

Clearing the Air: considering air purification systems for post-COVID spaces

By Dr. Jie Zhao Head of Delos Labs Last updated Jul 26, 2021

As COVID-19 restrictions are being lifted, more and more people are going back into offices, schools, shopping centers and stadiums. In response to the pandemic, building owners and managers are implementing new safety and sanitation measures to ensure the well-being of employees, occupants, and guests. Indoor air quality should be at the top of that list.

It is imperative for building owners to do their due diligence in selecting one of the most important elements of a post-COVID indoor environment. To mitigate potential future health risks, there are five key features to consider when selecting any air purification technologies.

No budget to renovate HVAC systems. Standalone units can be effective.

Pulling in filtered fresh air from the outdoors is always a great way to dilute the concentration of pollutants in the air indoors, but it too may present challenges. Many buildings have aging ventilation systems that may not have outdoor air intake. Furthermore, even with newer ventilation systems that have controllable outdoor air intake, energy cost can be a challenge if a high percentage of outdoor air is constantly pulled in and conditioned indoors. Not to mention, HVAC updates and renovations can be costly.



Standalone units on the other hand can be very effective in reducing major indoor air pollutants. Similar to HVAC systems, standalone units increase air change rate by internally circulating air while trapping pollutants inside the systems. Standalone units only need to be implemented in highly populated areas of the building, can be moved from room to room, and can be turned on and off when needed.

Look beyond the company's marketing claims and turn to third-party testing data

There are many types of air purification technologies, and probably the best way to objectively evaluate them is through third-party testing data. There are three types of testing data that are important when analyzing air purification technologies:

- Lab performance data based on widely accepted standards, such as the clean air delivery rate (CADR) for different pollutants.
- Harmful by-product testing data, which addresses the potential for the technology to have negative health effects.
- Real-world efficacy testing data to demonstrate the technologies' effectiveness in a building.

Performance testing data gives the purchaser an objective picture of a product and removes the potential bias from a company's own claims. When choosing an air purifier, one should ask the manufacturer to show this data from a third-party testing lab.



Size matters: the difference between 1 micron and 0.1 microns is the spread of a global virus

Building owners should consider the size of the particles the air filtration system is able to filter; this is especially crucial during and following a global pandemic. One micron or one-tenth of a micron might not sound like a big difference, but the difference could mean the ability to capture particles down to the viral size. For context, SARS-CoV-2 (the virus that causes COVID-19) particles range from 0.06 to 0.14 microns in size. Air purifiers have the potential to rid the air of harmful pathogens and pollutants, but if the filters are not properly sized, the effectiveness decreases. When choosing an air purifier, make sure to check out the filter performance data.

Ozone can be a dangerous by-product

Ozone is a by-product of many air purification technologies. It is especially common in ones that can neutralize bacteria and viruses, which is critical in any post-pandemic environment. However, while these units might do a good job at eliminating viral particles, some units on the market generate more ozone at the respiratory level than is safe.

Despite the efficacy an air purification system may portray, ozone is known to cause serious health effects and should not be overlooked. When choosing an air purifier, make sure to look for units that have certifications for safe levels of ozone emissions, such as UL2998 or the standards set by the California Air Resources Board (CARB).



Is ionization technology good or bad?

“Bipolar ionization” is a new electronic air filtration technology that sends ions into the air to attach to airborne particles, such as bacteria and viruses, and makes them fall to the ground, deactivated. However, if an ionization system does not have mechanical filtration to trap or collect these particles, they will attach to walls, floors, and other surfaces near the air purifiers as dust, which can be harmful. Some ionization technologies are also known for producing dangerous levels of ozone. Therefore, when choosing an air purifier with ionization technologies, make sure to take extra precaution.

While COVID-19 has prompted individuals to be more conscious about their health, the indoor environments in which we spend roughly 90 per cent of our time has been a concern for decades. Indoor air quality has long-lasting effects on physical health, mental health, concentration, and attentiveness. We ingest 300 gallons of air a day and only one gallon of water and yet our understanding of the value of water to our health is a lot better than our understanding of air.

Ventilation and air purification upgrades are not only an essential element for building owners to consider in a post-COVID indoor environment, but they are also a future mitigation strategy for other airborne viruses. The decision to upgrade current air systems is significant because of the claims each producer makes about their system, the number of products available and the expense, not to mention the number of products available on the market. A science-driven company, such as Delos Canada, can help building owners, operators and builders find the right technology through its evidence-based and data-driven evaluation process.



Dr. Jie Zhao is the head of Delos Labs, with a PhD in Building Performance and Diagnostics from Carnegie Mellon University. His research focuses on human-building interactions, the study of sustainability, energy efficiency, human behavior, comfort, health and productivity in the built environment. Dr. Zhao has dedicated 10+ years researching the impact of the indoor environment on health, well-being and sustainability. Learn more at delos.com for the latest white papers, studies, insights and tips for improving indoor air quality.