



## **WHEA LUNCH & LEARN**

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HVAC Filtration,  
UV Germicidal, Irradiation  
& Cottonwood Screen

# Presenters



**Nick Orlando**

*Sales Manager, Filtration Concepts*

Nick has been in the HVAC Filtration industry for over 16 years and achieved the certification of Certified Air Filter Specialist (C.A.F.S). In those 16 years, he has worked with many individuals in the healthcare industry with regards to Hospitals, Clinics, nursing homes etc. to develop detailed P.M. filter/UVGI programs to help achieve improved IAQ.



**Jay Carter**

*VP Sales Midwest, Sanuvox Technologies*

Lifelong carrier in the HVAC industry started as a young man out of school with a local HVAC service company to regional HVAC wholesale distribution to currently IAQ applications nationally with Sanuvox Technologies. Specializing in small to large commercial and industrial ultraviolet purification projects. Including: chemical free produce & plant solutions, sick building solutions and odor removal applications. My passion is finding the perfect solution for a problem and fix it!



**Randy Simmons**

*President & Co-Owner, Air Solution Company*

Over 25 Years in the Specialty Filtration business, Air Solution Company is the industry leader and manufacturer of Cottonwood Filter Screens, Universal Hail Guards and Snow abatement solutions. The company's products are specifically engineered to stop airborne debris from penetrating the building envelope and to protect key operational components on all Mechanical cooling and air movement systems.

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# **WELCOME & AGENDA**

- **Performance Measurements**
- **HVAC Filtration Products & New Technologies**
- **IAQ Best Practices in the COVID Era**
- **Introduction to Ultraviolet Light**
- **Ultraviolet Purification & Application**
- **ASHRAE UV Standards Overview**
- **Cottonwood Screens Applications**

# PERFORMANCE MEASUREMENTS





# M.E.R.V. – Minimum Efficiency Reporting Value

- M.E.R.V. is a report of the filters ability to capture larger particles between .3 and 10 Micron.
- This value is helpful in comparing the performance of different filters.
- M.E.R.V. is a number between 1-16 representing the minimum measured efficiency as defined in ASHRAE 52.2. The higher the number, the higher the efficiency.
- Anything over M.E.R.V. 16 is considered HEPA.



# Pressure Drop/Resistance (DP)

- How much the pressure changes from the upstream to downstream side of a filter at a given flow rate
- Or how hard it is to push air through the filter
- Commonly expressed in i.w.g. (inches of water, gage pressure) or #”wg

**Lower DP = Less energy used**

# Dust Loading Capacity (DHC)

- ASHRAE 52.2: A measurement of how much of a specific lab dust can be thrown at or held by a filter before it reaches its “final” resistance
- Expressed in grams of dust or grams/unit area

**DHC is roughly analogous to filter life. The higher the number, the longer the life.**

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# **HVAC FILTRATION PRODUCTS & NEW TECHNOLOGIES**



# LINK & RING PANEL FILTERS

- 2-, 3- and 4-ply construction
- Custom-sized Panels, Links and Cubes
- Panels and Links are permanently heat-sealed around an internal wire galvanized frame
- Wire galvanized frame for sturdiness and moisture resistance
- Self-gasketing design prevents air by-pass
- Will not promote microbial growth
- Media is unaffected by moisture, humidity, and most corrosive chemicals



# PLEATED FILTERS

- MERV 8, 10, 11, 13
- Available in 1", 2" and 4"
- Standard and High-Capacity Offerings
- Maximizes energy cost



# POCKET FILTERS

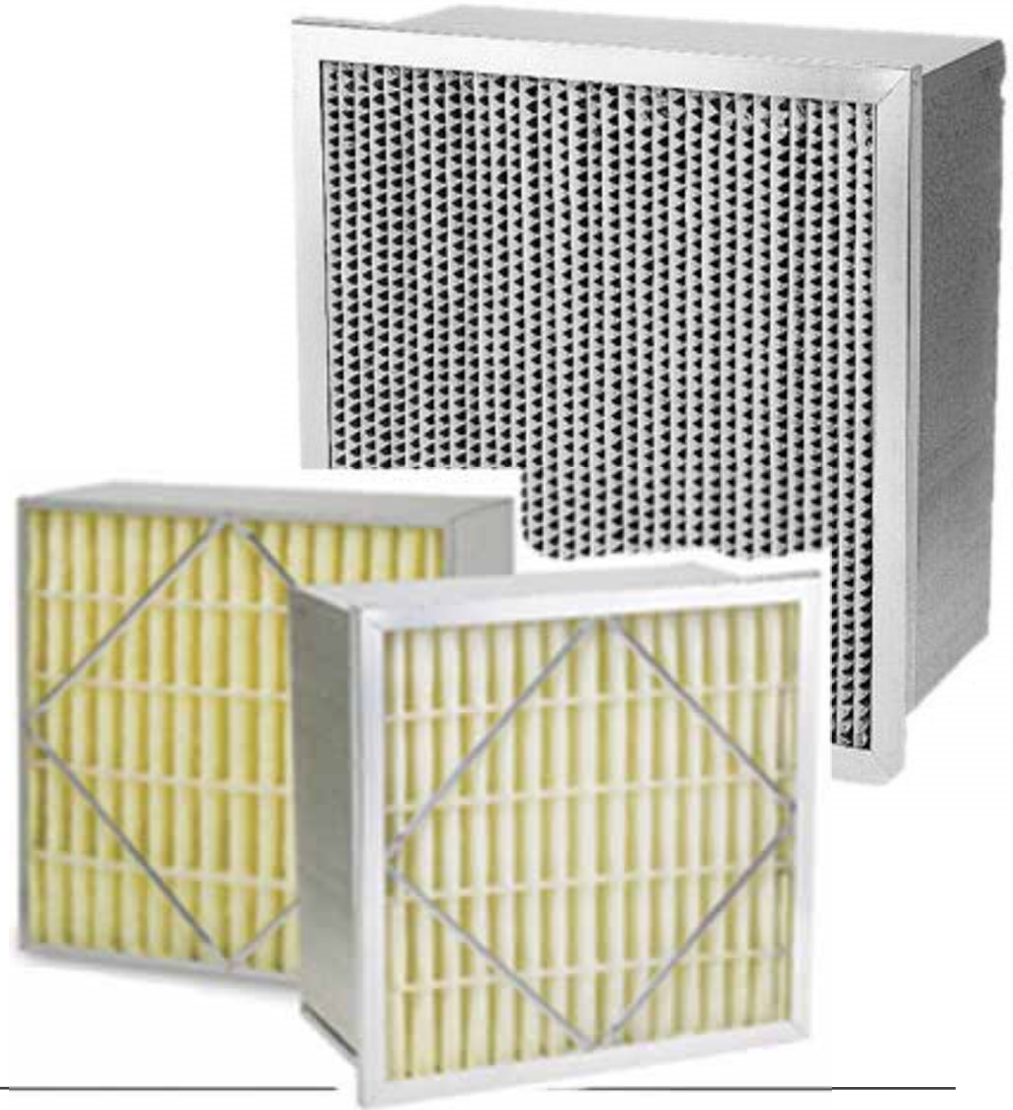
- MERV 8, 11, 12, 13, 14, 15
- Low initial pressure drop
- Superior dust holding capacity
- Can be used as a primary or secondary filter
- Available in fiberglass and synthetic medias





# RIGID CELL & ASHRAE CARTRIDGE

- MERV 10, 11, 13, 14, 15
- Galvanized steel frames provide exceptional strength
- Designed for use in variable air volume systems
- Moisture resistant for high-humidity applications
- Rigid Cell available in fiberglass and synthetic medias



## 2" & 4" MINI PLEATED FILTERS

- MERV 11, 13, 14, 15
- Low initial resistance saves energy costs
- Lightweight and compact design
- Filter media resists tears & damage
- Environmentally friendly – contains no metal components





# 2V & 4V CARTRIDGE FILTERS

- MERV 11, 13, 14, 15, 16 & 98% DOP
- Low pressure drop to promote significant energy savings
- Plastic frame creates strong, lightweight filter
- Performs exceptionally in turbulent air flow or repeated fan shutdowns
- Excels in environments with 100% humidity



# HEPA FILTRATION

## What is a HEPA filter?

**H**igh  
**E**fficiency  
**P**articulate  
**A**ir Filter

- Available in 99.97 & 99.99 at .3 micron



High Volume

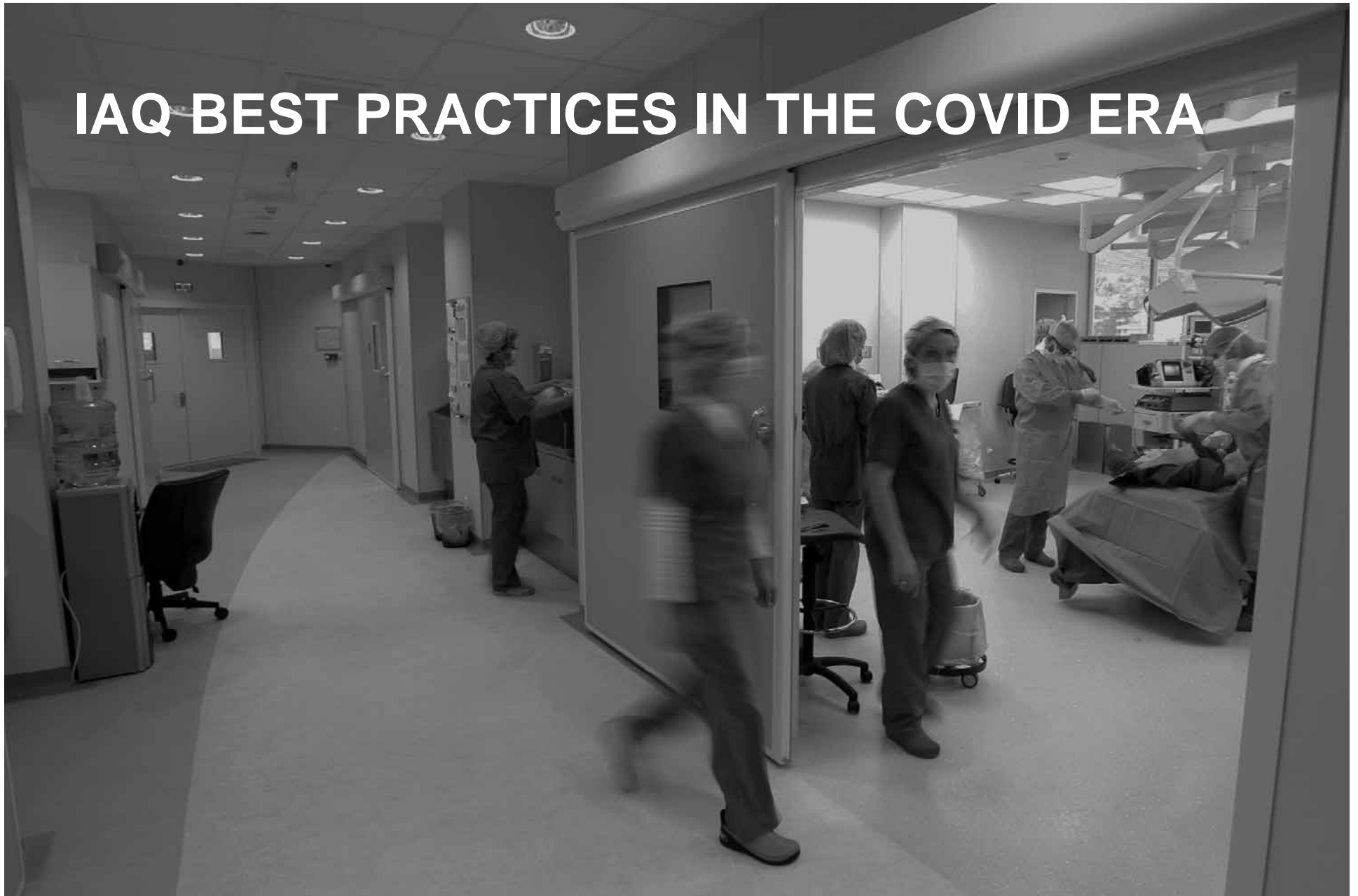


High Capacity



Standard Capacity

# IAQ BEST PRACTICES IN THE COVID ERA



# COVID-ERA OVERVIEW

- Indoor Air Quality (IAQ) has become a high priority since pandemic
- ASHRAE, CDC, OSHA and others have set safety guidelines, focused on reducing airborne contaminants
- Let's talk about ASHRAE recommendations and best practices.



# ASHRAE RECOMMENDATIONS



- MERV 13+ filters
  - Increased ventilation
  - RH 40-60%
  - Seal filter frame leaks
  - More air changes
  - UVGI
  - Room Air Purifiers
-

# WHY MERV 13?

- SARS-CoV2 the virus that causes COVID-19 alone it is about .1 micron in size. When combined with an airborne contaminate can be between 1-3 microns.
- MERV 13 is 90%+efficient at capturing 1-3-micron particles.
- MERV 13 is the highest rated pleated filter available in 1", 2" or 4" which easily fits into most commercial air handlers.
- In single-stage units MERV pleat is recommended. In 2 or more stage systems MERV 8 pleat and MERV 13+ final filter are fine.



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**Thank you!**



**Nick Orlando**

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**Jay Carter**

VP Sales, Midwest

Office: 888-726-8869

Direct: 816-839-7920

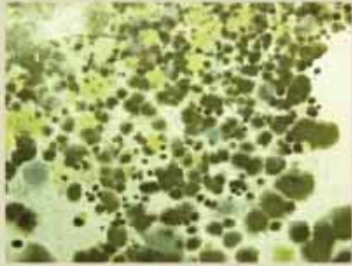
Email: [jcarter@sanuvoy.com](mailto:jcarter@sanuvoy.com)

**[www.sanuvoy.com](http://www.sanuvoy.com)**





# The “IAQ” ISSUES



mold



viruses



bacteria



dust mite fecal matter



smog



cooking odors



cigarette smoke & odors



lingering odors



pet odors & dander



VOCs & chemicals



allergy & asthma triggers



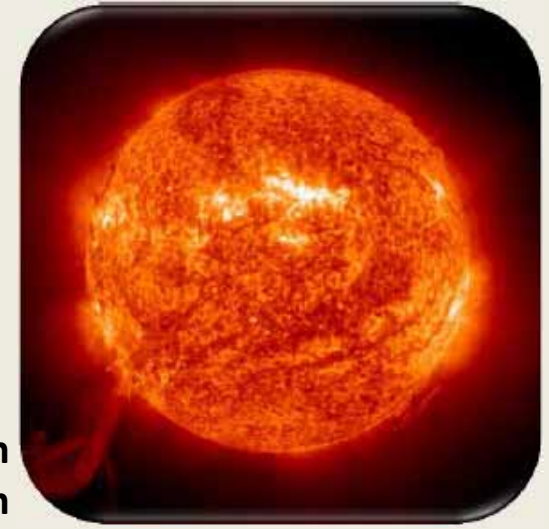
sick building syndrome

# Ultraviolet Light

The Sun purifies the Earth's atmosphere by bombarding it with Ultraviolet Light.

Ultraviolet-C (254 nanometers) & Ultraviolet-V (187 nanometers) light destroys the biological & chemical contaminants within our atmosphere.

Sanuvox High-Intensity UV Lamps produce the same UV-C & UV-V Light the Sun produces bringing the same purification process into the building.



## Ultraviolet

UV – A

## Wavelength

315 to 400 nm

UV – B

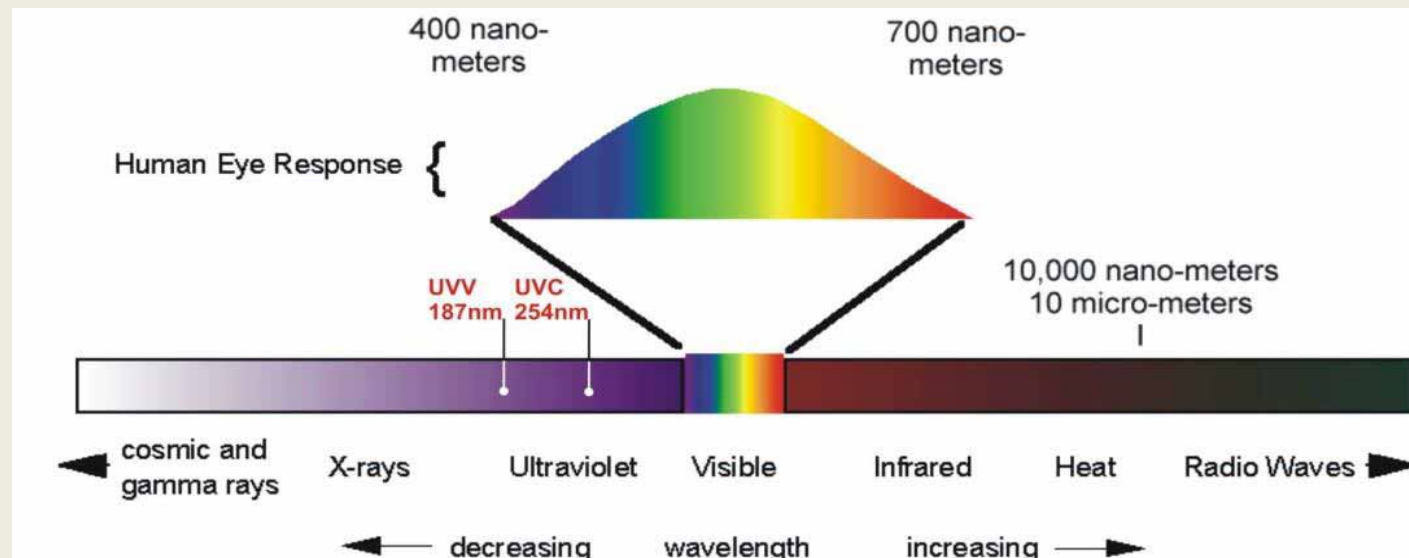
280 to 315 nm

UV – C

200 to 280 nm

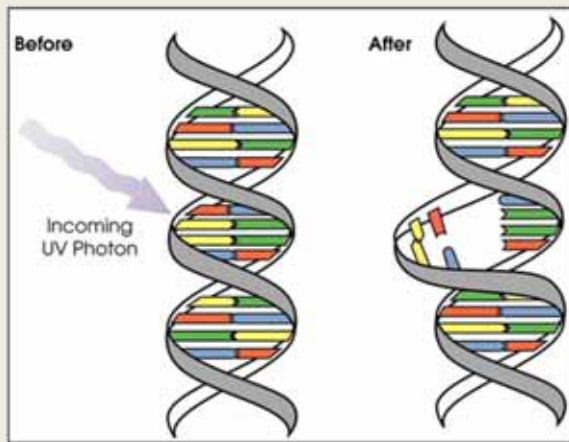
UV – V

100 to 200 nm



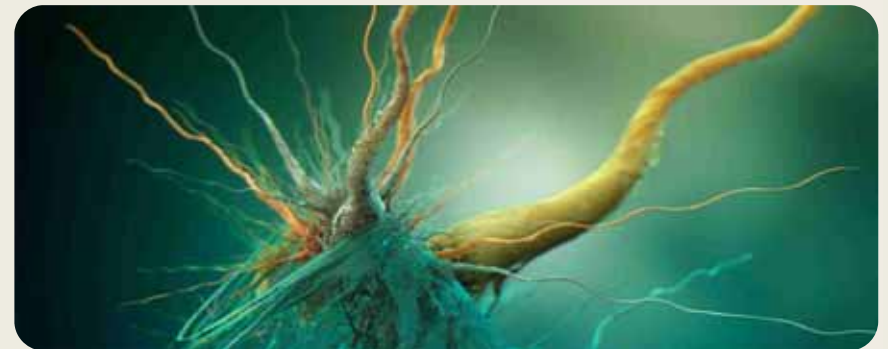
# Ultraviolet UVC Germicidal Light

UVC Germicidal Ultraviolet wavelength (254nm) is effective in penetrating the cell membrane breaking the DNA structure of a micro-organism. DNA sterilization inhibits reproduction.



Ultraviolet radiation can damage DNA by distorting its structure. Credit: NASA's Earth Observatory/David Herring. Image courtesy of [www.nasa.gov](http://www.nasa.gov)

Micro-organisms such as mold, bacteria & viruses will be destroyed with the **required concentrations of germicidal energy.**



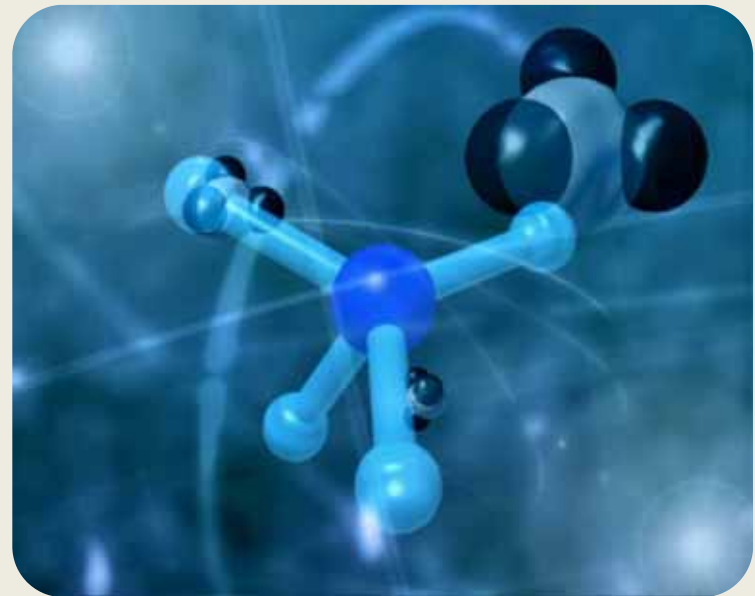


# Ultraviolet UVV Oxidizing Light

UVV Oxidizing Ultraviolet Wavelength (187nm) is effective as an oxidizing reactor.

UVV produces activated oxygen atoms that react to chemicals, odors and VOCs degrading them by successive oxidation into odorless & inoffensive byproducts.

Effective at destroying  
chemical contaminants such  
as cigarette smoke,  
formaldehyde, solvents,  
diesel fumes, odors & VOCs



# ASHRAE & UV: Past, Present & Future

<2005 IUVA (International Ultraviolet Association) was the predecessor to ASHRAE

2005 - ASHRAE SPC 185 formed

2005 ASHRAE Technical Group (TG)2.UVAS

This resulted in the first Handbook chapter regarding UV in 2008, titled:  
[UV Lamp Systems](#)

2011 Handbook: HVAC Applications : Chapter 60: Ultraviolet Air and Surface Treatment Applications

2012 Handbook: "HVAC Systems and Equipment: Chapter 17: Ultraviolet Lamp Systems  
which includes information from Research Project 1509-RP on the degradation of Typical HVAC Materials, Filters and Components Irradiated by UVC Energy.

2014 Standard 185.2 Method of Testing Ultraviolet Lamps for Use in HVAC&R Units  
or Air Ducts to Inactivate Microorganisms on Irradiated Surfaces

2015 Standard 185.1 Method of Testing UV-C Lights for Use in Air-Handling  
Units or Air Ducts to Inactive Airborne Microorganisms

2015-2019 Handbook Chapter 60/62 (Ultraviolet Air and Surface Treatment)

2016 Handbook Chapter 17 (Ultraviolet Lamp Systems)



# Using UV Effectively



**TIME**: The greater the exposure time (contact time between the contaminant and the UV source) the more UV energy can be delivered to the contaminant resulting in a greater Kill Rate.

**INTENSITY**: The greater the intensity (strength of the UV source) the more UV energy can be delivered to the contaminant resulting in a greater Kill Rate



# Maximize UV Effectiveness



There are many types of UV Lamps, these include: Hot-Cathode, Cold-Cathode, Regular Intensity, High Intensity, Amalgam, Soft Glass, Quartz Glass...

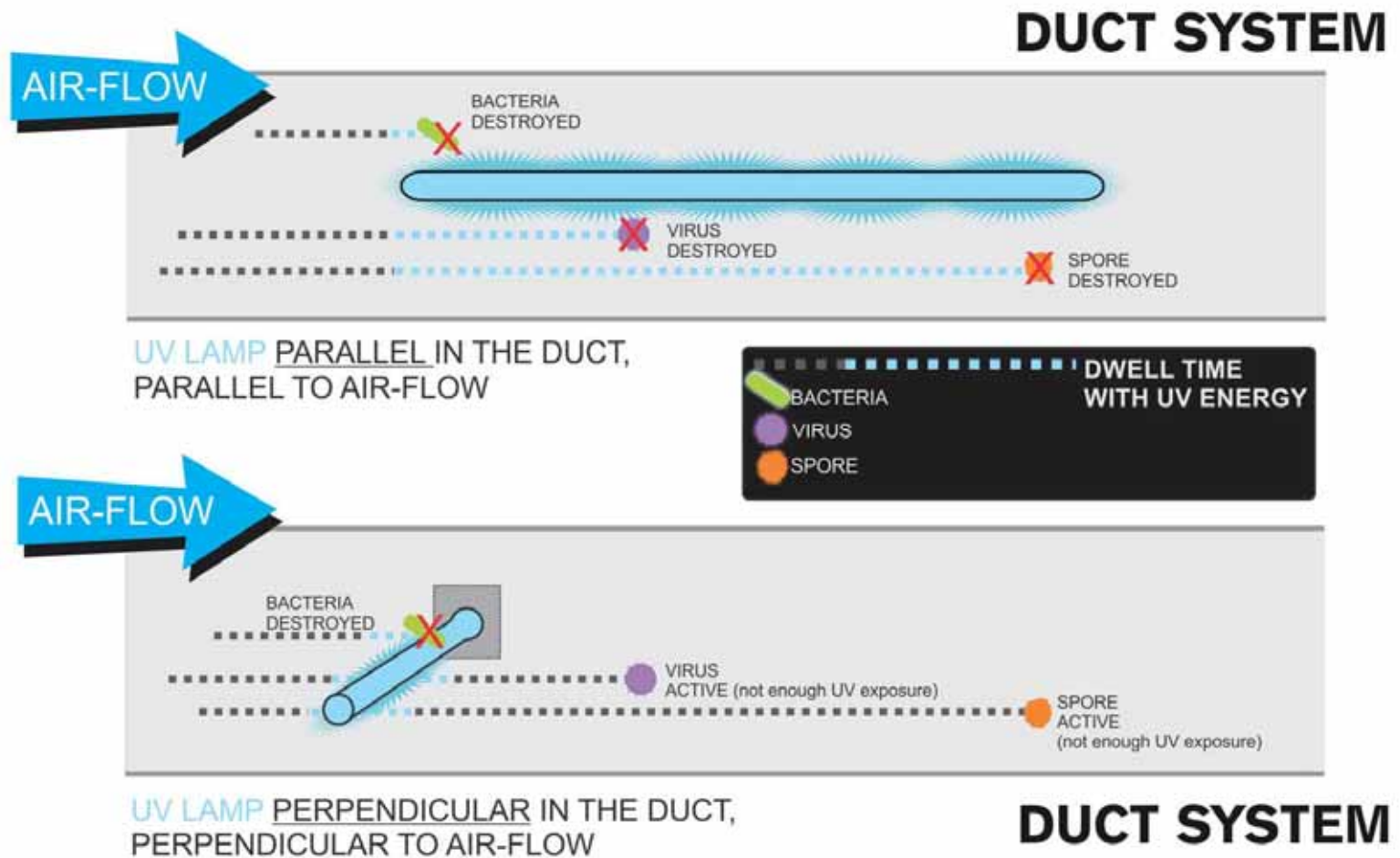
Although there are different types of UV Lamps, one thing is certain, ALL UV energy can BENEFIT from a few “helpful tools” which can dramatically increase the effectiveness of the UV light produced.

1. The Ultraviolet Source

2. Dwell Time

3. Reflection

# Dwell Time: Parallel

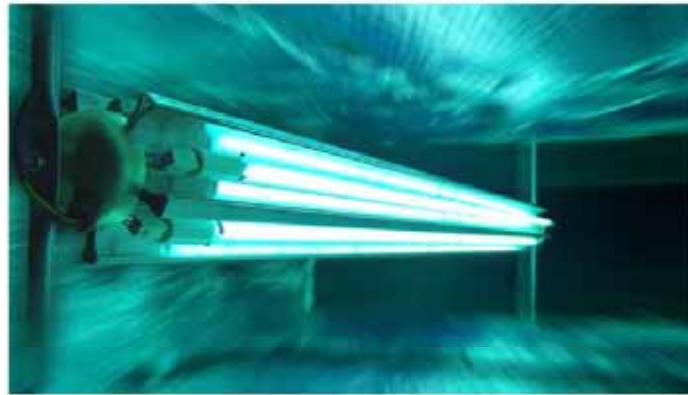




# The Question: Air or Surface?



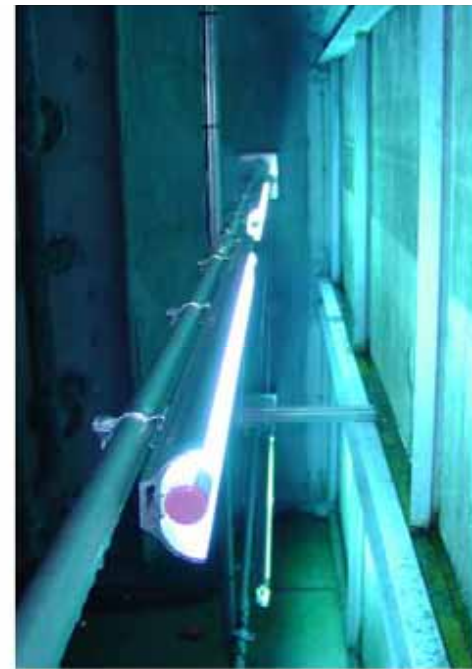
## AIR



Destroy bio-chemical contaminants  
circulating through the facility

AIR: SHORT EXPOSURE TIME

## SURFACE



Destroy mold & other microbial  
growth on the coil & surrounding areas.  
Improve energy efficiency by maintaining a clean coil

SURFACE: LONG EXPOSURE TIME

# UV Sizing



To size the UV Air Treatment, we simply need to know the:

Duct Size

CFM or FPM

With that, we can provide free-of-charge the “Real-Time” Kill-Rates per pass.

## WHAT IS NEEDED

### AIR TREATMENT CALCULATION

EMAIL: [jcarter@sanuvox.com](mailto:jcarter@sanuvox.com)

DATE: \_\_\_\_\_

FAX: 888-726-8869

PROJECT NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

CONTACT NAME: \_\_\_\_\_ EMAIL: \_\_\_\_\_

ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_

NOTE: All the following data is expressed in ☐ INCHES ☐ FEET

WILL QUATTRO OR BIOWALL BE INSTALLED IN? Air Handler Tag # \_\_\_\_\_

☐ RETURN DUCT (Preferred location. In addition, after O/A and make up Air combine)

☐ SUPPLY DUCT (If installation is in Supply side of the plenum, the maximum dimension will be the free space up to the first branch of ducting.)

WHAT ARE THE DIMENSIONS OF DUCT WHERE QUATTRO OR BIOWALL WILL BE INSTALLED?

HEIGHT: \_\_\_\_\_ WIDTH: \_\_\_\_\_ LENGTH: \_\_\_\_\_

DIAMETER: (if duct is round) \_\_\_\_\_

IS DUCT: ☐ DUCTBOARD ☐ SHEET METAL Highly Reflective Factor: Yes or No

☐ INTERNALLY INSULATED ☐ EXTERNALLY INSULATED ☐ NO INSULATION

CFM OF AHU (NOT MAX CFM, BUT OPERATING CFM): \_\_\_\_\_

VOLTAGE REQUESTED? ☐ 120 60Hz ☐ 230 60Hz ☐ 277 60Hz

SPECIFIC CONTAMINANTS FOR DESTRUCTION (IF KNOWN): \_\_\_\_\_

DESIRED LEVEL OF DESTRUCTION (IF KNOWN): \_\_\_\_\_

Example: 80%, 90% (1Log), 99% (2Log), 99.9 (3Log), 99.99 (4Log)

ANY ODOR OR VOC REDUCTION REQUIRED? \_\_\_\_\_

Additional Notes: \_\_\_\_\_

# Air Treatment Sizing

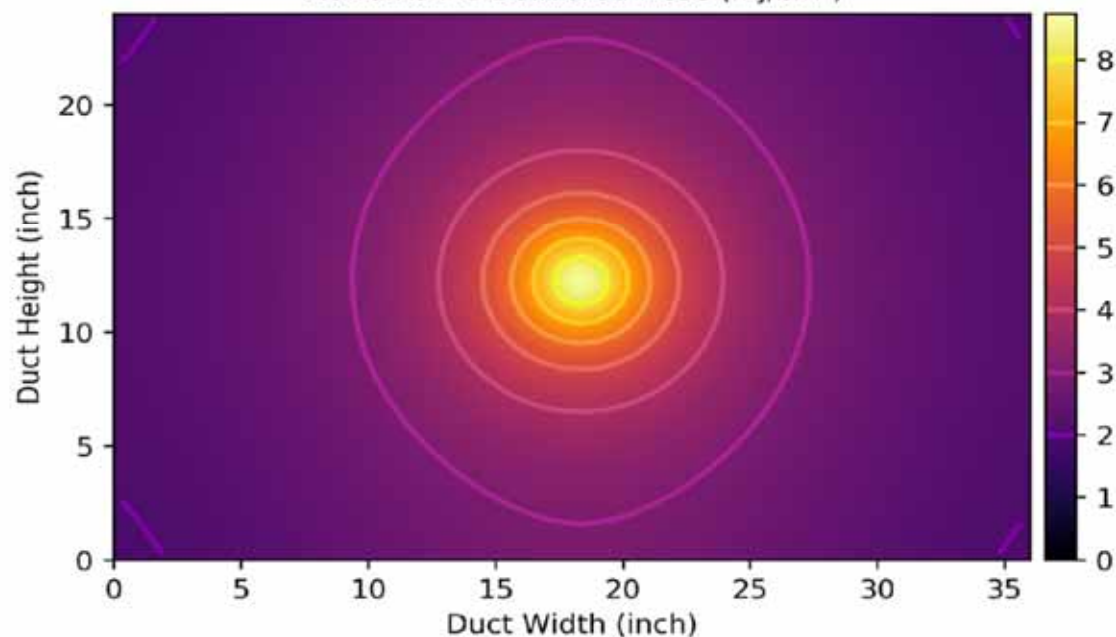
## Reference: Sample Reports/Air Purification Sample 10,000 CFM

Duct Info		General Info	
Duct Width	36.0 inch	Product	Bio40
Duct Height	24.0 inch	Lamp Length	40.0 inch
Duct temperature increase	0.16 °F	Number of biowalls	1
Duct airflow	10000.0 CFM	Total Input Power Required	516.5 W
Duct air velocity	1666.85 ft/min		

## Irradiation Dose Delivered

Min dose	Average dose	Max dose
2.0 mJ/cm <sup>2</sup>	3.0 mJ/cm <sup>2</sup>	9.0 mJ/cm <sup>2</sup>

Biowall UV-C Delivered Dose (mJ/cm<sup>2</sup>)



## Lamp Information

Lamp Length	40.0 inch
Unit Length	42.0 inch
Power	103.3 W



# Air Treatment



## Passes Summary

### SARS-CoV-2

Pass number	1	2	3	4	5	6
Min:	96.77 %	99.9 %	100.0 %	100.0 %	100.0 %	100.0 %
Average:	99.05 %	99.99 %	100.0 %	100.0 %	100.0 %	100.0 %
Average Log:	2	4	6	8	10	12

### Influenza B virus

Pass number	1	2	3	4	5	6
Min:	92.05 %	99.37 %	99.95 %	100.0 %	100.0 %	100.0 %
Average:	97.01 %	99.91 %	100.0 %	100.0 %	100.0 %	100.0 %
Average Log:	1	3	4	6	7	9

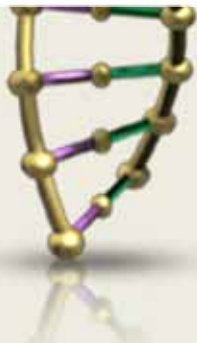
### Mycoplasma pneumoniae

Pass number	1	2	3	4	5	6
Min:	99.4 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
Average:	99.88 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
Average Log:	2	5	8	11	14	>16



# Microbe UV Tolerance

SANUVOX TECHNOLOGIES Indicative Disinfection chart (Exact values must be obtained during Sanuvox engineering software based on duct size, flow,etc)	SIZE		QUATTRO		BIOWALL-30		BIOWALL-40		BIOWALL-50		BIOWALL-60
	micron		2000 CFM		10 000 CFM		20 000 CFM		30 000 CFM		40 000 CFM
	---	LOG	% Disinfection	LOG	% Disinfection	LOG	% Disinfection	LOG	% Disinfection	LOG	% Disinfection
Mycobacterium tuberculosis		4.2	99.99%	4.1	99.99%	4.5	100.00%	4.2	99.99%	4.3	100.00%
Candida auris		4	99.99%	3.9	99.99%	4.3	99.99%	4	99.99%	4.1	99.99%
Coronavirus (SARS)		3.3	99.95%	3.3	99.95%	3.6	99.98%	3.4	99.96%	3.4	99.96%
Proteus mirabilis		2.6	99.72%	2.5	99.69%	2.8	99.83%	2.6	99.74%	2.6	99.77%
Mycoplasma pneumoniae		2.5	99.66%	2.4	99.62%	2.7	99.79%	2.5	99.68%	2.6	99.72%
Salmonella		2	98.90%	1.9	98.78%	2.1	99.25%	2	98.95%	2	99.05%
Aeromonas		1.8	98.41%	1.8	98.26%	2	98.88%	1.8	98.48%	1.9	98.61%
Coronavirus (COVID-19)		1.7	97.80%	1.6	97.61%	1.8	98.41%	1.7	97.89%	1.7	98.06%
Rickettsia prowazekii		1.6	97.24%	1.5	97.01%	1.7	97.97%	1.6	97.35%	1.6	97.55%
Staphylococcus epidermis		1.4	96.33%	1.4	96.05%	1.6	97.23%	1.5	96.47%	1.5	96.71%
E. Coli		1.4	95.85%	1.4	95.55%	1.5	96.84%	1.4	96.00%	1.4	96.27%
Yersinia enterocolitica		1.4	95.63%	1.3	95.32%	1.5	96.65%	1.4	95.78%	1.4	96.06%
Coxiella burnetii		1.4	95.63%	1.3	95.31%	1.5	96.65%	1.4	95.78%	1.4	96.06%
Lactobacillus reuteri		1.4	95.63%	1.3	95.31%	1.5	96.65%	1.4	95.78%	1.4	96.06%
Vaccinia virus		1.4	95.58%	1.3	95.27%	1.5	96.62%	1.4	95.74%	1.4	96.02%
smallpox		1.4	95.56%	1.3	95.25%	1.5	96.60%	1.4	95.72%	1.4	96.00%
Newcastle disease		1.3	94.69%	1.2	94.34%	1.4	95.87%	1.3	94.87%	1.3	95.19%
Acinetobacter baumannii		1.1	92.65%	1.1	92.21%	1.2	94.11%	1.1	92.86%	1.2	93.26%
influenza A virus		1.1	91.16%	1	90.68%	1.1	92.82%	1.1	91.40%	1.1	91.85%



Note: The above performance chart is based on single pass in a round or square duct shape with air velocity of 1000 ft/min (5 m/sec). Rectangular duct shape may require more than one unit to achieve the same performance. In any case, the only valid selection is from the Sanuvox Fitting engineering software.

# UV Surface Treatment



To size the UV Surface Treatment systems. We simply need to know the:

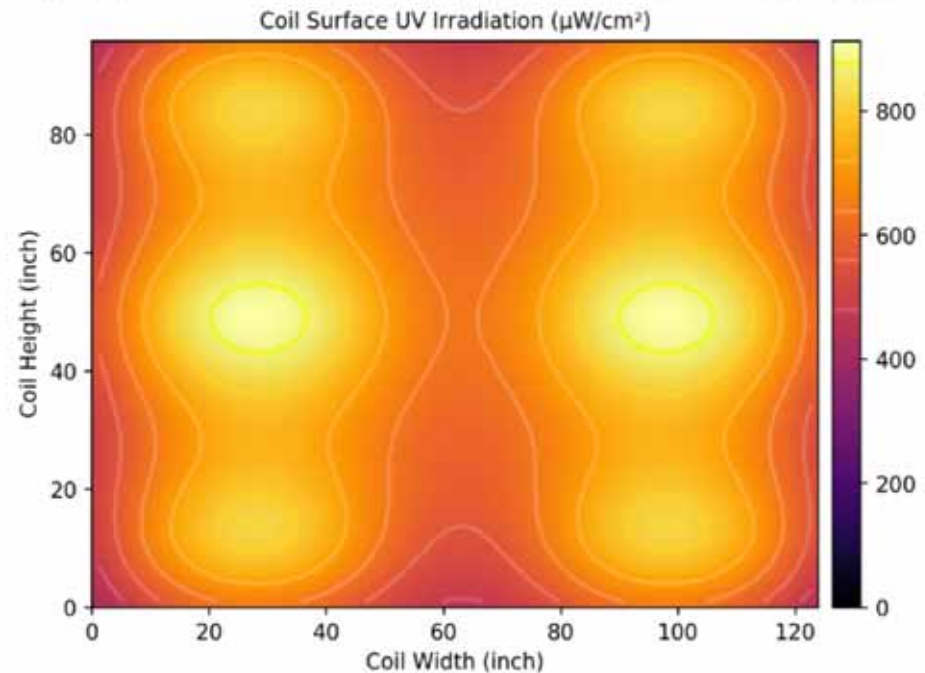
- Size of the surface (room dims or coil dims)
- Mounting distance of the UV fixtures to the surface.

With that, we can provide free-of-charge Time of Exposure required sizing reports.

Reference: Sample Reports/Coil Clean Upstream			
Coil Info		General Info	
Coil width	124.0 inch	Lamp type	IL40
Coil height	96.0 inch	Lamp Length	40.0 inch
Distance between coil and lamp	18.0 inch	Unit Length	42.0 inch
		Number of rows	3
		Number of lamps per row	2
		Lamp position in relation to the coil	Downstream
		Lamp fouling	Expected
		Total number of lamps/fixtures	6
		Total Input Power Required	619.8 W

## Irradiation Intensity

Min dose	Average dose	Max dose
424.0 $\mu\text{W}/\text{cm}^2$	695.0 $\mu\text{W}/\text{cm}^2$	914.0 $\mu\text{W}/\text{cm}^2$

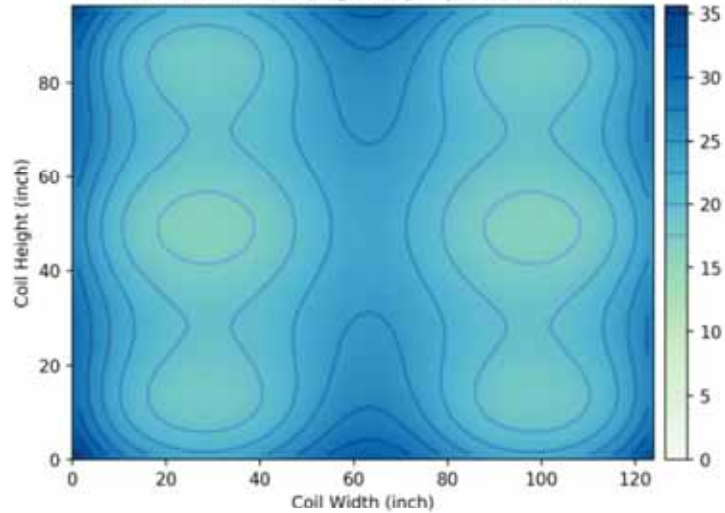


# UV Surface Treatment – 99% Kill

## Aspergillus niger spores

Min	Average	Max
16.46 min	22.1 min	35.5 min

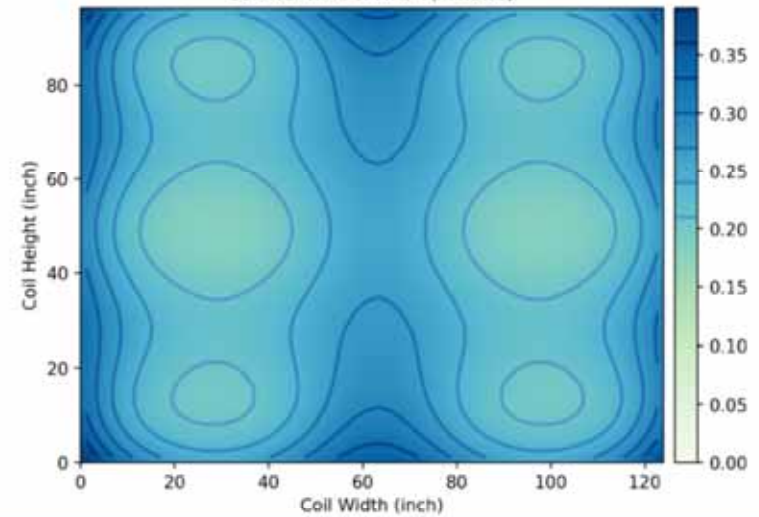
Survival Time of Aspergillus niger spores (minutes)



## MRSA

Min	Average	Max
0.18 min	0.24 min	0.39 min

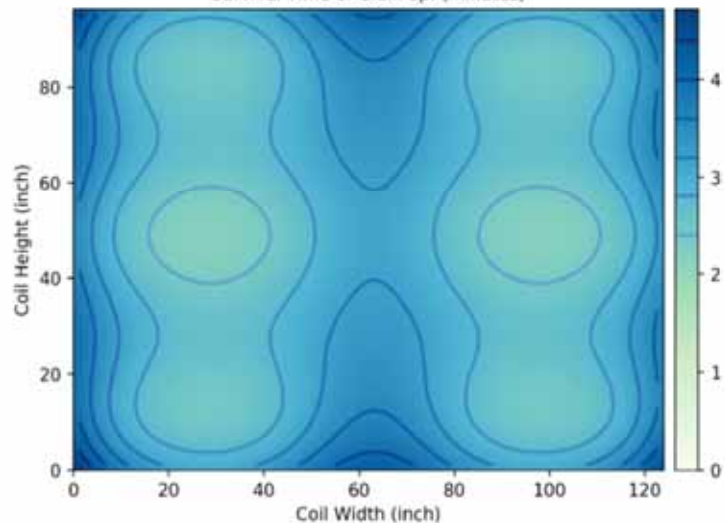
Survival Time of MRSA (minutes)



## C.diff sp.

Min	Average	Max
2.18 min	2.93 min	4.71 min

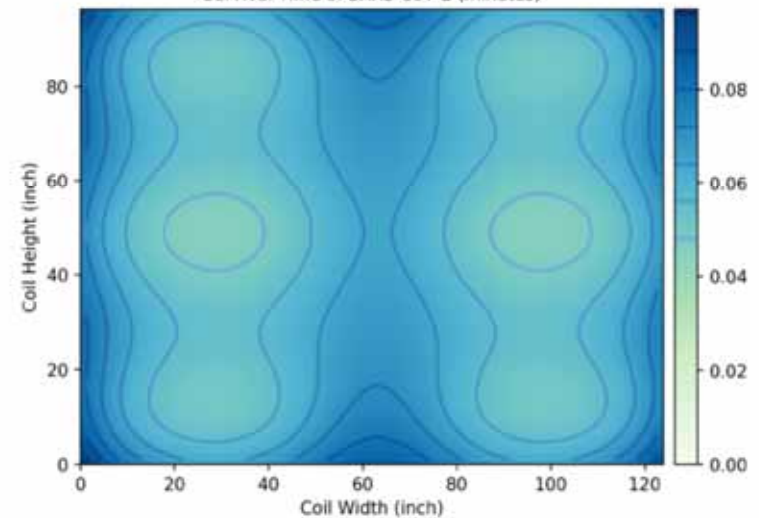
Survival Time of C.diff sp. (minutes)



## SARS-CoV-2

Min	Average	Max
0.04 min	0.06 min	0.1 min

Survival Time of SARS-CoV-2 (minutes)







# Does UV Really Work?

Jay Carter  
Home Test



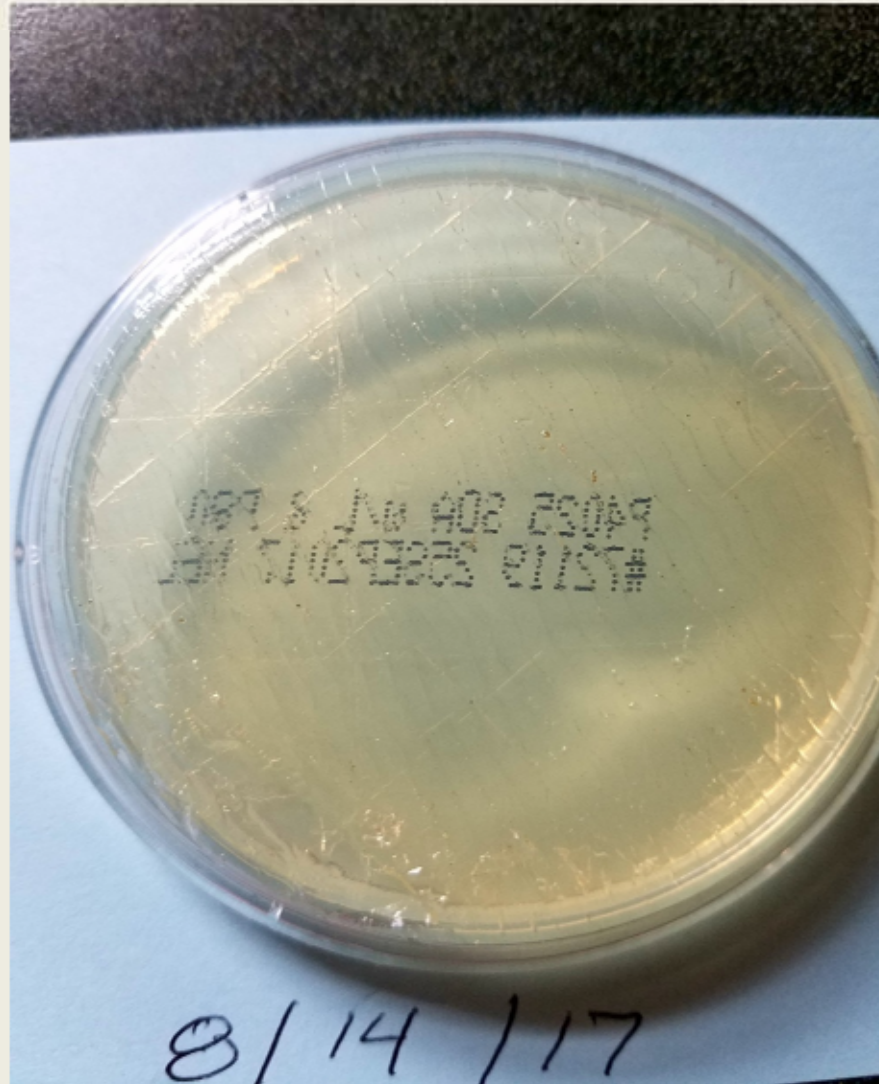
# The Application: 3 Ton Downflow Residential System



# Dirty Coil???



# Before UV Install Petri-Dish Day 1



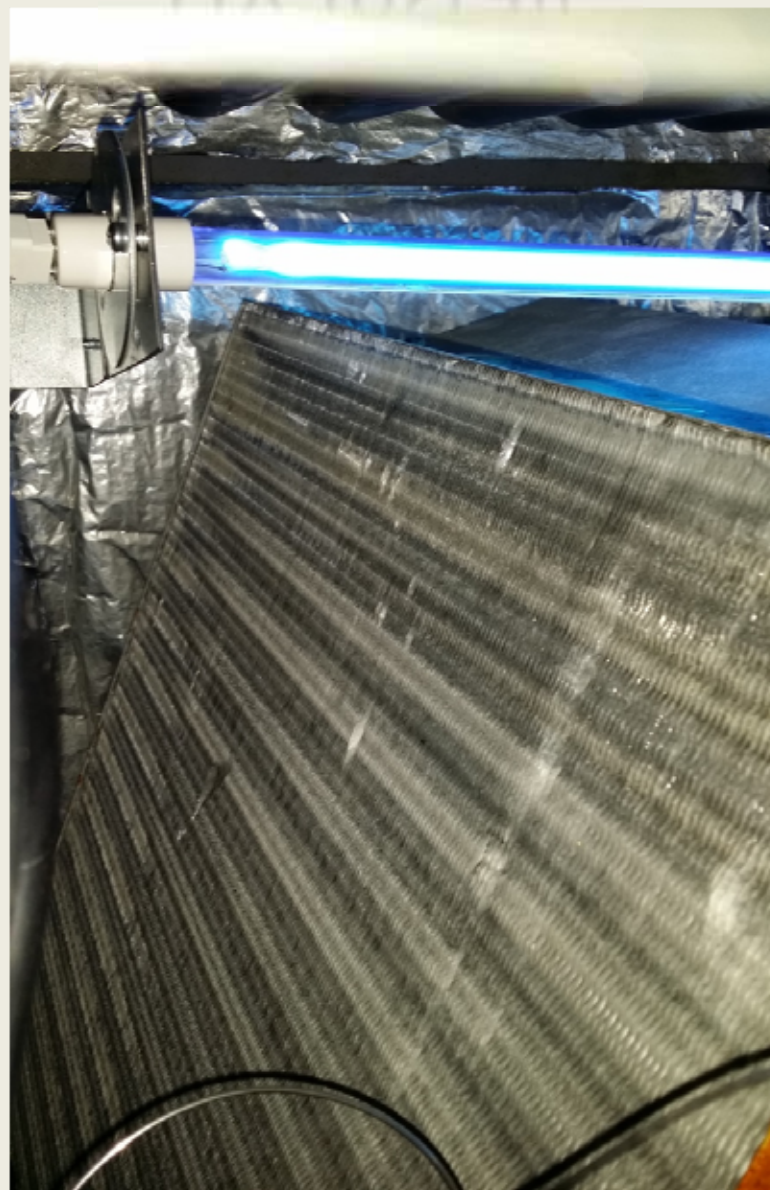


# Before UV Install Petri-Dish Day 5

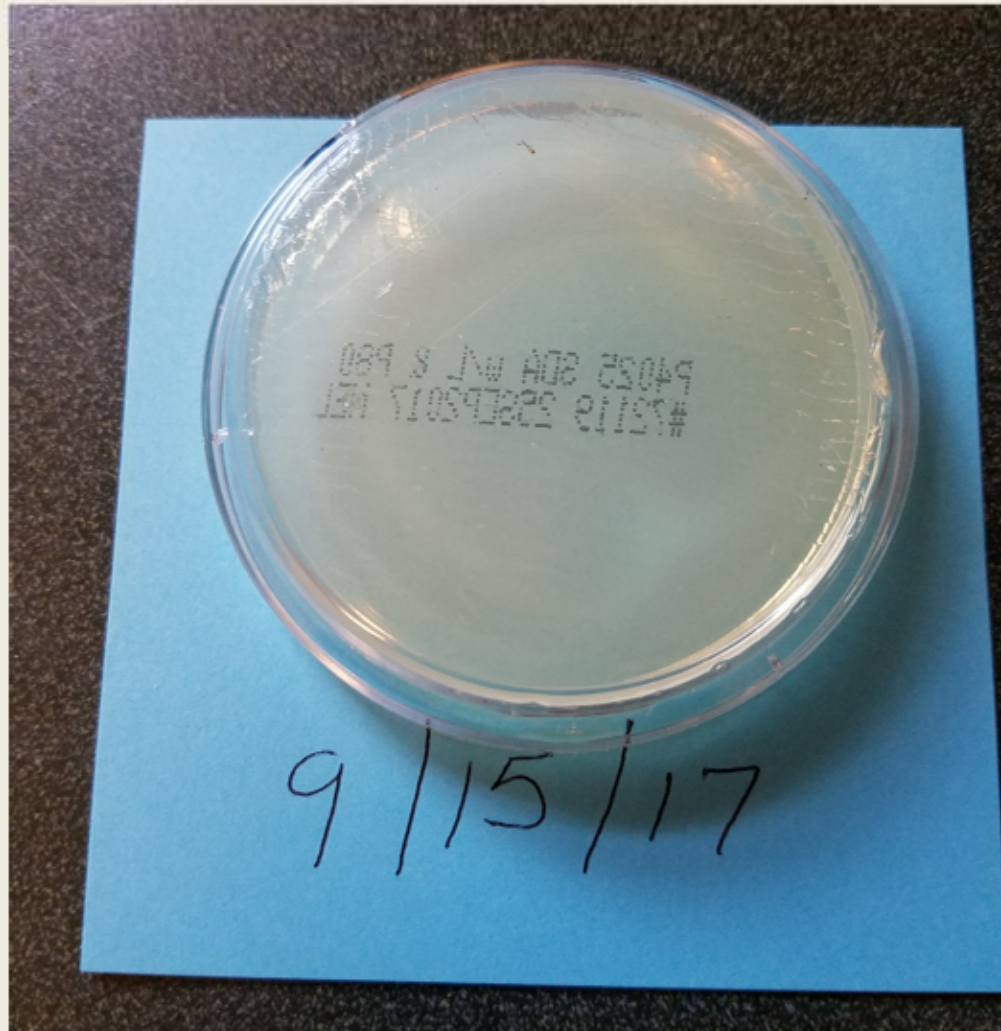


**SANUVOX**

UV Install

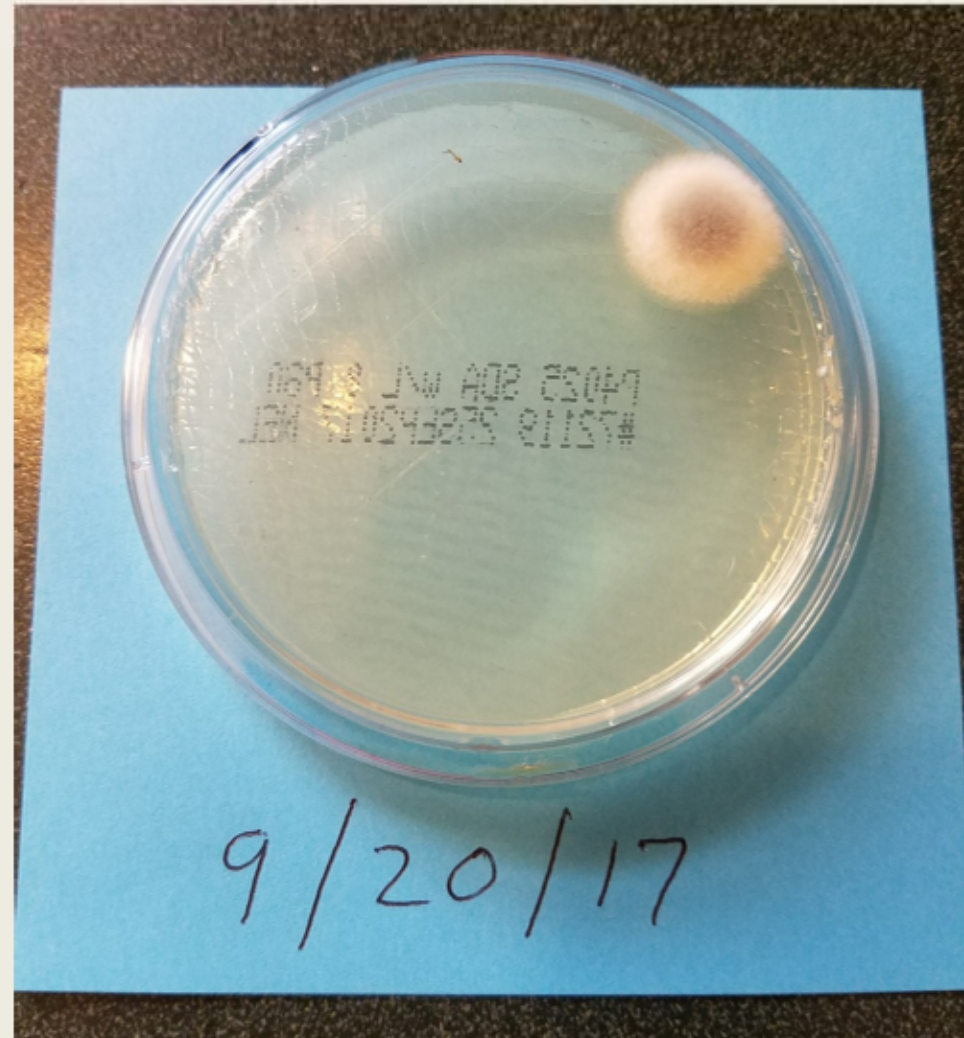


# After UV Install Petri-Dish Day 1



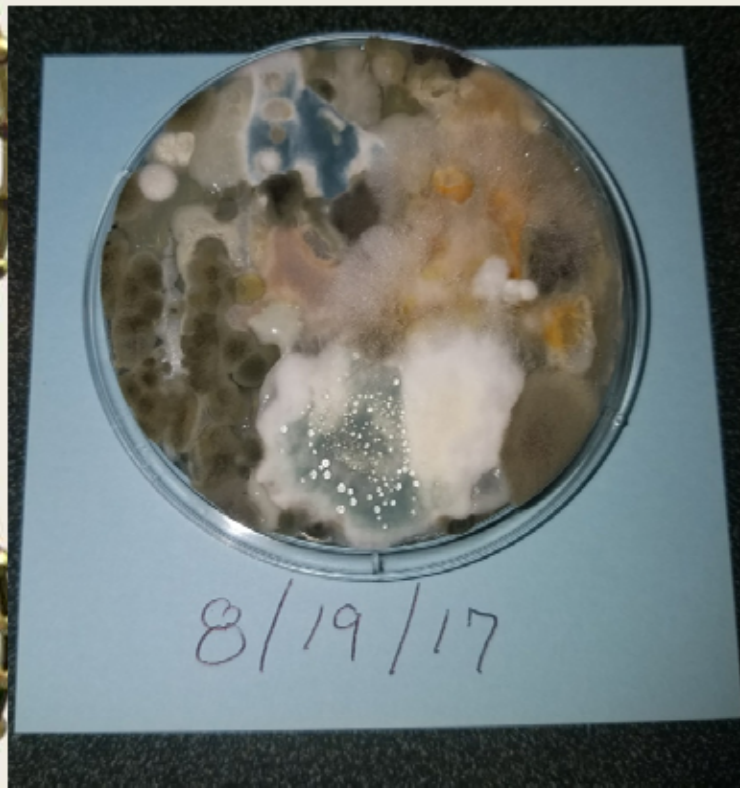


# After UV Install Petri-Dish Day 5

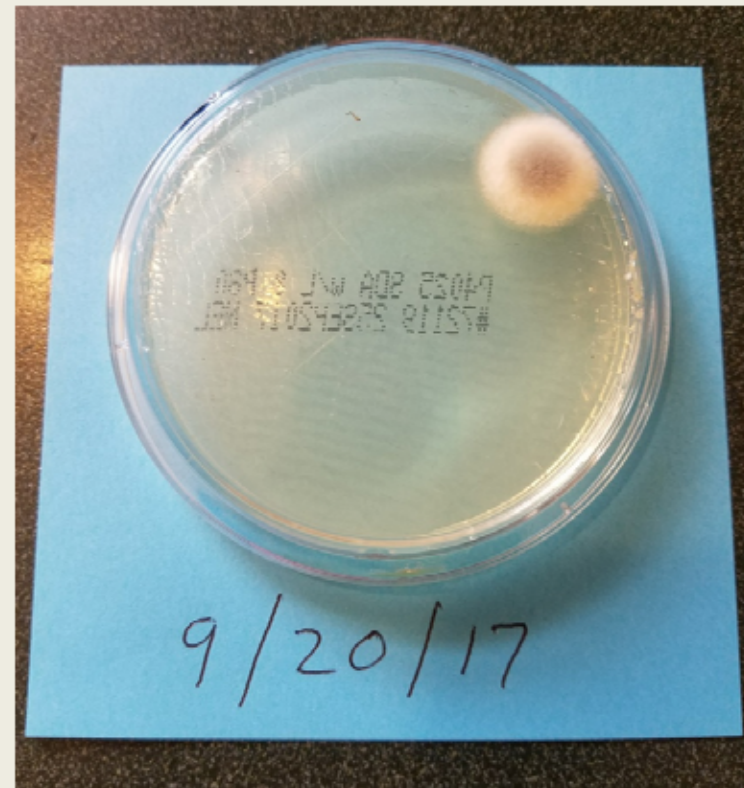


# Before and After

**Before UV 5 Day Test**



**After UV 5 Day Test**



# Stand-Alone Air Treatment Examples



**S100-GX**  
**T-Grid or Wall Mount**  
**UV Air Purifier**

Single speed 100 CFM.  
Ideal for Daycare, Offices,  
Classrooms and Break  
rooms.



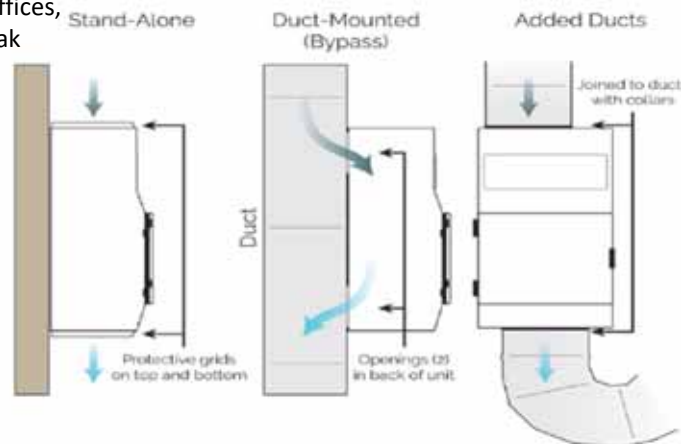
**P900-GX Portable**  
**UV Air Purifier**

Variable Speed up  
to 75 CFM  
Ideal for Daycare,  
Offices, Classrooms  
& Break Rooms



**S300-GX**  
**HEPA & UV Air Purifier**

Stand Alone, Ducted or Bypass  
Two speed 200/300 CFM.  
Additional configurations available.



**S1000-GX**  
**Filtration & UV Air Purifier**

Standard MERV-8 Pre-Filter,  
MERV-15 Post-Filter  
Ducted 1,000 CFM  
Additional configurations  
available. \*HEPA / Clean Room



**S600**  
**UV Air Purifier**

Stand alone  
Variable Speed 300-600 CFM.  
Heavy odor applications  
Ideal for garbage rooms up to  
14,000 cubic ft



# In Room Fixed Surface Sterilization



5 Minute Disinfection cycle each use.

Disinfect 99.99% contaminants such as VRE, C.Difficile, MRSA and Influenza A Virus, by sterilizing the commonly touched surfaces.

# Mobile Room Surface Sterilization

Disinfects rooms to 99.999% in 5 minutes



# UV QUESTIONS?



**SANUVOX**  
PURIFYING AIR AT THE SPEED OF LIGHT™

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# Thank You!



# Cottonwood Filter Screens

Your First Line of Defense Against Airborne Contamination



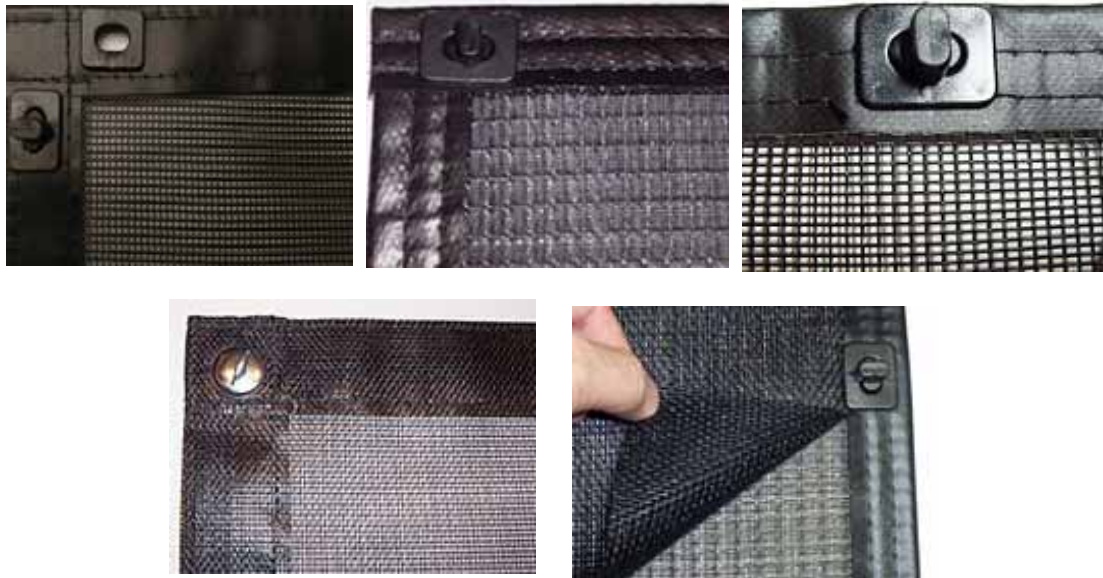
**Presented By:**

**Randy Simmons, President**



# What Are They

- Also Known As Air Intake Filters, Air Inlet Screens are Specially engineered **HVAC mesh filters** designed for High Volume / Velocity Air Movement with little impact on airflow and static pressure. **NOT** window screen, pet screen or commercially available mesh



# Features

- Multiple Filter Grades for any budget and application
- Non-Stick Surface
- Service Life up to 15+ Years (*Varies with grade*)
- Coat Bonded – With Rip-Stop Feature
- UV, Mold & Mildew Resistant
- Flame Retardant
- Heavy Duty Outer Binding for Strength & Durability
- Variety of Mounting Options for every Application.

# Easy / Quick Release Mounting Options



**Quick Release Fixed Mounted**



**Industrial Fixed Mounted**



**Magna-Track / Traversing Fasteners**



**Retractable Pulley Mount Filter**



**Roller Track System**

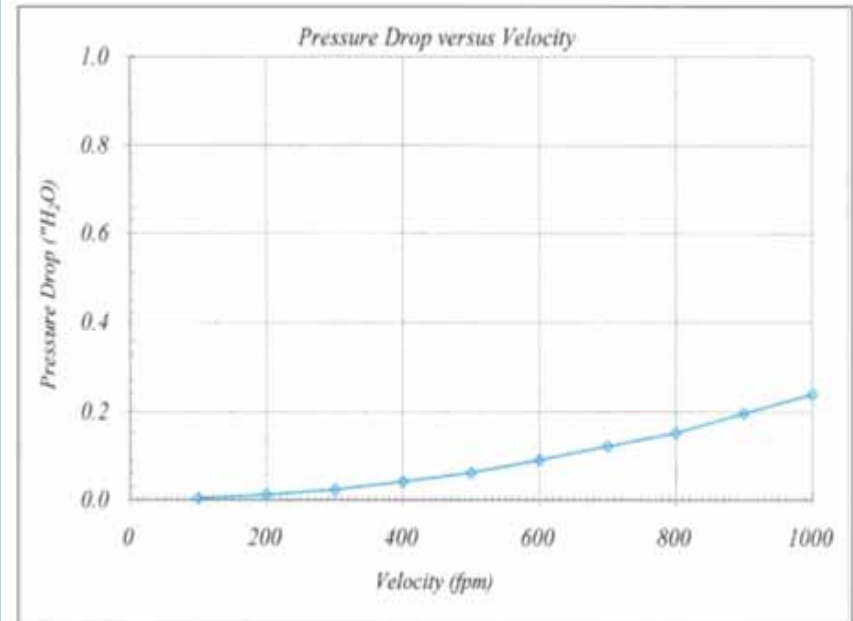
## IDEAL BALANCE BETWEEN AIRFLOW & FILTRATION PERFORMANCE

### NEARLY INVISIBLE TO THE AIR-FLOW

*LMS Technologies, Inc.*  
6423 Cecilia Circle, Bloomington, MN 55439

<i>Date:</i>	March 18, 2003	<i>Test Requested by:</i>	
<i>Filter ID:</i>	Air Solution Company 0%	<i>Air Solution Company</i>	
<i>Test Type:</i>	Pressure Drop	<i>Filter Manufacturer:</i>	<i>Air Solution Company</i>

	Velocity (FPM)	Velocity m/s	Pressure ("H <sub>2</sub> O)		Pressure Drop ("H <sub>2</sub> O)	Pressure Drop Pascals
			Upstream	Downstream		
RTU Condensers Louvers	100	0.51			0.001	1
	200	1.02			0.012	2.99
	300	1.52			0.024	5.97
	400	2.03			0.042	10.5
AHU, Chillers Cooling Towers	500	2.54			0.061	15.2
	600	3.05			0.091	22.6
	700	3.56			0.122	30.4
	800	4.06			0.153	38.1
	900	4.57			0.197	49
	1000	5.08			0.24	59.7



# What They Do

Mounts over Intake Openings Stops Debris at Point of entry





# Where To Use

*Will Not Void  
Equipment  
Warranties*



Compatible With All Makes & Models.



# Benefits

## Air Handling Units

- Stops Premature Face Loading of Debris  
*(Cottonwood seed, leaves, pollen, snow, dust, insects, etc.)*
- Extends Service Life of Consumable Filters up to 60%  
*(Merv 13, HEPPA's, Bags, etc.)*
- Enables Internal Filters to Perform at Optimal Efficiency.
- Reduces Filter Changes up to 50% depending on location.





# Snow Stopper Screens



## Condenser Coil Systems

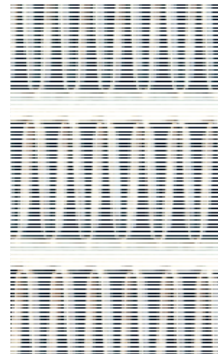




**Are You Getting The Energy  
Savings You Paid For From Your  
High Efficiency Equipment?**



Std. Efficiency Fin & Tube  
8 – 10 Fins per/ inch



High Efficiency  
Micro- Channel  
15-20 Fins per/ inch

# Benefits

## Condenser Coils

- Stops Fouling Eliminates Conventional Coil Cleaning (Especially Important on Fragile Micro-Channel Coils)
- Clean Filters without Removal - Leaf Blower, Broom, or garden Hose – Even Rain will clean them.
- Keeping Coils Clean Reduces Fan Motor Run Time and Reduces Energy Cost up to 35%



# Energy Savings Chart

Based on 9 months Cooling 18hrs / Day

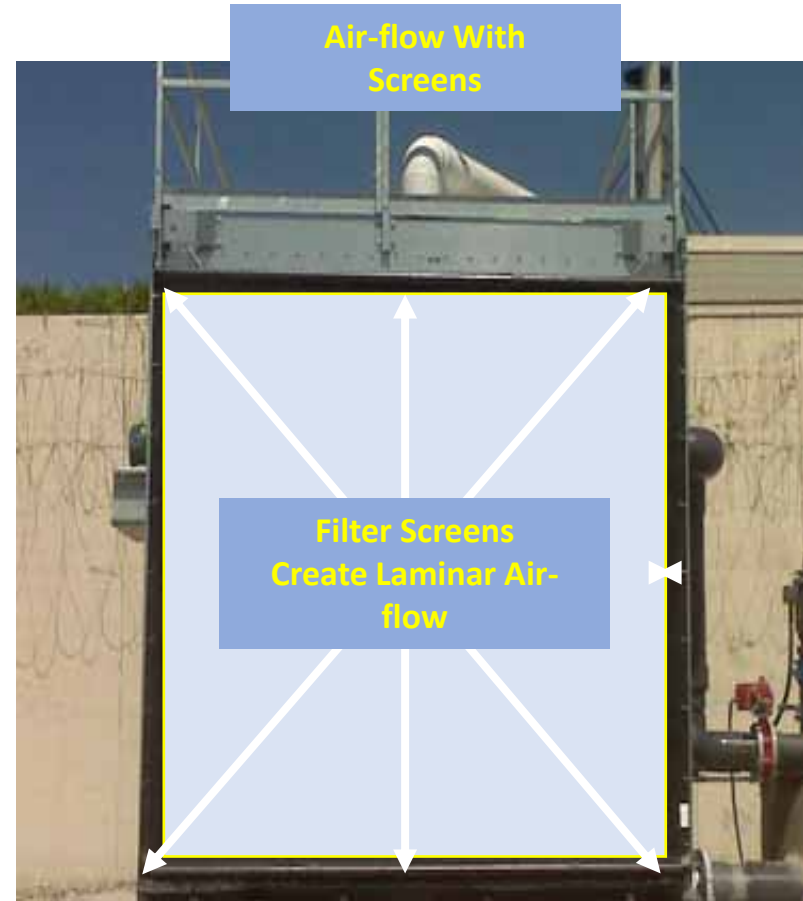
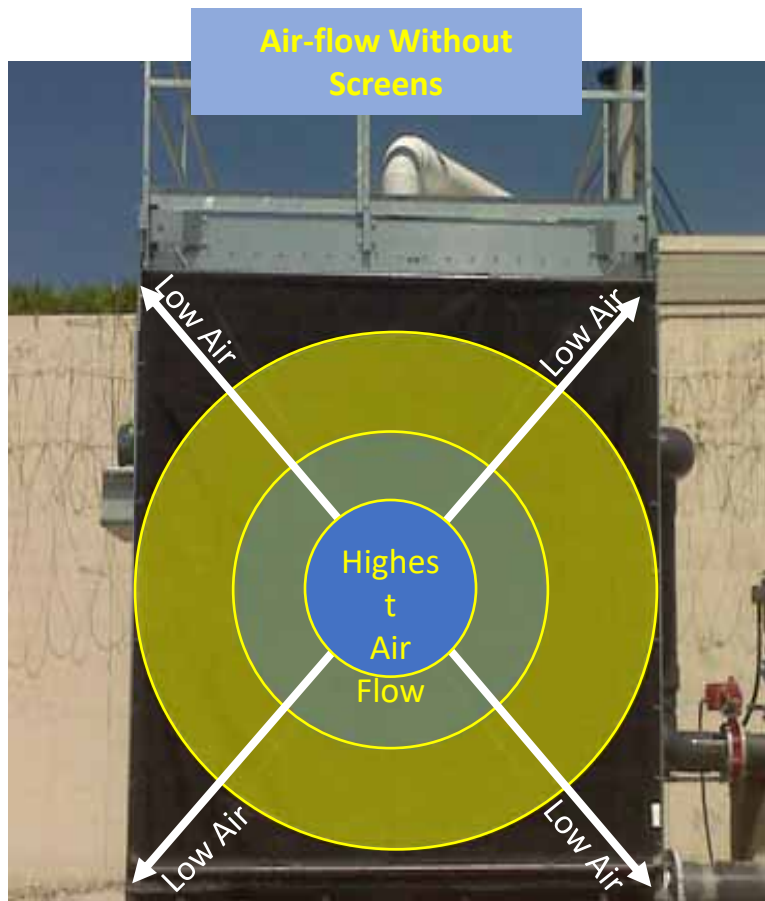
Number of Units Same Tonnage Rating		1		Energy Rate per kwh		.09
Chiller / Condenser Tonnage Rating	Moderately Dirty Condenser Coils		Clean Condenser Coils		Savings (Dirty vs. Clean Coils)	
	KWH Per Season Per Unit	Energy Cost	KWH Per Season Per Unit	Energy Cost	CLEAN COIL Energy Savings	ENERGY SAVINGS %
3	5,700	\$1,368	4,100	\$984	\$384	28%
5	8,100	\$1,944	5,500	\$1,320	\$624	32%
7.5	11,200	\$2,688	7,400	\$1,776	\$912	34%
10	16,800	\$4,032	12,300	\$2,952	\$1,080	27%
15	24,400	\$5,856	16,000	\$3,840	\$2,016	34%
20	32,400	\$7,776	20,800	\$4,992	\$2,784	36%
25	40,800	\$9,792	27,000	\$6,480	\$3,312	34%
30	48,900	\$11,736	30,000	\$7,200	\$4,536	39%
40	66,400	\$15,936	41,500	\$9,960	\$5,976	38%
50	82,300	\$19,752	52,100	\$12,504	\$7,248	37%
60 – 75	98,600	\$23,664	63,000	\$15,120	\$8,544	36%

# Benefits

## Cooling Towers

- Stops Organic Debris Outside of Tower (preserves fill)
- Increases Efficacy of Chemical Water Treatment. *(better protect against waterborne bacteria ie., Legionella)*
- Eliminates sludge build-up in basin and strainers
- Increases Laminar Air-flow
- Reduces Fan Run Time
- Reduces Basin temp up to 1.5deg. F over design.





slight air resistance Forces air to spread out  
creating a wall of air



**Average Cost Per Sq / Ft.  
vs. Service Life**

**\$8.00  
Sq/Ft.**

**Filter Grade**

**\$19.00  
Sq/Ft.**



**5+ Yr.**

**10+ Yr.**

**15+ Yr**

**Service Life**

**Payback 1 – 2 yrs.**



QUESTIONS

