



## SARS-CoV-2 / COVID-19 Information & Guidance re: Indoor Air Quality, HVAC, & Air Filtration

At BGE Indoor Air Quality Solutions, our mission is to deliver clean, healthy indoor air environments. We are considered the leaders in our industry and we understand air filtration and indoor air quality better than most. At these times when facility managers are concerned about human health and the spread of the SARS-CoV-2 virus, we believe it's important to share facts, science, and insights to help ensure customers have the best information to make decisions about protecting your facilities and occupants.

### Important Disclaimer re: Evolving Scientific Information

There is still much that the world does not yet know about the SARS-CoV-2 virus, in particular how it transmits through the air. Scientists around the world are conducting and sharing research in real-time. At BGE, we are committed to finding and sharing the latest scientific information - especially as it relates to the *airborne nature* of the SARS-CoV-2 virus, which is critical to understanding the role that HVAC systems and filtration might play in helping prevent transmission.

Unfortunately, there is still disagreement in the scientific community around the airborne transmission risk of this virus. To make things even more complex, different countries/jurisdictions have interpreted different studies in their own way, drawing different conclusions, and making different recommendations. Even close neighbors like Canada and the United States have differed in their interpretation and approach. We discuss these differences later in this document.

As such, BGE cannot advise if any specific precautionary HVAC or filtration modifications will directly result in any health outcomes or prevent transmission of this virus. Instead, we can advise you on steps you might take to improve the likelihood that you are better protecting your facility and reducing the chance of airborne transmission.

### Our commitment to customers

We are committed to help our customers in the following ways:

- We will thoroughly listen, gather, and assess information about your facility, your assets, your concerns, and your objectives.
- We will point you to the latest studies and information about the specific airborne nature of SARS-CoV-2 and we will also do our best to highlight the points of scientific disagreement and/or varying interpretations of the airborne science.



- Based on our extensive experience and our understanding of well-accepted existing and emerging HVAC/filtration science, we can help educate you about HVAC, filtration, indoor air quality, and airborne particulate (including viruses), to help you decide if you would like to make changes to your facility.
- If, after considering the information above, you believe it makes sense to take some action, then we can help identify additional precautions to protect your building and its occupants.

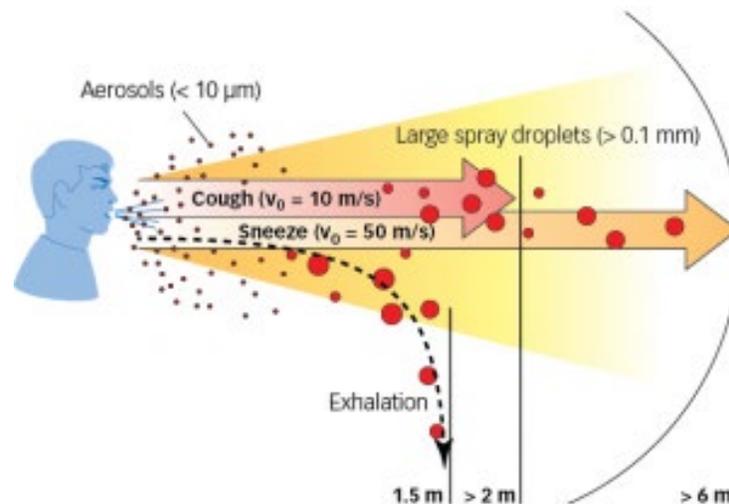
For over 52 years, BGE has always been committed to educating our customers about filtration and indoor air quality, so that together we can make intelligent choices for your facility. Now, more than ever, that education and shared understanding is critical.

Let's get started.

## How is SARS-CoV-2 transmitted?

The novel coronavirus SARS-COV-2 transmits via liquid droplets that are expelled when an infected person (the 'primary host' of the virus) sneezes, coughs, or talks.

These liquid droplets vary in size. The larger, heavier droplets fall quickly in the air while the smaller droplets - called **aerosols** - can form clusters or 'clouds' that can stay suspended in the air for a very long period of time:



Virus concentration and transmission is highest in the larger droplets that fall quickly to the floor or nearby surfaces, which is why the greatest risk of transmission is when an uninfected person touches that surface and then touches their face. However, scientists are now also studying the potential of transmission via the smaller 'aerosol' droplets.

## What do we know about smaller airborne aerosol droplets?

The aerosol clouds may float around ***poorly ventilated rooms*** with low air movement and can then transmit the virus to secondary hosts (other people) in the room.

Decreasing the exposure of potentially infectious airborne aerosols to secondary hosts may be an important step in stopping the spread. The best way to do that is through adequate ***ventilation and movement of clean air***, which we will discuss later.

Here are some of the best resources we have found that explain what we know about airborne particles and aerosols:



[Video - Japanese Association for Infectious Disease](#)

- The above is an excellent video highlighting the Japanese Association for Infectious Disease and their ongoing research into SARS-CoV-2 and aerosol transmission.
- MIT study & paper on [Turbulent Gas Clouds and Respiratory Pathogen Emissions](#) (which references many different global scientific studies).
- While not a scientific source, this is a helpful [visual simulation of how aerosols move around](#) (from The New York Times), which is consistent with many of the above sources and other scientific studies/information that we have reviewed.

## How pervasive are aerosol clouds and can they transmit SARS-CoV-2?

***This is a question still being studied and debated by the scientific community.***

There is virtually no disagreement that humans expel aerosols when they sneeze, cough, or talk. However, early in the pandemic, many scientists argued that there was not enough ***concentration of virus particles*** inside most aerosol clouds to pose a significant risk of airborne transmission. These scientists believed the only aerosol clouds with high enough droplet and virus concentrations to risk transmission were those generated from more invasive medical or dental procedures such as intubations, CPR, or dental work.

However, late in 2020, most scientists and national health bodies acknowledged that under certain conditions, virus concentrations in droplet clouds can reach high enough concentrations to pose airborne transmission risk. Accordingly, most have suggested that precautions should be taken in any setting where an infected person might be present.

Most relevant to our Canadian markets and customers, Health Canada has recognized the potential risk of airborne transmission and has published specific recommendations around HVAC, ventilation, and filtration enhancements to help reduce the risk to indoor occupants:



Government  
of Canada

Gouvernement  
du Canada

### **COVID-19: Guidance on indoor ventilation during the pandemic**

<https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/guidance-documents/guide-indoor-ventilation-covid-19-pandemic.html>

## What is BGE's position re: airborne transmission risk of SARS-CoV-2?

Based on our research and also our extensive expertise with indoor air and particle dynamics, we can say for certain that most of the larger (and presumably most dangerous) droplets will settle within a few feet of an affected individual after they sneeze, cough, or talk loudly. This is why the most important public health guidance continues to be physical distancing, washing hands, surface cleaning & disinfection, etc.

We also now know that smaller aerosol droplets (and also droplets that have dried) can remain airborne for much longer and travel much greater distances. However, as indicated earlier, more time and more science will still be needed to answer these three important questions:

- (a) What sorts of regular human activities cause large, concentrated aerosol clouds?
- (b) When do these aerosol clouds contain a high enough concentration of virus to be dangerous if a healthy person comes in contact with the aerosols?
- (c) How long can the infected aerosols stay airborne and travel around rooms or even throughout buildings (e.g. through vents and HVAC systems) such that they infect other rooms or building occupants?

Because nobody knows these answers for sure, scientists and health bodies believe it is prudent to err on the side of caution and assume that this virus does transmit through the air.

The remainder of this document discusses what we know about airborne particulate dynamics and how HVAC systems and filtration can play a significant role in mitigating airborne transmission risk.

It also provides emerging guidance around precautions that building and facility managers should consider implementing in order to best protect their occupants.

## What can be done to reduce airborne transmission risk?

Scientists agree that dissipating and/or removing the aerosols - i.e. reducing the airborne concentration of droplets in the air - is the best way to reduce the risk of any potential airborne transmission.

A Harvard researcher penned this article (with reference to several studies) in the New England Journal of Medicine:

### [Droplets and Aerosols in the Transmission of SARS-CoV-2.](#)

The article concluded that:

*“The possible contribution of infective aerosols to the current pandemic suggests the advisability of wearing a suitable mask whenever it is thought that infected persons may be nearby and of providing adequate ventilation of enclosed spaces where such persons are known to be or may recently have been.”*

## What role can HVAC & filtration systems play?

Ventilation, circulation, and filtration provided by a building’s heating, ventilation, air conditioning (HVAC) systems can have significant impact on the distribution and concentration of aerosols, thus reducing the risk of transmission.

Canadian and American design standards and building codes follow guidelines for HVAC standards established by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).



The following statements have been released by ASHRAE regarding transmission of SARS-CoV-2 and the operation of HVAC systems during the COVID-19 pandemic:

1. ***“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.”***
2. ***“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.”***

BGE Indoor Air Quality Solutions Ltd. disclaims any liability whatsoever in connection with the use of information provided herein, which is based partly on publicly available information. It is general in nature and not based on any specific fact or situation. The COVID-19 outbreak is rapidly changing and it is important to continue to consult up-to-date scientific and public health sources for ongoing advisories.

Further to these statements, ASHRAE has published a full Position Document and a comprehensive resource centre on Infectious Aerosols that includes many recommendations for HVAC and filtration.

Please visit [ASHRAE's technical resources section](https://www.ashrae.org/technical-resources/resources) for the full position document and detailed recommendations. <https://www.ashrae.org/technical-resources/resources>.

## What should we do with our facilities, HVAC, and filtration?

While ASHRAE and many other sources have published general recommendations, it is critically important to recognize that every facility and its HVAC and filtration systems are unique.

Therefore, before considering and implementing changes, we strongly recommend contacting your BGE representative who would be happy to provide a free consultation & assessment to help you consider the most cost-effective solutions for your specific environment and needs.