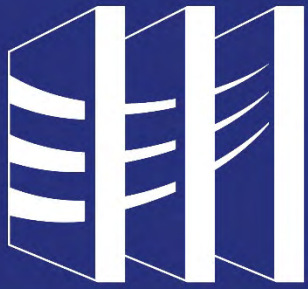




**WEBINAR SERIES**

**COVID-19 Air  
Cleaning Trends:  
The Integration  
of Air Purifiers,  
UV-C & Bipolar  
Ionization**

**February 4, 2021 | 4:00 pm ET**



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*“Relationships forged in NAFA justify every dollar spent on dues”*  
- NAFA Past President, Trey Fly, CAFS, NCT II



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**Keith Jordan, MBA**  
VP Sales USA – Sanuvox

[kjordan@sanuvox.com](mailto:kjordan@sanuvox.com)

817-938-6843



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# *INDUSTRY GUIDELINES:*

ASHRAE, CDC, WHO, IES, IUVA, NAFA, HARVARD

THE IMPLEMENTATION OF UVGI IS IN THE TOP 5 RECOMMENDATIONS FOR  
MICRO-ORGANISM AND AEROSOL DISINFECTION

WIDELY USED FOR OVER 100 YEARS  
TOP PEER REVIEWED TECHNOLOGY  
PROVEN EFFICACY AND SAFETY

## TOP 5 UV-C (UVGI) GUV APPLICATIONS

- AIR STREAM DISINFECTION
- COIL CLEANING
- SURFACE DISINFECTION
- UPPER AIR UV
- PORTABLE OR STAND-ALONE AIR CLEANERS

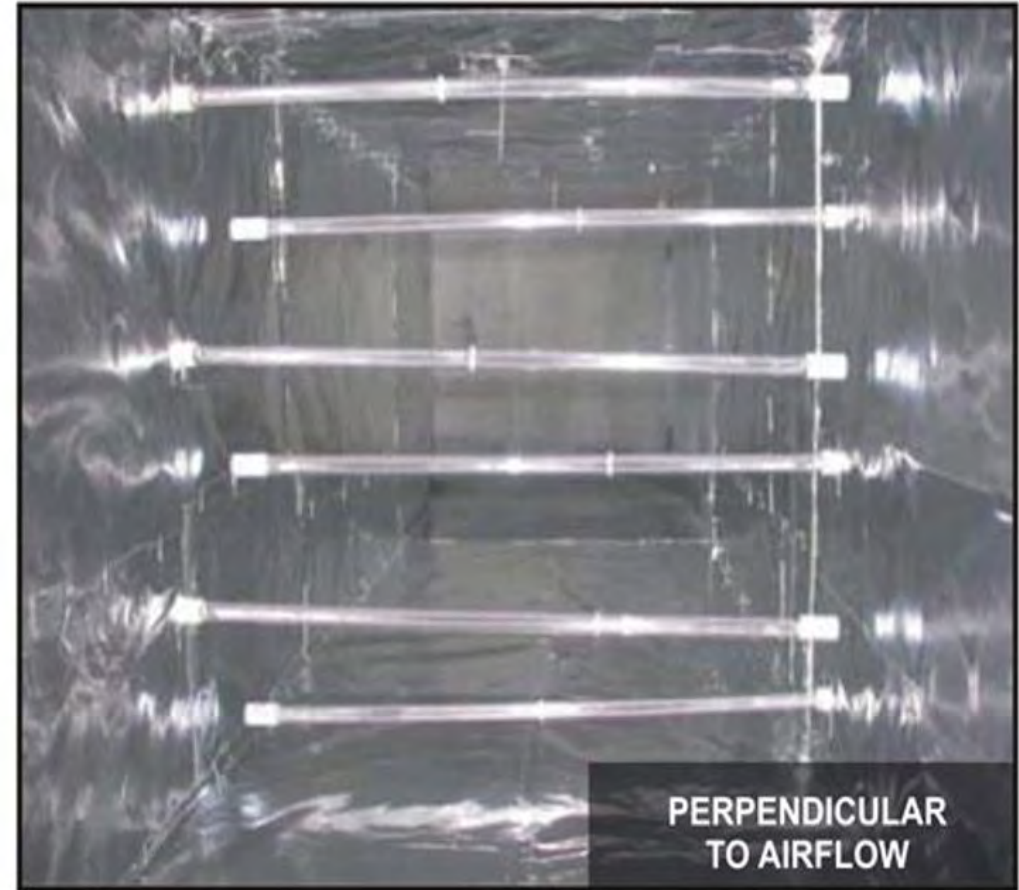


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# USING UV FOR AIR DISINFECTION

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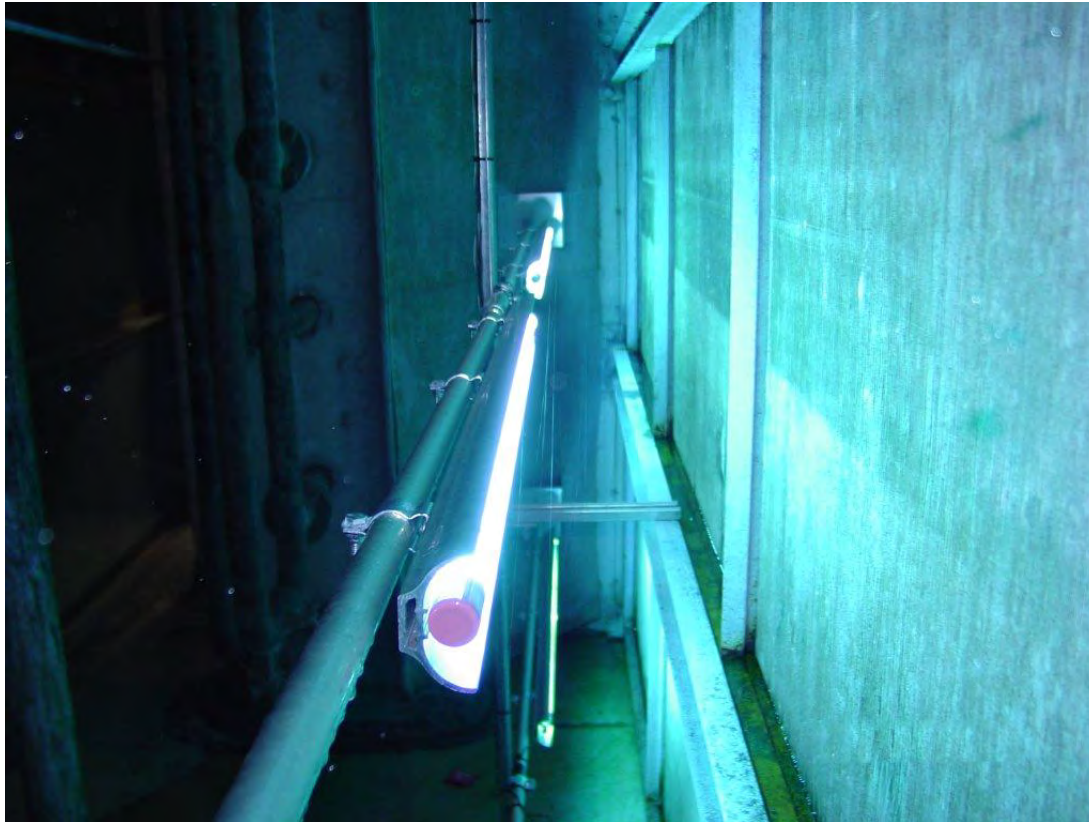


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# USING UV FOR EVAPORATOR COIL DISINFECTION

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# UV FOR HOSPITAL SURFACE DISINFECTION



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# UPPER AIR UV

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# STAND ALONE OR PORTABLE AIR CLEANERS

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## **Jose Senatore**

Director, Technology & Services

AAF| Flanders

[jsenatore@aafintl.com](mailto:jsenatore@aafintl.com)

+55.11. 976.641.203



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**Mechanical filtration** – Well known and recognized technology. Air filtration is always <ON>

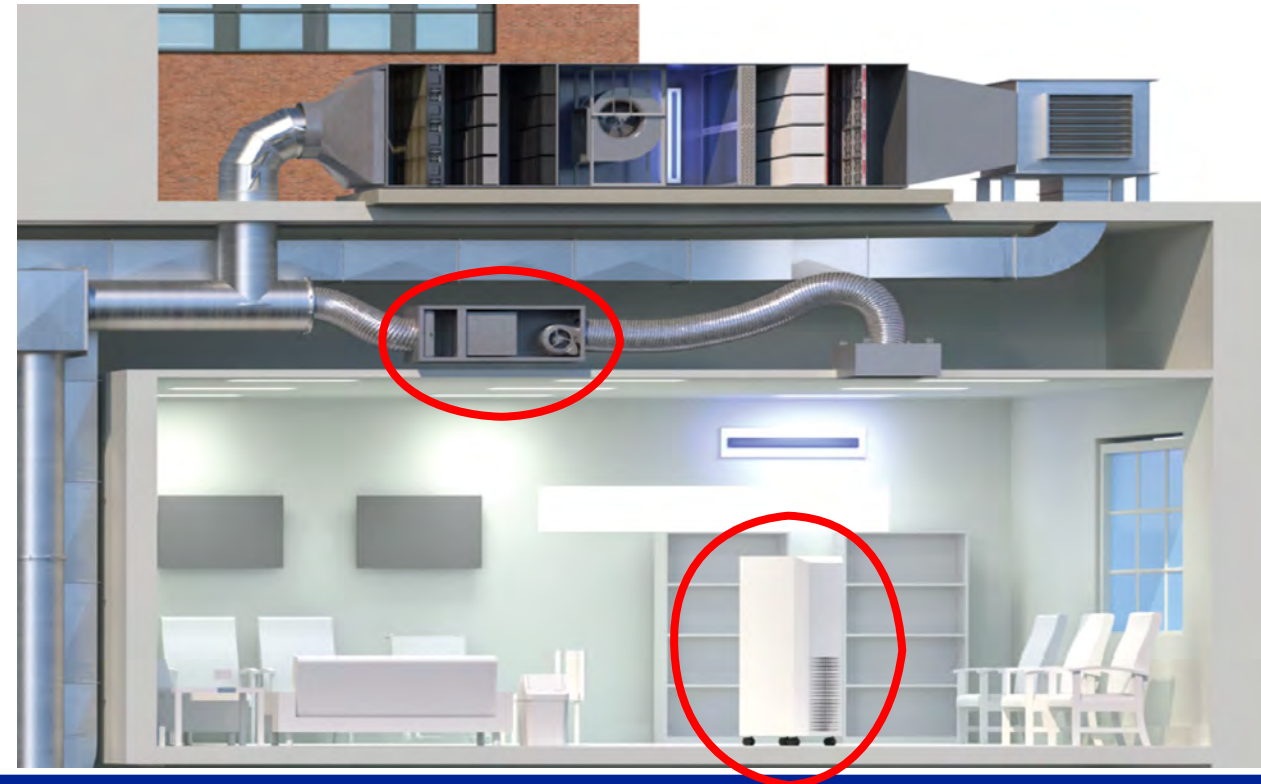
(As air is forced across the media, it is mechanically impossible for air filtration to *not* take place)

These filters are utilized in essentially all industries from a commercial office space to a hi-tech Life Science facility.

**Air Purifiers** – increase the filtration efficiency / air cleaning potential within a space:

**Fixed – Ceiling/concealed** - recirculating the indoor air or acting as a booster to the traditional Air Handling unit system.

**Portable** – Installed inside the room, preferably close to the contamination source.



# COVID-19 Air Cleaning Trends: The Integration of Air Purifiers, UV-C and Bipolar Ionization

## Air filtration system:

Pre-filter (coarse particles) + HEPA filter (tested according to IEST, EN1822 or ISO29463 standards). Efficiency superior a 99,95% MPPS – H-13, ISO-35H or 99,97%@0.3 micron.

Optional gas-phase filtration to filter VOC and other gases.

Can be used in conjunction with other new technologies, like UV.

**More study: UV radiation close to the filter's media and actual efficacy at high velocity.**



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## Challenges

How to define the correct airflow rate for the system operation? How many units should I use?

Important concern: Noise level (especially for portable units).

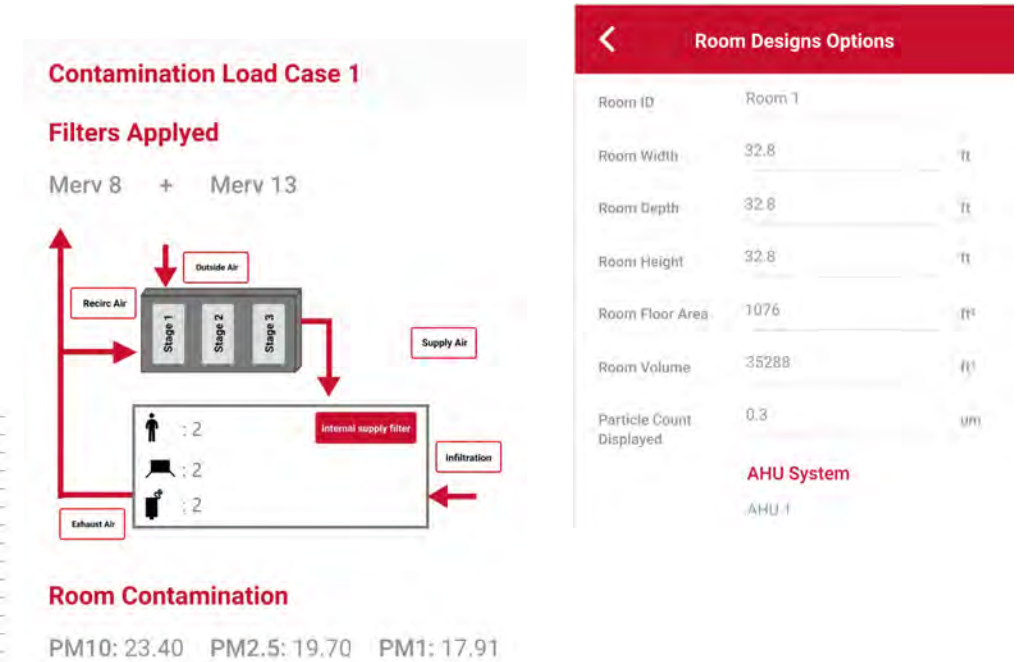
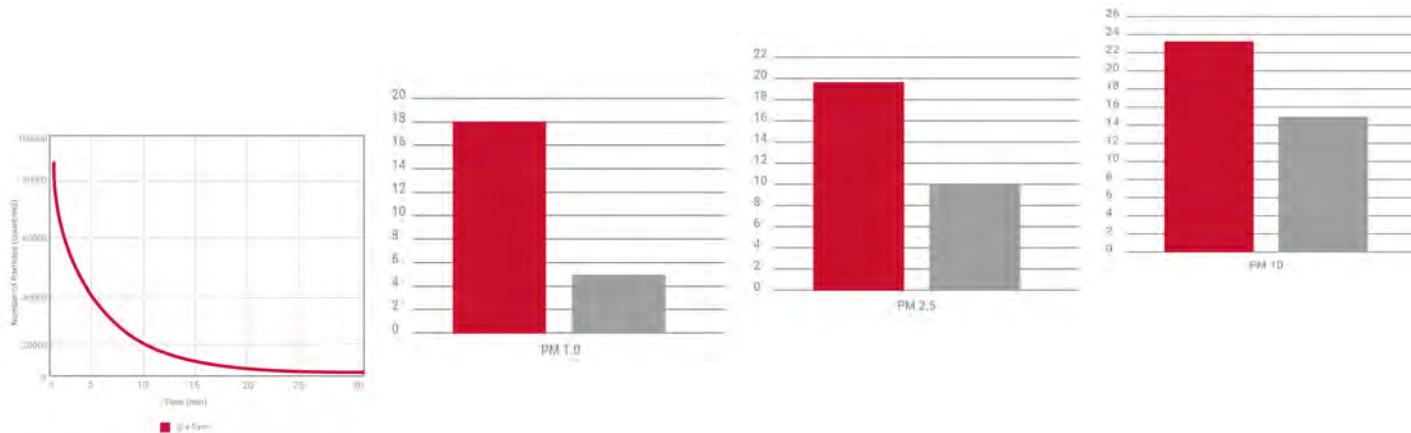
Recommendation: Increase the speed (high noise) as a decontamination cycle when no occupancy. Then reduce the speed (and noise) when the room is occupied.

Test results can provide a fair comparison between products.  
ISO is working on a test standard. AHAM has a standard AC-1.

# COVID-19 Air Cleaning Trends: The Integration of Air Purifiers, UV-C and Bipolar Ionization

Every room is different, so the ventilation effectiveness has an important role. **Technical consultancy is recommendable.**

- ✓ Selection software can help. CFD simulation as well.
- ✓ Sensor technology plays an essential role in defining the better place to install the equipment, monitor the air quality and manage the airflow rate to improve the IEQ.



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# Building Occupancy – How to achieve a safer reentry and prepare for the “New Normal”

**Brad Sharp, CHC**

Director

Velocity Building Technical Services

[brads@velocitybts.com](mailto:brads@velocitybts.com)

425-350-0905



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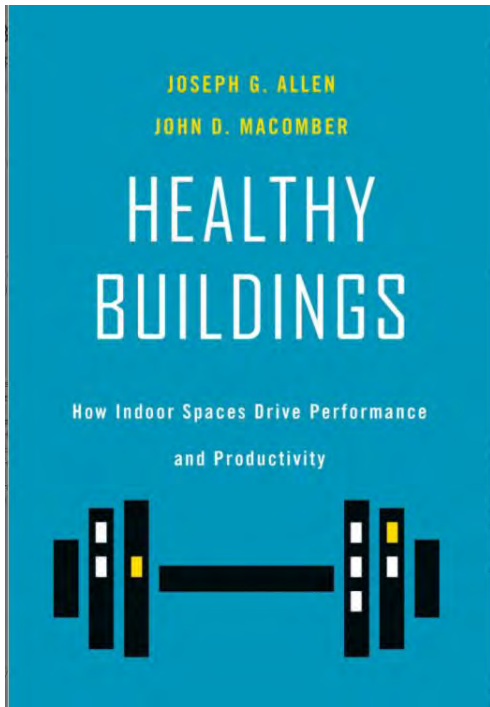
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## Quick Facts!

- By the time, the average American is 80 years old they will have spent 72 of them indoors
- Indoor Air Pollution is on average 3x higher than outdoors and responsible for 5% of all cancer diagnosis
- 7.5 Trillion in building optimizations in the last 30 years and less than 400 Million spent on IAQ studies and code refinement
- 40% of all energy consumption in the US is commercial building based and 1/5 dollars in the US economy is spent powering and supporting this
- In the next 2-6 years buildings will need a “Health Dashboard” or risk liability

## More Quick Facts!

- Green Buildings are out, and **Optimized Healthy Buildings** are in!



- This is the book the incoming federal administration is using as their bible for going forward
- Harvard School of Public Health is setting policy
- PM2.5 Matters, and you better know why!
- People are the new focus – Not energy savings unless it makes the building healthier
- ESG in the new normal – (Environmental, Social and Governance) for the investing world. Per Harvard Business School 81.7 Trillion dollars in assets have signaled commitment to incorporating ESG into their investment decisions- Know your social purpose for your facility!



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## LEED Certification

- Make them federal regulation
- 46 Billion in incentives over 12 years

## Natural options first

- More OSA
- Smart Glazing's

## Energy Retrofits for Health

- Nationwide funding mechanisms
- Co-risk strategies for weatherization and HVAC upgrades with a focus on Controls and Analytics

- Biden Admins Plan
- Carbon emission reduction projects get priority after Health projects
- Solar and Geo-thermal are back!

- Biden will make a \$2 trillion accelerated investment, with a plan to deploy those resources over his first term, setting us on an irreversible course to meet the ambitious climate progress that science demands.
- Biden will ensure these jobs are filled by diverse, local, well-trained workers – including women and people of color
- Biden's plan to upgrade 4 million commercial buildings will return almost a quarter of the savings from those retrofits to cash-strapped state and local governments.

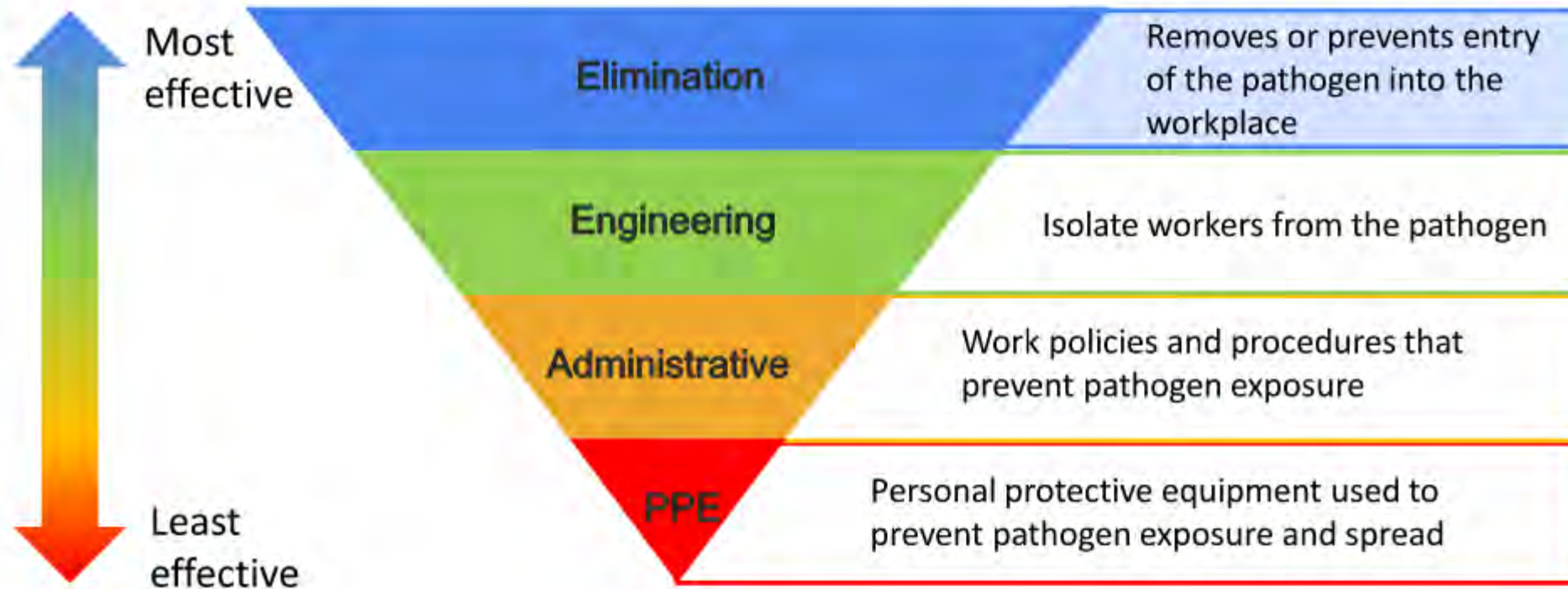


- Changing work will drive the needs of the building
- Know the “Build Back Better” buzz word to gain trust in tenants
- Learn the team “Integrated Technologies for Healthy Buildings
- 2050 Net Zero Carbon is a tenant goal so make it yours too and keep them from leaving (Low carbon Construction and TI’s)

| Changes                      | Old         | New          |
|------------------------------|-------------|--------------|
| Office Area P/P              | 100ft/sq    | 250ft/sq     |
| Closed office P/P - 40 Staff | 8-16        | 16-24        |
| Hours HVAC on                | 84 Per week | 190 Per Week |

# Covid-19 – Lets talk about that! – New CDC approach

## COVID-19: Hierarchy of Controls



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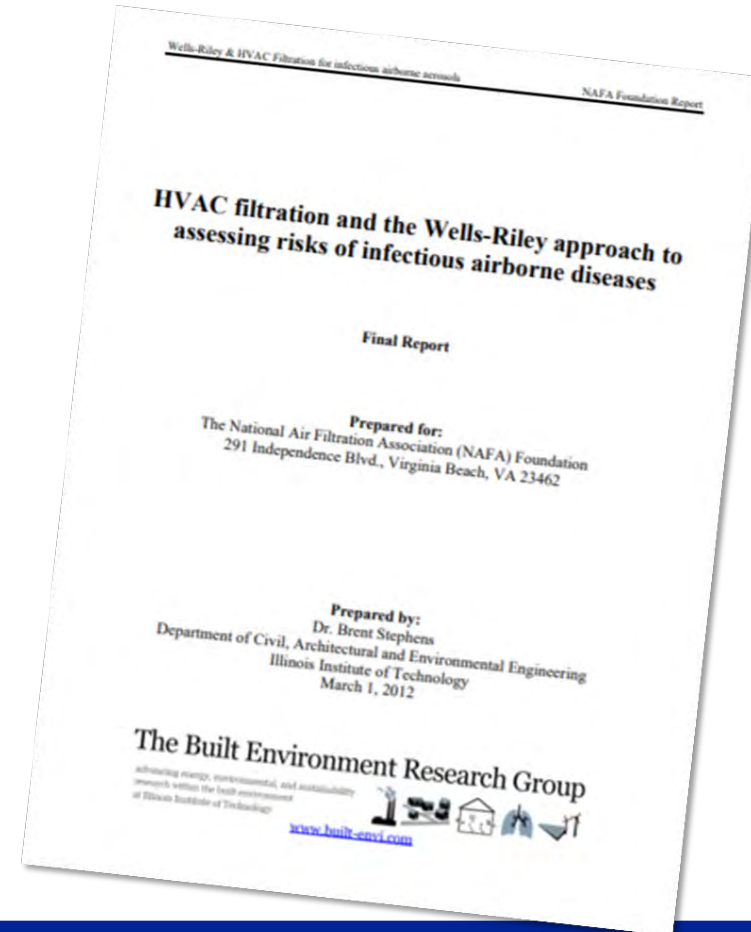
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# Now more laminar flow!

## Flushing is still best!

- According to NAFA's Wells Riley Report, increasing outdoor air ventilation to 4 ACH (air changes per hour) has shown to reduce pathogen exposure from 40% to 8%\*.
- Follow ASHRAE 52.2 Guidelines

**In combination with MERV 13 Filters or other\***



# Increased Outside Air

Manual Introduction

CO<sub>2</sub> Sensors

HVAC System Programming

Updates/DDC

Temps – 64-78 degrees F

Rh – 40% (Install sensors!!!)

## Considerations:

Temperature

Humidity

Pressurization (+.01-.05 in. w.g.)

Adequate Economizer



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**Flushing is still best!**

## Filtering is working!

- PER STUDIES IN SINGAPORE, COVID-19 WAS FOUND ON PARTICLES 1-4 MICRONS IN SIZE. NO DETECTION FOUND ON PARTICLES SMALLER THAN 1 MICRON

**MERV 13 filters are in short supply still – FYI!**

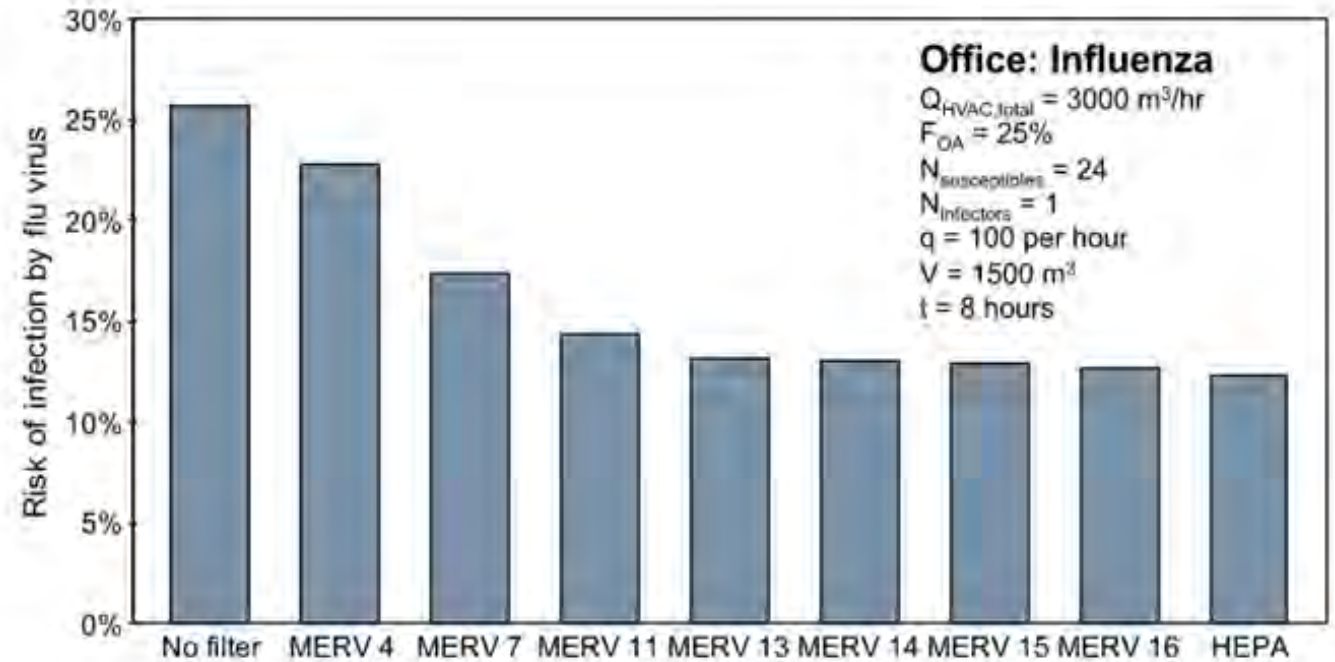


Figure 6. Projected risk of infection by influenza virus during an 8-hour workday in a hypothetical office building with 25 occupants and 25% outdoor air supply using a range of HVAC filters installed in a system with a recirculation rate of 1.5 per hour



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# Cleaning is working!

**How to kill it everywhere?**



The 18V ONE+ Cordless Handheld Electrostatic Sprayer Kit allows users to spray disinfectants, cleaning solutions, and deodorizers with cordless convenience. The sprayers utilize electrostatic charging technology to positively charge particles to allow solutions to cover surfaces quicker and more evenly, even wrapping around high touch surfaces. The sprayer reaches up to 5 feet and has an on/off switch to activate the electrostatic technology.

**Germicidal UV-C (FAR)**

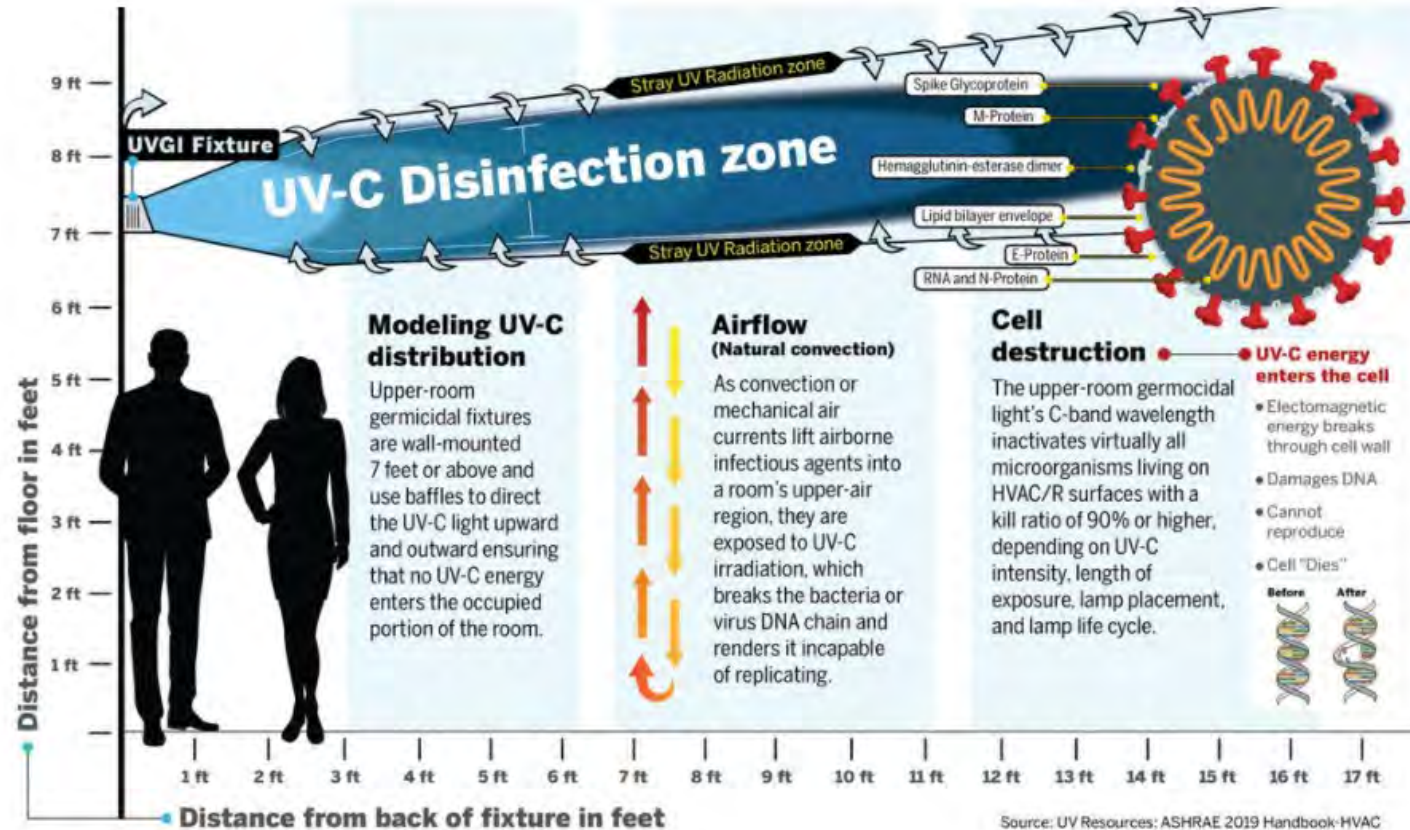
**Human Cantic (254NM)**



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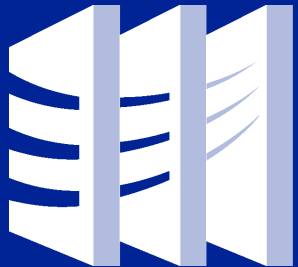
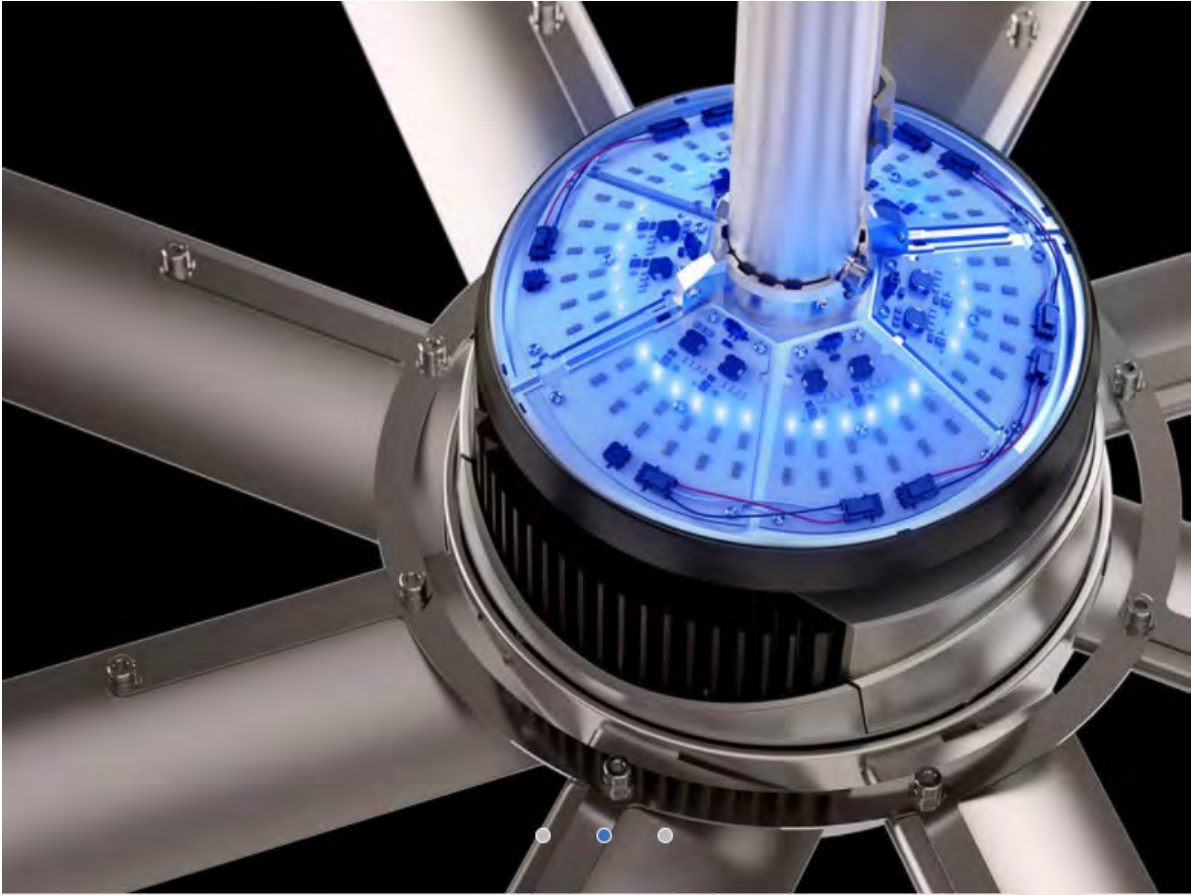
# Covid-19 – FAR-UVC (@ 222nm ) is the new darling! – Cannot penetrate anything beyond what you can see so you must still clean!



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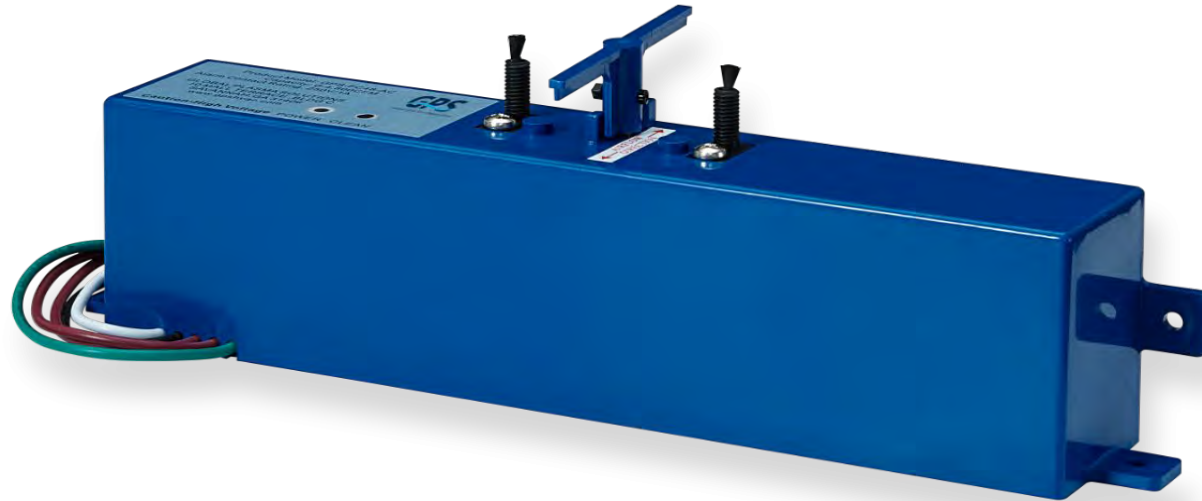
**Covid-19 – FAR-UVC (@ 222nm ) is the new darling! – Can circulate dust so you still need aggressive filtering and cleaning of surfaces**



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## Covid-19 – Ionization Systems – Lets talk about them



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# Covid-19 – Ionization Systems – Real or Snake oil?? (Actually, they are both if not properly implemented)

**Beware**  
**The COVID-19 Snake Oil Salesmen Are Here**  
Francis J. Offermann PE CIH  
Indoor Environmental Engineering  
[www.ice-sf.com](http://www.ice-sf.com)  
November 5, 2020

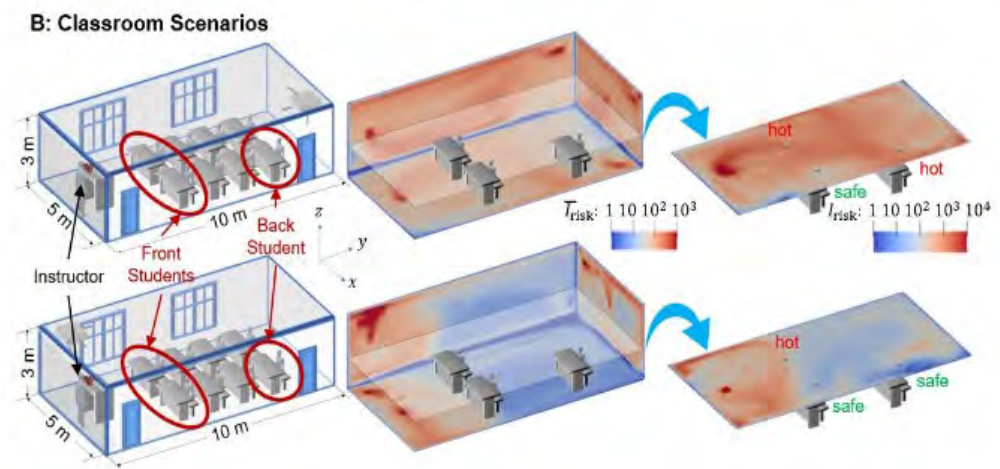
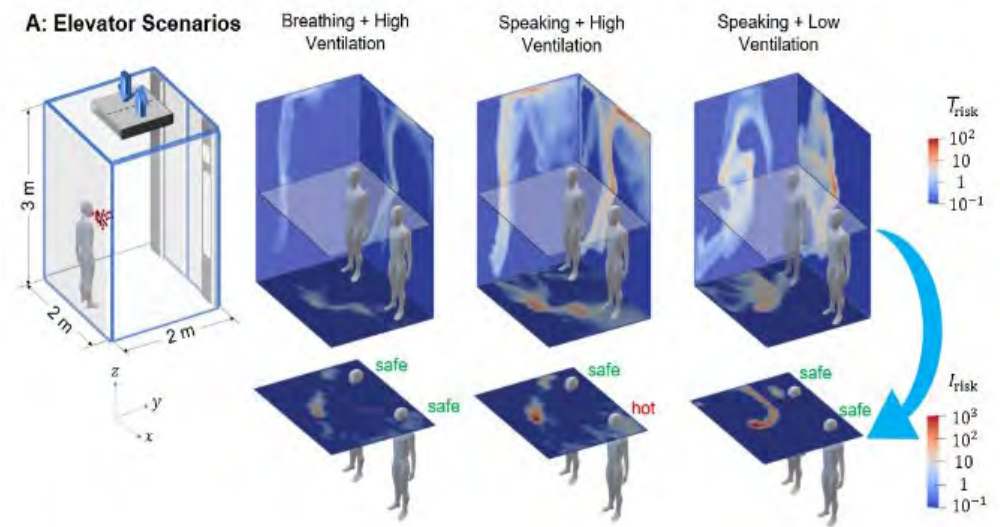
The snake oil salesmen are here and they are out to sell you air cleaners that promise to eliminate the SARS-CoV-2 airborne virus that causes COVID-19. Beware, at best these air cleaners provide little to no removal of airborne virus and may actually produce dangerous chemicals, such as ozone and formaldehyde.



The Snake Oil Salesman (Morgan Weistling)

Many of these air cleaners claim to use electrostatic effects (e.g., bipolar ionization, negative ion generation, cold plasma, etc.) to reduce indoor air contaminants, including virus and bacteria, by more than 98%. These air cleaners are not new, and have been re-incarnated many times since the early 1900s. I have reviewed test data from many of these devices and I have never found that these devices significantly remove air contaminants from the indoor air.

Nor should we expect these ionization devices to have a significant effect on airborne concentrations. While ionization of air can increase the deposition rates of particulates onto indoor surfaces, this effect is small compared to the overall removal by ventilation and filtration, and hence ionization does not significantly reduce indoor concentrations.



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# Covid-19 – How not to get cheated by Ion technology!

- Buy units that don't produce any or limited O3
- Install the units as close to the space of concern as possible
- Ensure you have good air distribution and good filtration on the HVAC units – (free ions kill virus not ones that are hitting excessive PM5 or greater)
- Measure the Ion concentration after install and ensure its grater than 7500 ions per cubic centimeter combined -/+ and if not then add more devices
- Install Ion monitoring into DDC to keep your piece of mind



# Washington State is leading the charge with new clean building laws – like it or not!

- A Clean Building, referring to the state statute RCW 19.27A.200 (aka House Bill 1257), meets the state's newly established energy performance standard for commercial buildings 50,000 square feet and larger. Install the units as close to the space of concern as possible
- Commercial building owners will be notified of their performance requirements no later than July 1, 2021. Compliance dates will be:
- June 1, 2026 for buildings greater than 220,000 SF +
- June 1, 2027 for buildings greater than 90,000 to 220,00 SF +
- June 1, 2028 for buildings greater than 50,000 to 90,000 SF +

|   |   |  |
|---|---|--|
|    | <b>RULE-MAKING ORDER</b><br><b>PERMANENT RULE ONLY</b>              | <b>CODE REVISER USE ONLY</b><br><br>OFFICE OF THE CODE REVISER<br>STATE OF WASHINGTON<br>FILED<br><br>DATE: October 30, 2020<br>TIME: 9:04 AM<br><br>WSR 20-22-059 |
|   | <b>CR-103P (December 2017)</b><br><b>(Implements RCW 34.05.360)</b> |  |
| Agency: Washington State Department of Commerce   |   |  |
| Effective date of rule:<br>Permanent Rules<br><input checked="" type="checkbox"/> 31 days after filing.<br><input type="checkbox"/> Other (specify) _____ (If less than 31 days after filing, a specific finding under RCW 34.05.380(3) is required and should be stated below)   |   |  |
| Any other findings required by other provisions of law as precondition to adoption or effectiveness of rule?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, explain:  |   |  |
| <b>Purpose:</b> RCW 19.27A.210 directs Commerce to adopt rules to establish a state energy performance standard for commercial buildings over 50,000 square feet. The standard offers the opportunity to reduce greenhouse gas emissions, lower energy consumption, and avoid energy costs, and provides a technology-neutral, building-specific approach to greenhouse gas emissions reductions with a long-term planning horizon. |   |  |
| <b>Citation of rules affected by this order:</b><br>New: WAC 194-50<br>Repealed:<br>Amended:<br>Suspended:  |   |  |
| <b>Statutory authority for adoption:</b> RCW 19.27A.210   |   |  |
| <b>Other authority:</b>   |   |  |
| <b>PERMANENT RULE (Including Expedited Rule Making)</b><br>Adopted under notice filed as <u>WSR 20-17-129</u> on <u>August 18, 2020</u> (date).<br>Describe any changes other than editing from proposed to adopted version: None   |   |  |
| If a preliminary cost-benefit analysis was prepared under RCW 34.05.328, a final cost-benefit analysis is available by _____  |   |  |

## **Jose Senatore**

Director, Technology & Services

AAF| Flanders

[jsenatore@aafintl.com](mailto:jsenatore@aafintl.com)

+55.11. 976.641.203

## **Keith Jordan, MBA**

VP Sales USA – Sanuvox

[kjordan@sanuvox.com](mailto:kjordan@sanuvox.com)

817-938-6843

## **Brad Sharp, CHC**

Director

Velocity Building Technical  
Services

[brads@velocitybts.com](mailto:brads@velocitybts.com)

425-350-0905

## **Jeff Gradek, CAFS, NCT II**

President

Filter Services, Inc

[jeffg@filterservices.com](mailto:jeffg@filterservices.com)

847-878-1315



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QUESTIONS?

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# “The first wealth is health”

-Ralph Waldo Emerson

Recommended resources –

Healthy Buildings by Allen and Macomber 2020, Standard 62.1 User Manual by ASHRAE 2016, Health Facility Cx Guideline & Handbook – ASHE, Guideline for design and construction of Outpatient Facilities 2018 edition