

April 23, 2020

## **Role of HVACR and Water Heating Equipment in Preventing Coronavirus Transmission**

While the primary method of COVID-19 transmission is in droplet form—i.e., person-to-person or via surfaces, researchers are still studying the behavior of this particular virus, given its brief stint thus far on the world stage. Researchers have not definitively determined that the virus can be transmitted through the air, the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) recently issued a statement in which it asserted that, “Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled.”

So, while hand-washing with warm water and plenty of soap, along with and surface-sanitizing and avoidance of close person-to-person contact are still the main methods to stay healthy, there are several other steps that homeowners and building owners can take to significantly minimize the risk of transmission.

### **For Residential Buildings:**

#### **Ventilation**

The dominant central air conditioning system in the United States – the split, ducted system, relies on outside ventilation as its primary source of air.

A recent ASHRAE [paper](#) is very clear about one of the beneficial roles of such HVAC systems in airborne virus transmission, finding that the “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 [on the other hand] 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.”

#### **Filtration**

Those concerned about the potential spread of the virus through the air should consider installing AC and furnace filters with a high MERV rating to ensure they catch the maximum particles, while recognizing that this will only reduce, not eliminate, the transmission potential.

#### **UV Light Treatment**

In a March 9 [article](#) in the HVAC trade publication *ACHRNews*, industry experts noted that ultraviolet (UV) light treatment can complement filtration by addressing the particles that can slip through filters. “UV germicidal systems have also been shown to reduce microbial load and pathogens that are found within the HVAC system and drain pan that would otherwise be introduced and distributed throughout the envelope of the building,” the article quoted Aaron Engel of indoor air quality equipment manufacturer Fresh-Aire UV as saying. UV treatment systems can be used in homes and commercial buildings.

His opinion was seconded by William Bahnfleth, former ASHRAE President and Director of Penn State University’s Indoor Environmental Center, who noted that, “Even HEPA filters that have been tested in the laboratory with viruses will have some level of penetration...”

not much — a few percent. But if anything gets through and if it's a very virulent pathogen, that means you're not perfectly protected against infection by that filter.” Hence the complementary UV system to catch those that slip through.

### **Humidity Control**

Penn State’s Bahnfleth advises paying attention to a home’s relative humidity. “The recommendation for a long time has been to try to keep minimum relative humidity between 40 and 60 percent, because viruses are least viable in that range,” he said. “Many commercial buildings have humidity control to keep conditions in this range, but in a home in the winter — especially if it's leaky and in a cold climate — humidity drops into the 20s or lower. A well-maintained home humidifier that keeps your relative humidity at the recommended level is a good idea.”

### **For Commercial Buildings:**

#### **Ventilation**

In a recent New York Times [op-ed](#), Dr. Joseph Allen, Director of the Healthy Buildings program at Harvard University’s T.H. Chan School of Public Health, extolled the benefits of adequate building ventilation in helping to stem the spread of disease. “...bringing in more outdoor air in buildings with heating and ventilation systems (or opening windows in buildings that don’t) helps dilute airborne contaminants, making infection less likely. For years, we have been doing the opposite: sealing our windows shut and recirculating air.” He further quoted a 2019 [study](#) in the journal *Nature* that found that even minimum levels of outdoor air ventilation could reduce transmission of the flu to an extent normally associated with a 50- to 60-percent vaccination rate.

#### **UV Light Treatment**

As noted above, UV light treatment can kill pathogens that escape filtration. Daniel Jones, president of UV Resources, a UV light treatment equipment company, touted upper-air UV-C fixtures as a commercial building remedy for viral droplets: Airborne droplets containing infectious agents can remain in room air for six minutes and longer,” he said. “Scientists have found that COVID-19 can remain infectious on surfaces at room temperature for up to nine days. Upper-air UV-C fixtures can destroy those microbes when they are exposed to the UV-C energy in a matter of seconds.” He pointed to kill ratios of up to 99.9 percent on a first-pass basis that have been modeled, and concentrations are further reduced each time the air circulates.

#### **Humidity Control**

As noted above, relative humidity control can help control the viability of viruses and should be closely monitored by commercial building engineers and kept within the 40- to 60-percent range, according to Penn State’s Bahnfleth.

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