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How City M can help in reducing the risk of infectious virus in the indoor air using high efficiency air filtration

A research team comprising scientists from the United States, Canada and Spain reveals that more than [800 million viruses fall on every square metre](#) of the planetary boundary layer (the lowest part of the atmosphere) every day – the equivalent of 12 viruses for every person in the UK, 25 viruses per person in Canada. The risk of getting an infection through virus is high as unlike bacteria rain cannot wash them away.

A potentially devastating new disease has infected thousands of people since it was discovered in Wuhan, China in December last year. Chinese cities have been placed in lock-down in a bid to control the spread of the virus. This latest strain of the disease is particularly threatening because it causes pneumonia but will not respond to antibiotics. However, coronavirus (COVID-19) is by no means the only threat to human health.

This, of course, begs an important question – **what can you do to protect yourself** from these infections (not to mention other biological contaminants that pose health risks for building occupants such as smoke, mite, bacteria, house dust and pollen)?

Unlike with many other risks, we have no choice about breathing. But while most of us don't have the power to make the air cleaner, there are some things individuals can do to [reduce the effect of these infectious](#) particulates in the air.

HEPA filters can reduce the impact of the virus from the air

HEPA filters have been proven over decades across a wide range of healthcare facilities and life sciences applications, controlling the spread of airborne particles and organisms such as viruses and bacteria.

Indeed, many professional engineering organisations recommend [HEPA \(high-efficiency particulate air\)](#) filters in hospitals, infection control clinics and other healthcare facilities to eliminate microbes and other dangerous particles.

True high-efficiency particulate air (HEPA) filters most commonly are rated by test methods that begin with a minimum capture efficiency. The efficiency of HEPA filters is measured at MPPS (most penetrating particle size) that means this is the lowest efficiency of the filter. For smaller or larger particles that filter will perform even better. MPPS is typically between 0,1-0,25 micrometer in size. Bacteria and viruses are often smaller than that but typically attach themselves to larger particles. It's also important to understand HEPA filters do not actively kill living organisms. They capture and hold them within the matrix of the filter.

[High efficiency air filters](#) can be installed in HVAC systems, filtering out biological pollutants and particulate matter carried by the air-stream, preventing them from entering or recirculating back into the room. As unfiltered air flows through the HVAC unit's duct-work, the air filter captures and holds the airborne pollutants.

For further risk mitigation of airborne pathogens, it is recommended to upgrade or install the highest possible efficiency HEPA filtration (H13 or higher) in the existing ventilation system. This will improve your chances to avail an extra layer of protection against airborne pathogens.

What kind of solutions you need to reduce the risk of virus in the air?

Virus containment at health care facilities and bio-safety labs is very much about control measures and precautions for airborne exposure. Measures include ventilation, pressure differentials, exhaust ventilation, air filtration and cleaning, ultraviolet and germicidal irradiation (UVGI) and even temperature and humidity control.

CONTROL HUMIDITY

High Humidity Leads to Loss of Infectious Influenza Virus from Simulated Coughs*

An indoor humidity level of between 40-60%RH has been scientifically proven to combat airborne flu infections. This ideal humidity level shortens the time airborne flu remains infectious.

ULTRAVIOLET & GERMICIDAL IRRADIATION

Germicidal type of UV lights are capable of inactivating microorganisms such as bacteria and viruses. Spread the UV light over the surface you wish to clean for the directed amount of time and the virus and bacteria will decrease substantially.

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AIR FILTRATION & CLEANING

Sealed windows and doors can cause stagnant, recycled air that can harbor airborne allergens, virus and bacteria. HEPA filters can remove the smallest microbes in the air, reducing harmful airborne germs that not only include cold and flu viruses but also dust, pollen, mold spores, pet dander and smoke particles.

COMBAT INFECTIONS IN THE AIR

BenchVent
The Bench Ventilation Company

Source: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0057485>

Air filtration solutions depend on the category of the risk when in application. High density areas with most affected surroundings such as laboratories, containment units, quarantined zones need much higher level of protection compare to low risk exposure surroundings or controlled areas like homes or small business space. High risk application needs air containment and filtration equipment of HEPA Class H13 or higher along with use of special personnel equipment and clothing, as well as a segregated air supply, among other precautions.

Consider using [air cleaners](#) for fast and easy retrofit in case of sub-standard ventilation system for improvement in air filtration. It is also a way to rapidly boost the air quality of an already good functioning system when there is an increased risk that demands even better protection.

For crucial high-risk applications such as [quarantined zones and laboratories](#) BenchVent provides compelling containment equipment. However, an air cleaner is recommended for use where the risk of airborne contamination is elevated. Both containment units and air cleaners cannot be installed anywhere as they are specific to the risk and nature of the

surroundings, but an air cleaner can never replace a full containment set where there is a need. On the other hand, low risk applications can consider using EPA filters or ePM1 80% or higher category of air filtration.



“There are more than 60 bio-safety laboratories classified as Level 4 (highest risk) by international commission in the world. Camfil has already delivered containment solutions for many of them in China, France, Switzerland, Germany and the U.S.A” - Anders Sundvik, Vice President Research & Development, Camfil

See the graphic below created by Camfil experts to understand air filtration and containment requirements on basis of its application.

WHAT KIND OF AIR FILTRATION YOU NEED?

viruses, respirable dust, mites eggs and excretions, mold, allergens, pollen, bacteria, dust mites, cigar smoke, asbestos, various toxic dusts and aerosols, dander

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HIGH RISK APPLICATION	MEDIUM RISK APPLICATION	LOW RISK APPLICATION
<p>high density area most affected</p> <p>laboratory, containment units, quarantined areas</p>	<p>high risk of exposure high concentration of virus</p> <p>medical facilities, airport, public areas, schools, industries</p>	<p>low risk of exposure controlled area</p> <p>home, small office or business, personal use</p>
<p>HEPA + RELEVANT CONTAINMENT EQUIPMENT</p> <p>Class: H13 or higher</p> <p>pass up 0.05% or 0.1 micron particles per liter of air</p> <p>efficiency: MPPS of 99.95%</p>	<p>HEPA (recommended) or EPA</p> <p>Class: E12 or higher</p> <p>pass more than 0.5% of 0.1 micron particles per liter of air</p> <p>efficiency: MPPS of 99.50%</p>	<p>EPA (recommended) or ePM1 (80%) or higher</p> <p>Class: E10 or higher</p> <p>captures particles <1 µm in size such as bacteria and viruses</p> <p>efficiency: ePM1 95%</p>

MPPS - most penetrating particle size

