

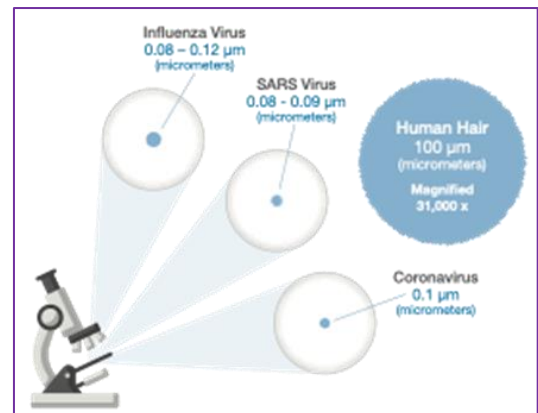


Why Pura Air?

The Problem Statement

Breathing polluted air can cause severe health problems. This risk increases significantly indoors where air is trapped, often re-circulated and full of contaminants. We are all at risk of contracting and spreading viruses and bacteria, especially in busy public areas such as medical facilities, offices, stores, schools, museums, theatres, etc. In fact, with indoor workers breathing approximately 11,000 litres of air a day, the Environmental Protection Agency has identified indoor air quality as one of the top five most urgent environmental risks to public health.

The big risk is small. The world's leading health-related organizations consider PM10, PM2.5, and PM1 fine dust fractions as the most important and dangerous for humans. Particles with an aerodynamic diameter of 10 microns, deposit in the nose and pharynx of the human respiratory system. Particles with an aerodynamic diameter of 2.5 microns are small enough to reach the human lung and deposit in the bronchia. Particles with an aerodynamic diameter of 1 micron or smaller are small enough to find their way through the cell membranes of the alveoli into the human blood stream and cause life-threatening diseases. Influenza, SARS Virus and Coronavirus all fall into the 1 micron or smaller category.



Airborne viruses move through small water droplets called bio-aerosols which are released after a person coughs or sneezes. The COVID-19 virus ends up in the air and can survive for several hours according to the New England Journal of Medicine, emphasizing the fact that air purification is crucial for controlling the virus.

The Importance of Airflow and ACH

An air change is how many times the air enters and exits a room from the HVAC system (or air purification system) in one hour (ACH). The amount of fresh air—outside air—that needs to be introduced into a building varies widely depending upon the activity and level of occupancy. ACH is simply the measure of air volume that can be added/removed from a space in a given hour. One air change results when all air has been replaced. It is a complete recycling of the air. Airflow and ACH have been increasing topics of importance due to possible air transmission of viruses such as COVID-19. One of the components of air filtration is that the higher the rate of change of air, the more times the air goes through filtration, the more disbursement and removal of the potentially hazardous particulates.

The Centre for Disease Control has [recommendations on how many ACH are required](#) to effectively remove infectious contaminants from the air for 99 to 99.9% efficiency. In an empty room, no people, HVAC ACH of 2, a minimum of 3 hours and 27 minutes are required for airborne-contaminant removal. This is an impractical scenario in most facilities looking for air purification. The more ACH, the lower the time required.

Will increasing AHC alone work to clean the air? No. It is part of a bigger picture on air filtration. Airflow. Speed. Filtration. The particulate size for harmful viruses and bacteria is too small and needs to be put through a high grade filtration system so that you can ensure you are putting clean air back into the room. They work together.

Pre-Covid-19 Setup in a Workspace –the HVAC system

Many workspaces, like other businesses and residences, use HVAC systems for heating, ventilation, and air-conditioning. Apart from maintaining the required, comfortable air temperature, an HVAC system provides adequate indoor air



quality (IAQ) by diluting and removing contaminants from indoor air through ventilation and by providing proper building pressurization. However, as pointed out by ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) in [April of 2020](#), page 5, “even the most robust HVAC system cannot control all airflows and completely prevent dissemination of an infectious aerosol or disease transmission by droplets or aerosols.”

Specifically, commercial HVAC systems have the following characteristics:

- they are designed to deliver only between 2 and 5 ACH (air changes per hour). Is that efficient for your facility? For example, a minimum of 12 ACH is recommended by [CDC for airborne infection control](#) in healthcare facilities.
- their filtration levels are lower than the required MERV (Minimum Efficiency Report Values) of 14, i.e., they filter out less than 75% of particles that are between 0.3 and 1.0 microns
- their fans are designed for filter resistances of MERV 14 or lower. That is, they do not deliver the increased airflow required for a true HEPA filter, which are also required as per the above CDC Guidelines. Replacing a MERV 14 filter with a true HEPA filter will not work in trying to improve filtration levels due to this airflow need.

A higher density of occupants may also necessitate additional ACH. It is important to check the operational limits of existing HVAC units, as the system’s design may not safely allow for increased air flow.¹

Pura Air Purification Solution

Pura Air has developed an air filtration and purification system to address all the above essentials. It is based on the best practices outlined by the American Conference of Governmental Industrial Hygienists (ACGIH®).

The keys? We provide appropriate airflow for a centralized application independent of HVAC, which is scaled to industrial ventilation standards, drawing contaminated air through a filtration unit that purifies and filters the air to a level of 99.99%. Using this design of high disinfection rates combined with high ACH to deal with the micro-organisms hanging in the air is how Pura Air systems effectively and efficiently delivers clean air.

[Appropriate Airflow](#)

The TC1200, for example, in its dental office application, is the only known central air filtration and purification unit designed to draw a large volume of source capture air through hoods positioned over the patient’s breathing area, into the filtration and purification unit, and redistribute 99.99% filtered and purified air back into the work-space. The unit fan is powerful enough to overcome external static pressure losses through the hoods, arms and ducting. This same centralized unit can be applied in regular office setups without the surgical arms to move the air, simply by ducting to each office through ceilings. The AV1000 unit is designed to be a stand alone unit in a required common area. Both systems are designed to increase ACH as well as filter and purify the air down to 99.99% removal in a given space without any alterations to the existing HVAC. Determining the number of filtration and purification units required in a given space to reach an ACH goal is an easy calculation.



[Germicidal Purification and Filtration, a matchless combination](#)

The TC 1200 is designed with a UVC chamber and a true HEPA filter so it can kill and capture 99.99% of particles and viruses in the air passing through. The AV1000 uses the same UVC chamber design principle.

¹ [“Addressing SARS-CoV-2 \(COVID-19\) Exposure Risk Using Engineering Controls”](#), By Alex LeBeau Aug 5, 2020, EHS Daily Advisor.



Germicidal Purification – an Ultraviolet (UVC) Chamber

The TC 1200 includes a UVC chamber, designed in cooperation with Signify (formerly Philips Lighting), a world leader in lighting. UVC light is germicidal. It deactivates the DNA of bacteria, virus, and other pathogens, destroying their ability to multiply and cause disease. Air in motion- such as travelling through a ducting system- is incredibly challenging to disinfect, mostly because of the speed at which it moves. Because of this, the design needs to consider using a big enough chamber to slow the air down adequately, where in combination with an appropriate number of UVC lights, the air can get enough exposure. In this application, the principle of design is based on a product of time and intensity—you must have a certain amount of time of exposure and intensity of light for a successful design. The chamber is designed with adequate cross-sectional area to effectively slow down airflow to provide adequate UVC coverage to remove viruses such as COVID-19, hepatitis A, influenza and rotavirus. This chamber is intrinsic to the TC 1200's design and has not just been retrofit to the requirements of existing HVACs. In fact, to ensure the highest effectiveness in irradiation, the chamber has been fabricated of pure aluminum. This offers the highest reflectance efficiency, even higher than galvanized or stainless steel. Care has been taken in the design of this chamber to create the most effective environment conducive to the use of UVC germicidal light possible.

Second and third stages

Second stage of filtration is the MERV 8 Pre-filter and odor control chamber which is a necessary pre-filter to the HEPA filtration chamber, as well as carbon filter to scrub the air of odours.

Filtration – a True HEPA Filter

The Pura Air TC 1200 uses a final stage true HEPA Filter that is scan tested to provide 99.99% filtration down to 0.3-micron particles. Scan testing provides a higher level of redundancy to increase the efficiency of the filter.

What is a 'true' HEPA ("high efficiency particulate air") filter? It is a pleated mechanical air filter manufactured, tested, certified, and labeled in accordance with U.S. Dept. of Energy standards. It must remove at least 99.97% of dust, pollen, mould, bacteria, and airborne particles of up to a size of 0.3 microns (μm). However, some filters are simply HEPA-like filters and do not conform to the stringent standards mentioned above. Testing to these standards certifies that there are no pinhole leaks in the filter, or breaches of the seal between the frame and the filter material, as these would compromise the efficiency of the filter to below HEPA standards, and make it not a 'true' HEPA filter.

Pura Air only uses scan-tested, true HEPA filter as the final filtration stage.

Installation - Uses Existing HVAC System

The TC 1200 does not interfere with the operations of existing HVAC systems. One hundred percent of the air drawn into the TC1200 is re-circulated as 99.99% purified air back into the workspace. Depending on jurisdiction, the installation will require an electrical permit, and optionally a seismic engineering sign-off. It takes approximately three days from delivery of the TC 1200 on site to having it operational.



Summary – Why Pura Air?

Seeking services and gathering in public indoor spaces should not be a risky activity. As the WHO recommends, adequate ventilation, where increased ventilation and airflow can be achieved, reduces the risk of transmission of viruses like COVID-19 in closed settings. Pura Air Purification is focused on developing, manufacturing, and distributing both fixed and standalone medical-grade air purifiers to remediate and protect against infectious and non-infectious airborne particulate. Our technology is designed to integrate seamlessly into your space, increase the air-changes per hour without modifications to your existing HVAC and drastic installation costs, and remove and sterilize 99.99% of viruses such as COVID-19, hepatitis A, influenza, & rotavirus.