Delos™

EVIDENCED-BASED HEALTH AND WELLNESS INTERVENTIONS FOR REAL ESTATE

INTERNATIONAL WELL BUILDING INSTITUTE™

A SUBSIDIARY OF DELOS

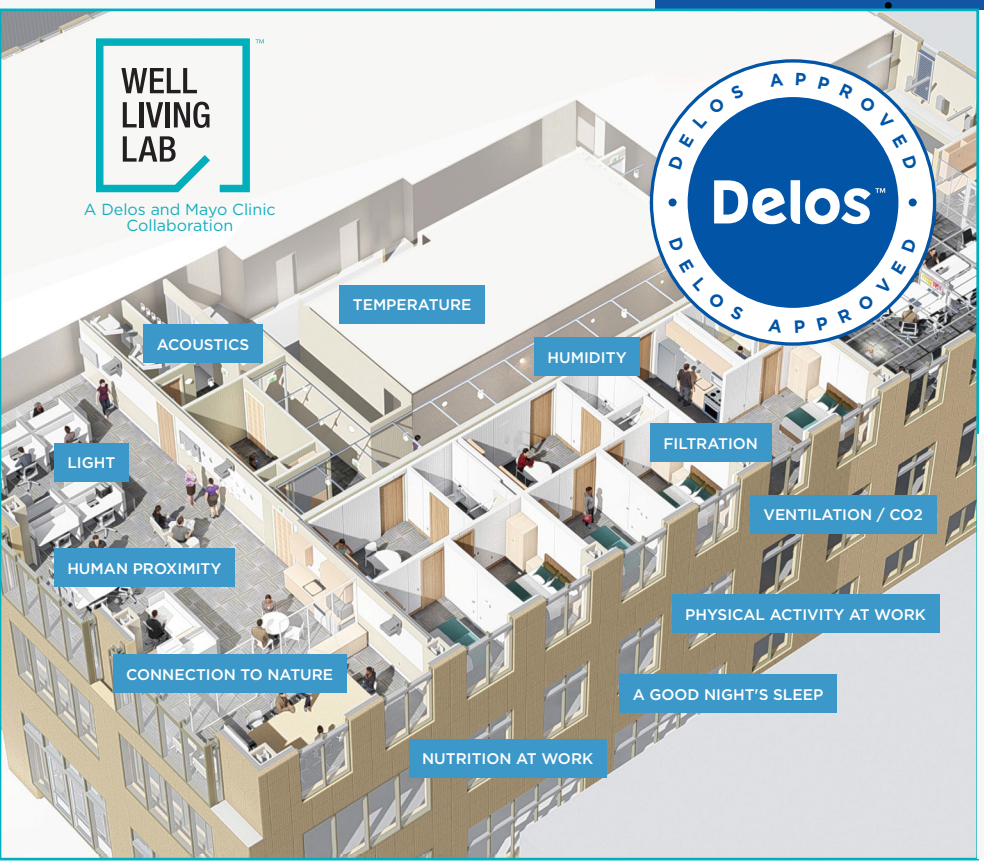
4,386
WELL PROJECTS

611M+
SQUARE FEET

62
COUNTRIES

317
CERTIFIED PROJECTS

As of August 6, 2020



Delos™ Innovate Well
BUILDING SCIENCE

MAYO CLINIC
HEALTH SCIENCE

RESEARCH PARTNERS

Cleveland Clinic Wellness

IHME
Measuring what matters

Delos™

For the past 8 years, Delos and its subsidiaries has helped clients around the world activate wellness in their portfolios. Our core competencies of scientific research, technology innovation and human experiences enable our clients to best optimize the impact of embracing a wellness centered market approach.

Delos Labs have developed a unique product review process to identify and vet, through third-party testing, best-in-class products and solutions available on the market - focusing heavily on material safety, functionality, labeling, marketing and health claims, as well as user experience.

THE CHALLENGE:
AIRBORNE VIRAL LOAD IN BUILDINGS

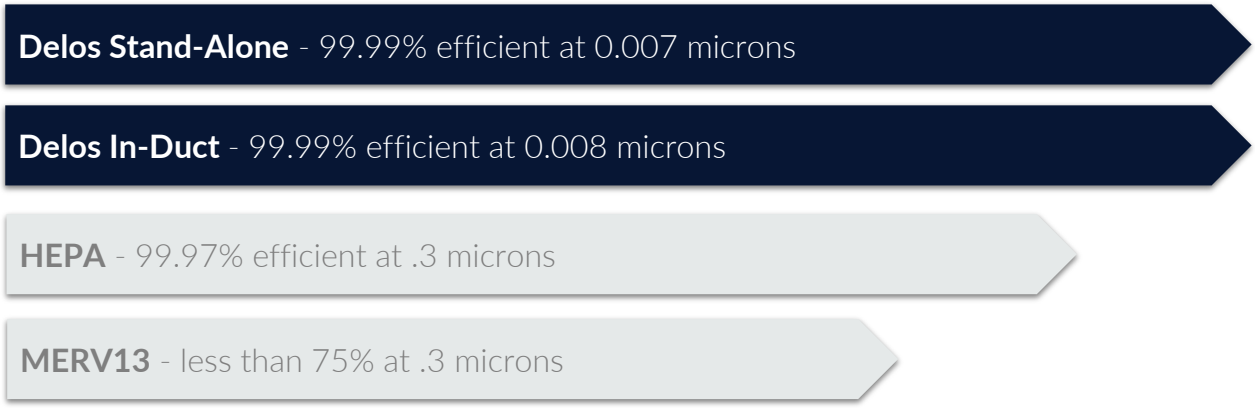
- Buildings may be **carriers of viral load**, which spreads through air and high touch surfaces.
- Viral pathogens can **travel up to 27 feet** if an infected person who is not wearing a mask sneezes.
- Some pathogens can travel even further distances, and **stay in the air for hours when air is recirculated** in a mechanically-ventilated space.
- The virus causing COVID-19 (SARS-CoV-2) and other enveloped viruses range in size from **0.06 to 0.14 microns** which is significantly smaller than particles that are captured by conventional filters.

THE SOLUTION:
DELOS ADVANCED AIR PURIFICATION

MADE IN USA

- Delos offers an advanced air purification solution that focuses on **capturing ultra fine particles**.
- The solution features patented technology capable of trapping and removing particles as small as **0.007 microns at 99.99% efficiency**, which is smaller than SARS-CoV-2 and other enveloped virus particle sizes
- The advanced air purification devices can be installed into an existing mechanical system **with minimal disruption**.

A CLOSER LOOK AT THE SOLUTION



***Each particle size shown here is an estimated mean. Each will have a range of sizes.*

DELOS ADVANCED AIR PURIFICATION

- To be able to safely return to our workplaces and public spaces, we need solutions that directly focus on minimizing the viral load in the air and on surfaces.
- During the 2003 SARS epidemic, the CDC recommended air-cleaning devices, such as portable HEPA filtration units as one of the means to reduce the concentration of contaminants in the air. Traditional HEPA filters are very effective, certified to capture 99.97% of particles that are 0.3 micron in diameter*. *The actual removal efficiency of particles smaller than 0.3 microns of individual HEPA filter is not included in standard HEPA testing. The individual SARS-CoV-2 particles **range in size from 0.06 microns to 0.14 microns**, so without additional testing it is hard to assess precise effectiveness of HEPA filters on removing SARS-CoV-2.
- Delos advanced air purification solution is as efficient as a traditional HEPA filtration system and has **even greater efficiency for ultrafine particles**:
  - Based on third-party testing - the stand-alone version Delos solution offers efficiency greater than **99.99% for aggregate removal of for particles sized 0.007 microns** and greater and the in-duct version provides **99.99% efficiency at 0.008 microns**. The in-duct system also has the benefit of a significantly lower pressure drop than a traditional HEPA filtration system. Note: Individual particle sizes and specific particle size ranges may have different filtration efficiency rates.
  - Each product is also tested off the production line by the manufacturer to ensure quality control and efficient particle capture down to 0.007 microns.
- The product line is **highly-configurable**. The device can come with or without a motor and fan to help ensure the purification system can be implemented into nearly any space required, whether stand-alone in a return cavity or in-line in conjunction with the air handling unit.

ADVANCED AIR PURIFICATION: SCIENCE AND TECHNOLOGY

THE DELOS SOLUTION FOCUSES ON ULTRAFINE PARTICLE CAPTURE AND REMOVAL.

Patented Filtration Technology

- The patented technology powering the Delos advanced air purification devices utilizes **electrostatic precipitation** combined with means of mechanical capture to enhance particle capture efficiency.
- Electrostatic precipitators utilize an electrically charged plate which forces particles to become negatively charged as they pass by the electrically charged plate. This negative charge provides two benefits:
    - First, it forces particles to agglomerate (group with one another), creating larger particles that the mechanical filter may more easily capture.
    - Second, the mechanical filter is charged oppositely of the agglomerated particles, forcing the particles to become attracted to, and subsequently captured by, the mechanical filter.
- While many electrostatic precipitators utilize an oppositely charged collection plate to capture particles, the Delos air purification device charges the filter itself, enabling purification efficiency for a significantly longer period of time than comparable devices.
- In addition to efficient system purification, the electrically charged filter creates a bacteriostatic environment, which means that microorganisms are unable to multiply, prolonging filter life.
- The filtration process may produce ozone as a byproduct; however, third-party laboratory test results show the ozone emission concentration to be less than 0.050 parts per million (ppm), which meets the rigorous requirements of California Air Resources Board (CARB).

APPENDIX

ULTRAFINE PARTICLE FILTRATION EFFICIENCY VIA THIRD-PARTY VALIDATION

Blue Heaven Technologies, a third-party laboratory, conducted a filtration efficiency assessment of the in-line purification system included in the Delos solution , in accordance with the standardized test EN-1822-5:2009. Based on the testing, the in-line air purification unit has a filtration efficiency of 99.97% at 0.3 microns, which is equal to a traditional HEPA filtration system, while meeting or exceeding 99.87% filtration efficiency for particle sizes below 0.3 microns, as shown in the chart below. In addition, these efficiencies are achieved with a lower pressure drop than a traditional HEPA filtration system.

PARTICLE SIZE RANGE (MICRONS)	PARTICLE REMOVAL EFFICIENCY
.008	99.99%
.062	99.95%
.118	99.87%
.163	99.94%
.202	99.95%
.3	99.97%

Similarly, the filter technology used in both the stand-alone and in-line systems included in the Delos solution was tested by Blue Heaven Technologies in accordance with ANSI/ASHRAE 52.2 to obtain a MERV rating for the system, with the following reported efficiencies :

PARTICLE SIZE RANGE (MICRONS)	PARTICLE REMOVAL EFFICIENCY
0.3 - 1	99.99%
1 - 3	99.99%
3 - 10	99.99%

According to the ANSI/ASHRAE 52.2 standard, the purification system achieved a rating of MERV16 at 2000 CFM. In accordance with application guidelines, a system with efficiencies identified above are typically referred for use in General Surgery, Hospital/Health Care and Superior/ Commercial Office Buildings.

In a third-party analysis performed by the University of Buffalo Industry/University Center for Biosurfaces [IUCB], the system's air purification technology showed purification efficiency of greater than 99.99% for aggregate removal of particles sized 0.007 microns and greater*, which is more efficient than traditional HEPA filter purification devices. For context, SARS-CoV-2 particles range in size from 0.06 - 0.14 micron in size.

Using a Condensation Particle Counter from TSI, the IUCB performed analysis of the purification technology on location at the manufacturer's headquarters. The filtration efficiency of the purification technology was tested by dispersing a mixture of stannic chloride and obtaining a baseline particle count within the mixture using the TSI Condensation Particle Counter. Subsequently, the purification device was turned on, upon which the TSI particle counter was placed on the air output of the device. The following information was obtained from the test:

TEST	EFFICIENCY
Test #1	99.9982%
Test #2	99.9954%
Test #3	99.99%

With these results, the IUCB University of Buffalo concluded; "The purification system was found to have a single pass removal efficiency of 99.9945% [on average] of particulate matter .007 micrometers and larger over the course of the three tests."

*Individual particle sizes and specific particle size ranges may have different filtration efficiency rates.

FLEXIBILITY OF INSTALLATION CONFIGURATIONS

SYSTEM EFFICIENCY

- Delos advanced air purification devices can be installed in numerous configurations. When used in conjunction with an Air Handling Unit (AHU) , the enhanced system delivers minimal pressure drop while retaining high particle capture efficiency by **utilizing a less dense media filter**.
- As particles agglomerate and become attracted to the mechanical filter, a less dense media is required to achieve as good or better filtration results than typical HEPA filters, with significantly less pressure drop. This significantly **improves energy efficiency by comparison to typical HEPA filters**.

INSTALLATION

In situations where ductwork is inaccessible, systems may be installed in a stand-alone capacity in ceilings, on the floor or nearly in any location with available space.

SPECIFICATION AND INSTALLATION PROCESS

- In typical circumstances, Delos will review the mechanical systems, AHU specifications and ductwork of the building to finalize a product specification package in accordance with building requirements.
- Delos will provide a proposal outlining the final product specification package. If requested, Delos can also include a quote for installation services of our preferred installation service provider.
- Delos will arrange for shipping and delivery of the products to the location specified by the client.
- In most installations, in-line systems may be installed in conjunction with the air handling unit (AHU). To do so, the in-line system units may be installed on the AHU itself, in the current filter rack, or in a new filter rack built to accommodate the weight of the installed devices ensuring direct application to the air handling unit.

REFERENCES

- ASHRAE. ASHRAE Position Document on Airborne Infectious Diseases.; 2020:22. https://www.ashrae.org/file%20library/about/position%20documents/airborne-infectious-diseases.pdf
- World Health Organization. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. Published March 29, 2020. Accessed May 12, 2020. https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations
- Bourouiba L. Turbulent Gas Clouds and Respiratory Pathogen Emissions: Potential Implications for Reducing Transmission of COVID-19. JAMA. 2020;323(18):1837-1838. doi:10.1001/jama.2020.4756
- Zhu, Na, Dingyu Zhang, Wenling Wang, Xingwang Li, Bo Yang, Jingdong Song, Xiang Zhao et al. "A novel coronavirus from patients with pneumonia in China, 2019." New England Journal of Medicine (2020). https://www.nejm.org/doi/full/10.1056/NEJMoa2001017
- Public Health Guidance for Community-Level Preparedness and Response to Severe Acute Respiratory Syndrome (SARS). Version 2/3. This website is archived for historical purposes and is no longer being maintained or updated. Accessed May 12, 2020. https://www.cdc.gov/sars/guidance/i-infection/healthcare.html. Text citations refer to the following sections: Supplement I: Infection Control in Healthcare, Home, and Community Setting - III. Infection Control in Healthcare Facilities.
- G. S. Earnest, M. G. Gressel, R. L. Mickelsen, E. S. Moyer, L. D. Reed, C. J. Karwacki, R. W. Morrison, D. E. Tevault, W. Delp, and A. K. Persily, "Guidance for Filtration and Air-Cleaning Systems to Protect Building Environments from Airborne Chemical, Biological, or Radiological Attacks," Cincinnati, Ohio: National Institute for Occupational Safety and Health (NIOSH), 2003.
- Perry JL, Agui JH, Vijayakimar R. Submicron and nanoparticulate matter removal by HEPA-rated media filters and packed beds of granular materials. NASA/TM–2016–218224. Accessed 2020 May 13 https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20170005166.pdf
- EN 1822-1:2009 High Efficiency Air Filters (EPA, HEPA and ULPA). Determining the efficiency of filter elements. London: British Standards Institution; 2009.
- ANSI/ASHRAE. ANSI/ASHRAE Standard 52.2-2017 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size. 2017.

INTELLIPURE COMPACT

PROFESSIONAL DFS AIR PURIFICATION SYSTEM

Delos™
POWERED BY
HealthWay®

INTELLIPURE COMPACT

PROFESSIONAL DFS AIR PURIFICATION SYSTEM

Delos™ POWERED BY HealthWay

Patented “DFS” Technology delivers advanced air purification throughout the entire home with a system specifically designed to capture and reduce ultrafine particles in the air. This revolutionary technology efficiently reduces airborne microorganisms and particulate matter while prolonging filter life by inhibiting the growth of captured microorganisms.

SPECIFICATIONS

- 150 CFM
- Dimensions (inches) 13w x 8.75d x 20h
- Weight 17lbs (8kg)

120V 60Hz or 230V 50Hz

Blower Speed	Air Flow	Particle Efficiency*
Low	22 cfm	99.99%
Med	49 cfm	99.99%
High	79 cfm	99.99%
Turbo	150 cfm	99.99%

*Individual particle sizes and specific particle size ranges may have different filtration efficiency rates.

FEATURES

- Particle efficiency - 99.99% @ 0.007 micron*
- 4-stage filtration efficiently removes particulate matter and harmful gases and odors
- Each machine is tested following manufacture to ensure the highest standard of air purification
- Substantial reduction in airborne microorganisms, chemicals, harmful gases, odors and smoke
- Efficiently remove airborne dust and dander, pollen, mold and fungi
- Slim compact design
- Wall mountable or stand-alone installation options
- Easy maintenance and filter replacement
- “DFS” Technology prolongs filter life by inhibiting the growth of microorganisms on the filter

Delos Living LLC is a reseller, not the manufacturer of the products. Products are manufactured by Healthway Home Products, Inc.