typically reserved for healthcare, clean room, manufacturing, pharmaceutical, and other clinical environments. Prior to the sustainable building movement, and the introduction of LEED, most commercial building filtration was limited to MERV 8. Newer buildings are typically specified with MERV 13 filtration systems.

We recommend consulting with your engineer to determine the highest MERV rating your existing HVAC systems can support. For instance, MERV 13 systems will capture up to 75% of all 0.03 to 0.1-micron particles (including respiratory viruses). Filtration with less than a MERV 13 rating should not be expected to capture viruses or bacteria.

FILTRATION ENHANCEMENT

Filtration enhancement technology that can be retrofitted into existing HVAC systems is another effective strategy to consider. There are two primary technologies available today, ultraviolet (UV) and Ionization systems. These are who different technologies that enhance filtration in different ways. UV technology is traditionally used to kill pathogens where they rest, most often on filter banks and heating and cooling coils. Ionization systems release positively and negatively charged ions into the HVAC system's air stream. These ions interact with the particles floating in air-conditioned spaces. The particles in the air will combine with particles of opposite charge. These larger particles fall out of suspension in the air and can be vacuum cleaned. Larger particles are also much easier for the filtration systems to capture. Some manufacturers claim performance as effective as MERV 16 when combined with ionization technology. More important, however, is the ability of ionization to kill pathogens by robbing them of their hydrogen atoms.

STAFF SAFETY

It is critically important that maintenance personnel protect themselves when handling used filtration media. Personnel should wear PPE and bag all filtration materials for disposal. PPE, appropriate cleaning supplies, and training should be provided for all cleaning staff who have the highest level of exposure to the virus.

OSHA states that workplaces should promote frequent and thorough hand washing, including by providing workers, customers, and worksite visitors with a place to wash their hands. If soap and running water are not immediately available, provide alcohol-based hand rubs containing at least 60% alcohol. In addition, OSHA suggests the following:

- Encourage workers to stay home if they are sick.
- Encourage respiratory etiquette, including covering coughs and sneezes.
- Provide customers and the public with tissues and trash receptacles.

- Employers should explore whether they can establish policies and practices, such as flexible worksites (e.g., telecommuting) and flexible work hours (e.g., staggered shifts), to increase the physical distance among employees and between employees and others if state and local health authorities recommend the use of social distancing strategies.
- Discourage workers from using other workers' phones, desks, offices, or other work tools and equipment, when possible.

PLUMBING SYSTEMS CONSIDERATIONS

As you have no doubt read, heard on TV or radio, and viewed on the Internet, washing your hands for 20 seconds is the most important mitigation measure for SARS-CoV-2. With respect to commercial buildings, we can do more. Making handwashing soap, paper towels, and trash receptacles near doors (to allow for opening of doors without touching the handles) available will aid in mitigation. Where possible, we recommend adjusting the automatic faucet controls to allow for longer rinse cycles.

The CDC has stated that SARS-CoV-2, which causes COVID-19, has not been detected in drinking water. Conventional water treatment methods that use filtration and disinfection, such as those in most municipal drinking water systems, should remove or inactivate the virus that causes COVID-19. However, SARS-CoV-2 has been detected in the feces of some patients diagnosed with COVID-19. The amount of virus released from the body (shed) in stool, how long the virus is shed, and whether the virus in stool is infectious is not known.

The CDC states that the risk of transmission of the virus that causes COVID-19 from the feces of an infected person is also unknown. However, the risk is expected to be low based on data from previous outbreaks of related coronaviruses, such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). There has been no confirmed fecal-oral transmission of COVID-19 to date. There is no evidence that COVID-19 can be spread to humans by use of pools, hot tubs or spas, or water playgrounds. Proper operation, maintenance, and disinfection (e.g., with chlorine and bromine) of pools, hot tubs or spas, and water playgrounds should inactivate the virus that causes COVID-19.

While there is ongoing community spread of COVID-19, there should be appropriate care taken both in and outside the pool, to protect yourself and others. Owners and operators of community pools, hot tubs, or spas should follow the interim guidance for businesses and employers to plan and respond to COVID-19.

CLEANING CONSIDERATIONS

Currently, the best guidance on cleaning and disinfection is provided by the CDC:
https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/cleaning-disinfection.html

OSHA states that it is important to maintain regular housekeeping practices, including routine cleaning and disinfecting of surfaces, equipment, and other elements of the work environment. When choosing cleaning chemicals, employers should consult information on Environmental Protection Agency (EPA)-approved disinfectant labels with claims against emerging viral pathogens. Products with EPA-approved emerging viral pathogens claims are expected to be effective against SARS-CoV-2 based on data for harder to kill viruses. Follow the manufacturer's instructions for use of all cleaning and disinfection products (e.g., concentration, application method and contact time, PPE).

In addition to that guidance, we are recommending to our clients to invest in commercial vacuum equipment with HEPA filtration. The SARS-CoV-2 virus, like all pathogens, is small and can be sucked up, and expelled into the same room when using a conventional vacuum cleaner. Wet cleaning of carpeting using disinfectant solution in the commercial carpet cleaning machine periodically should also be considered.

ENDNOTES/CITATIONS

1. ASHRAE Journal Newsletter, March 24, 2020 https://www.ashrae.org/news/ashraejournal/guidance-for-building-operations-during-the-covid-19-pandemic
2. ASHRAE Position Document on Airborne Infectious Diseases, February 5, 2020 https://www.ashrae.org/file%20library/about/position%20documents/airborne-infectious-diseases.pdf
3. OSHA 3990-03 2020 Guidance on Preparing Workplaces for COVID-19, March 2020
4. CDC: Interim Guidance for Businesses and Employers to Plan and Respond to Coronavirus Disease 2019 (COVID-19), March 21, 2020