

January 2019

## Chinese Corona Virus, SARS, Measles, Flu's & other Viruses

Steril-Aire UVC systems are very effective against the Corona Viruses and will provide excellent pandemic protection.

Steril-Aire very high output UVC works by destroying the DNA and RNA of microorganisms and is therefore effective against *all* types of viruses including **Flu's, Colds, Corona Virus/SARS, Measles and German Measles.**

The droplet nuclei for these viruses can remain airborne for hours or **days** depending on airflow and humidity (Virus micro-organism size is typically 10 – 500 millimicrons – millimicron = That's 1000<sup>th</sup> of a micron). They can also enter the biofilms growing on cooling coils and potentially mutate unless the coil is treated with UVC.

In order to understand how Steril-Aire UVC works, it is important to understand the science behind UVC:

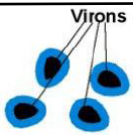
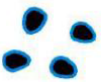

The C wavelength of the UV spectrum we use is (UVC – 253.7nm), this targets the DNA of microorganisms, destroying their cells and making replication impossible. Directed at a cooling coil or drain pan, UVC energy destroys surface biofilm, a gluey matrix of microorganisms that grows in the presence of moisture. Biofilm is prevalent in HVAC systems and leads to a host of indoor air quality (IAQ) and HVAC operational problems. UVC also **destroys airborne viruses** and bacteria that circulate through an HVAC system.

For the most effective microbial control, Steril-Aire UV germicidal Emitters are installed on the supply side of the system, downstream from the cooling coil and above the drain pan. This location provides more effective biofilm and microbial control than in-duct UVC installations. By irradiating the contaminants at the source – the cooling coils and drains pans – Steril-Aire UVC delivers simultaneous cleaning of surface microorganisms and destruction of airborne microorganisms. Steril-Aire patented this installation configuration in 1995.

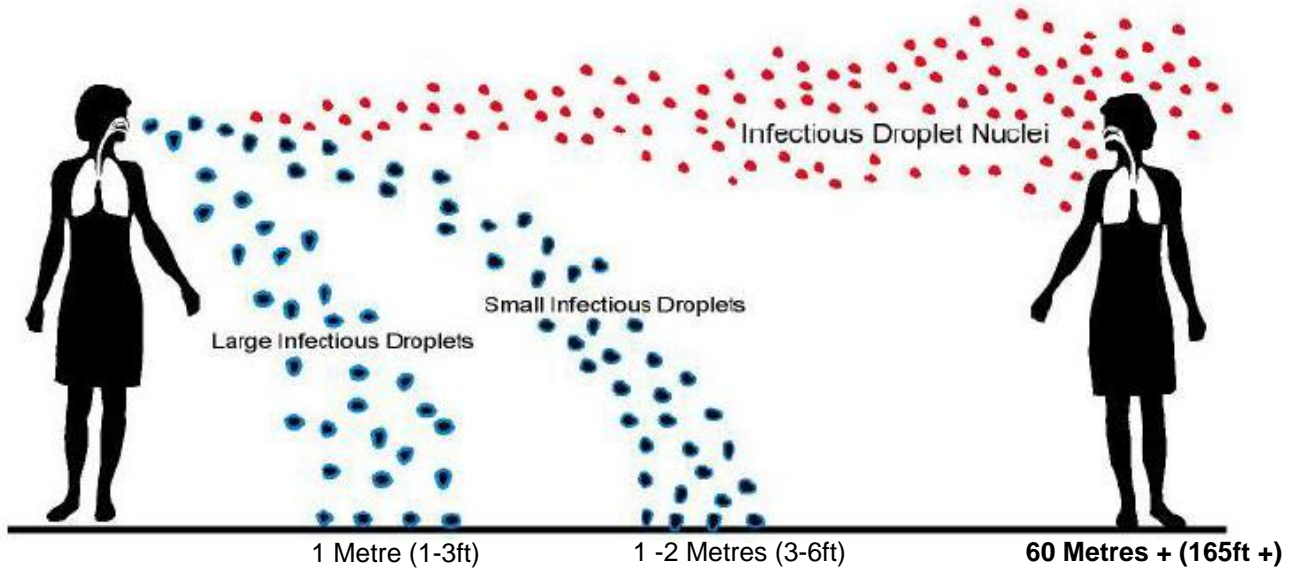
The recirculating air in HVAC systems creates redundancy in exposing microorganisms to UVC, ensuring multiple passes so the light energy is effective against large quantities of airborne microorganisms. Steril-Aire UVC delivers the highest UVC output, driving HVAC system efficiency while improving indoor air quality.

## Transmission of Corona and Other Viruses in Buildings

### Stages of Infectious Droplets & Droplet Nuclei:

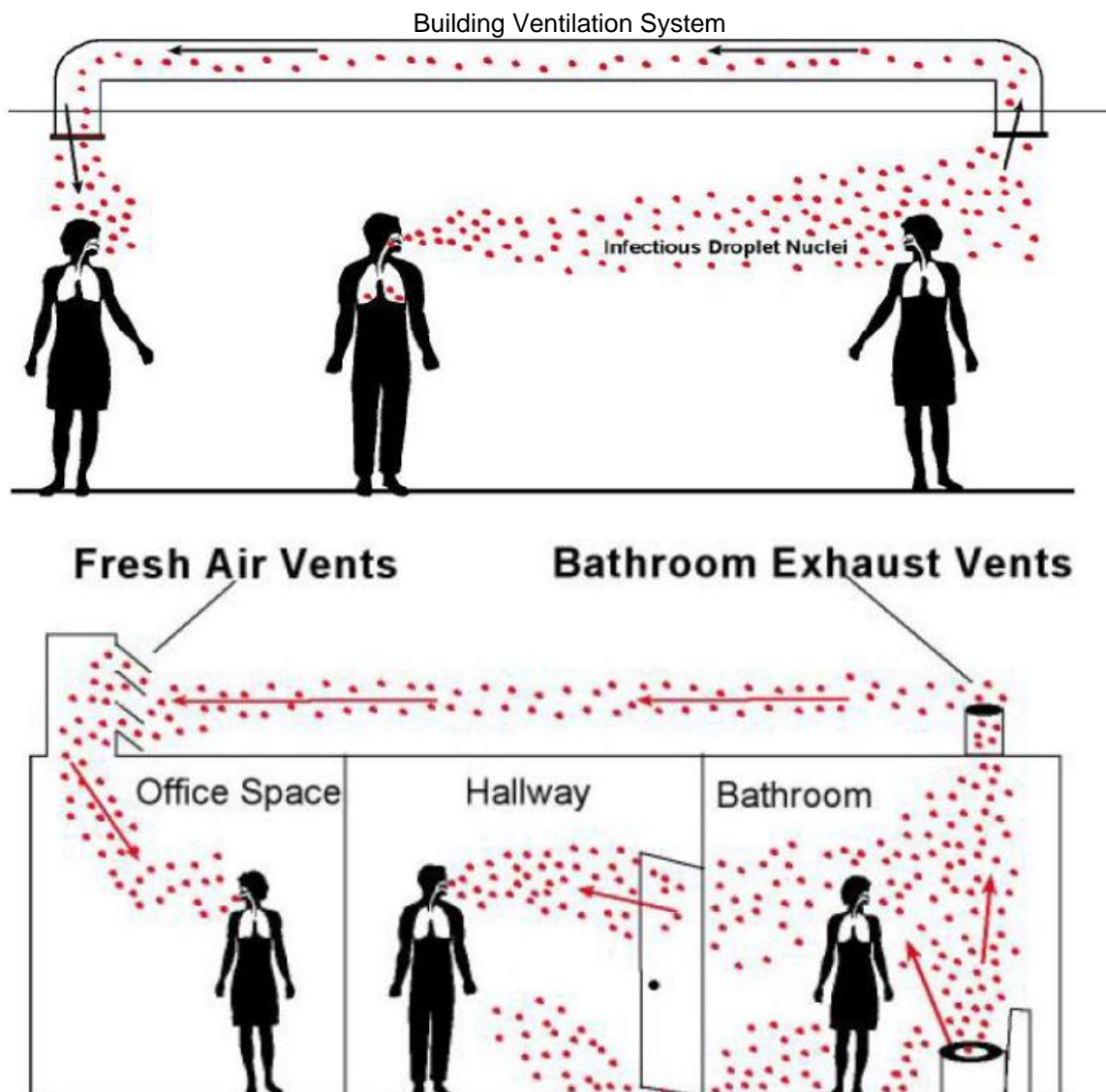
	<p><b>Large Infectious Droplets:</b> Mucus/water encased Viruses are aerosolised by the infector or by toilet water. These quickly fall to the ground after traveling up to 1 Metre (1-3ft)</p>
	<p><b>Small Infectious Droplets:</b> Mucus/water coating starts to evaporate. These will travel 1 to 2 Metres (3-6 ft) before falling to the ground. These droplets can become <b>Droplet Nuclei</b></p>
	<p><b>Infectious Droplet Nuclei:</b> Mucus/water coating has totally evaporated leaving only the VIRON. <b>This is a Droplet Nuclei</b> Droplet Nuclei are so microscopic they can float in the air indefinitely</p>

## Infectious Droplet & Droplet Nuclei travel lengths:

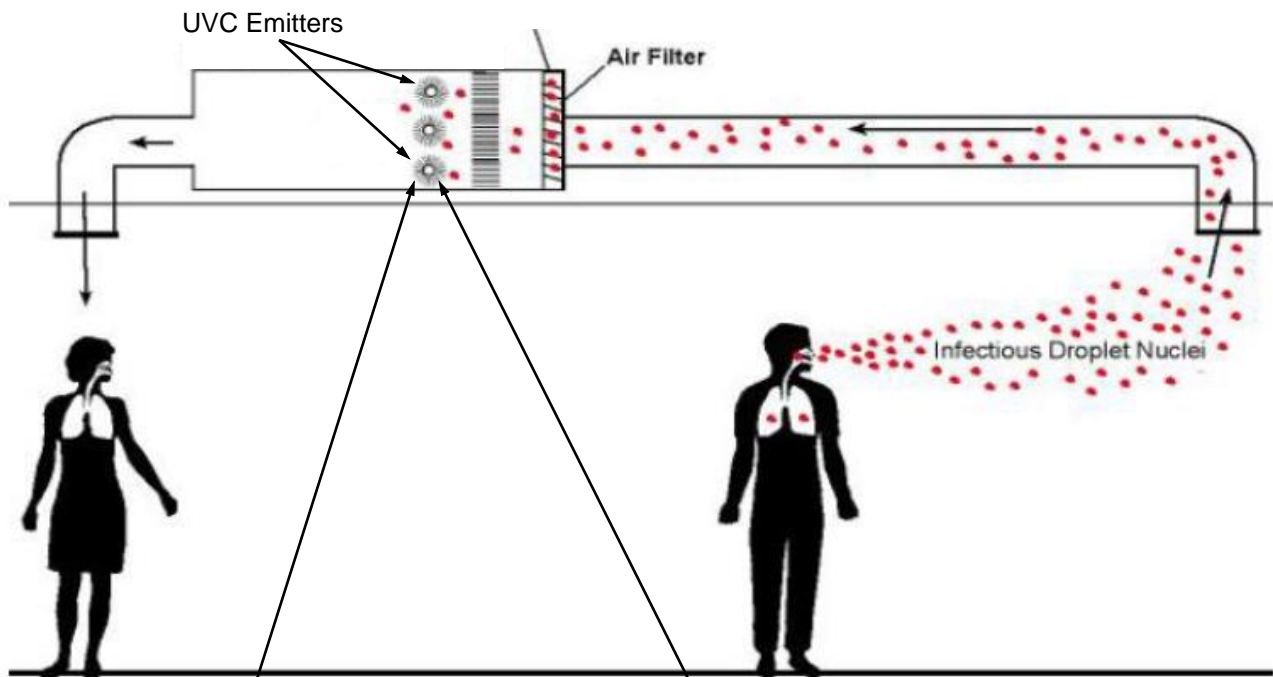


Note: Droplet Nuclei Viruses are below  $0.3\mu$  (microns) and typically in the millimicrons, they can Penetrate Deeply into the Human Lungs.

## Examples of how Occupant Aerosolised Droplet Nuclei travel both within indoor spaces and then throughout a Building:



## How Steril-Aire Emitters inactivate airborne Infectious Droplet Nuclei:

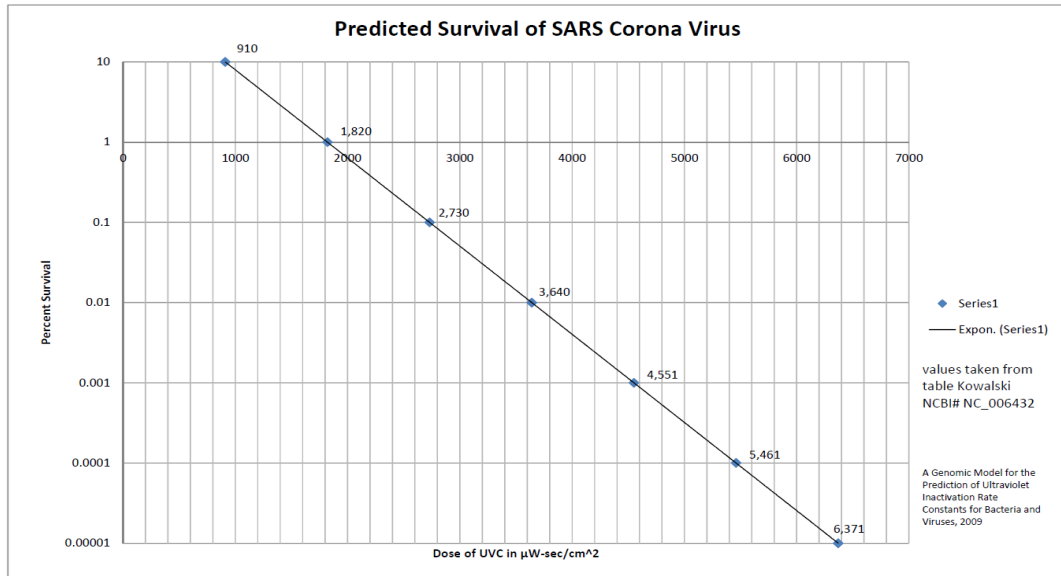


**UVC Energy Fields generated in Air Conditioning systems by Steril-Aire create a barrier that destroys the Droplet Nuclei from Corona Virus, SARS, Measles and Influenza etc**

- Humidity Levels within air-conditioned buildings typically have lower humidity than outside which allows Viruses to Evaporate faster thus creating **More Droplet Nuclei**.
- Lower humidity in buildings allows *Droplet Nuclei* to stay airborne longer as the droplets do not absorb water weight which cause them to fall to the ground.
- Indoor Air currents created by both HVAC systems and People movement assure that *Droplet Nuclei* will remain airborne **Indefinitely**.
- This allows HVAC systems to redistribute *Droplet Nuclei* throughout the building to infect more occupants.



## Typical Steril-Aire UVC selection performance:



### Example Inactivation Rates on a typical AHU selection:

$$\mu\text{J} = \text{Intensity } (\mu\text{W}/\text{cm}^2) \times \text{Time}$$

SARS Corona Virus 99.9% Inactivation = 2730  $\mu\text{J}/\text{cm}^2$

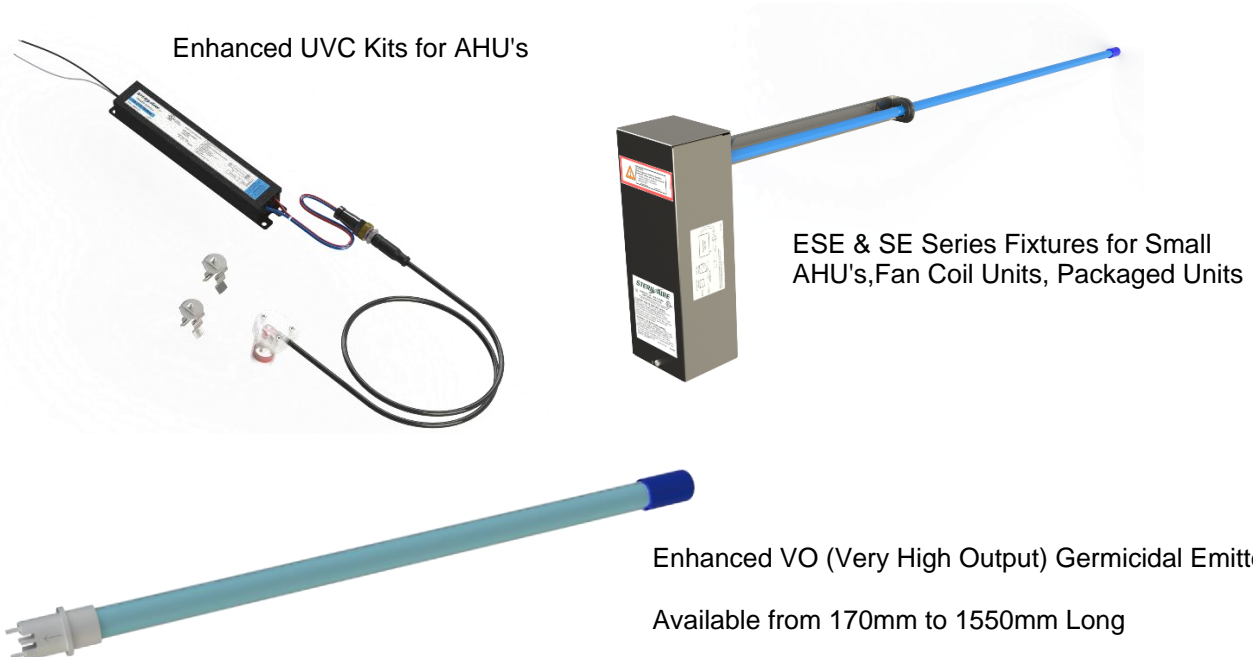
Coil Face Intensity (avg) = 3538  $\mu\text{Watts}/\text{cm}^2$

For 99.9% inactivation using our typical selection on an AHU

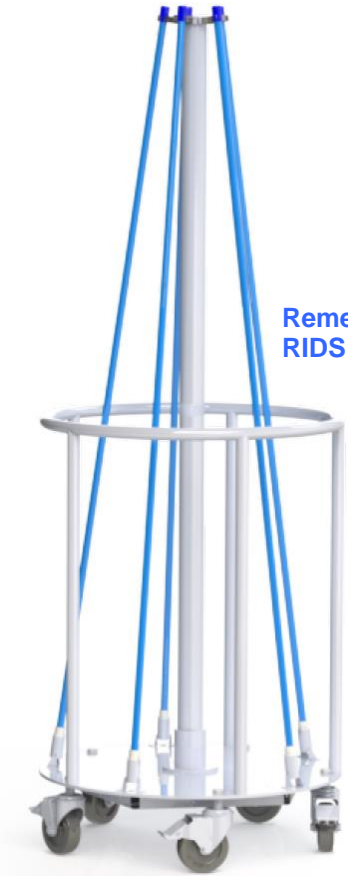
**Inactivation at coil face =  $2730 \mu\text{J}/\text{cm}^2 \div 3538 \mu\text{W}/\text{cm}^2 = 0.77$  seconds**

UVC energy fields closer to the lamps will result in quicker inactivation

### AHU, FCU. Rooftop Packaged Unit, Split System Steril-Aire Solutions:



**Surface Decontamination and Stand-Alone Solutions:**



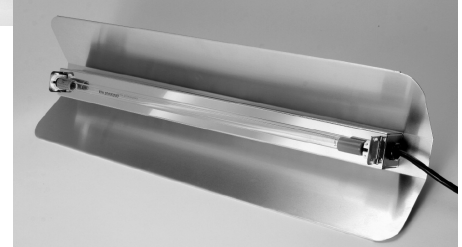
**Remedial In-Room Decontamination System  
RIDS**

**Self Contained Room Sanitizer  
Decontaminate Air & Surfaces**



**Steril-Wand**

**Hand-Held surface  
decontamination**



**DE422 Ceiling/Wall decontamination Unit**



**Steril-Zone**

**3-Stage cleaning Process In-Room portable Air Purifier**

**'Providing significant levels of Pandemic Protection'**

*Malcolm Cain*

*Managing Director – Steril-Aire Oceania*

**Sources:**

1. 'Transmission of Influenza & other Viruses in Indoor Air' - Federal Interagency Committee for IAQ, EPA 2009
2. 'Microbiomes of the Built Environment' – The National Academies of Science, Engineering, Medicine.
3. 'Airborne Infectious Diseases' – ASHRAE Position Document, 2009
4. 'The effectiveness of UVGI Coil Treatment on Typical HVAC System Cooling Coils' - Timothy Leach