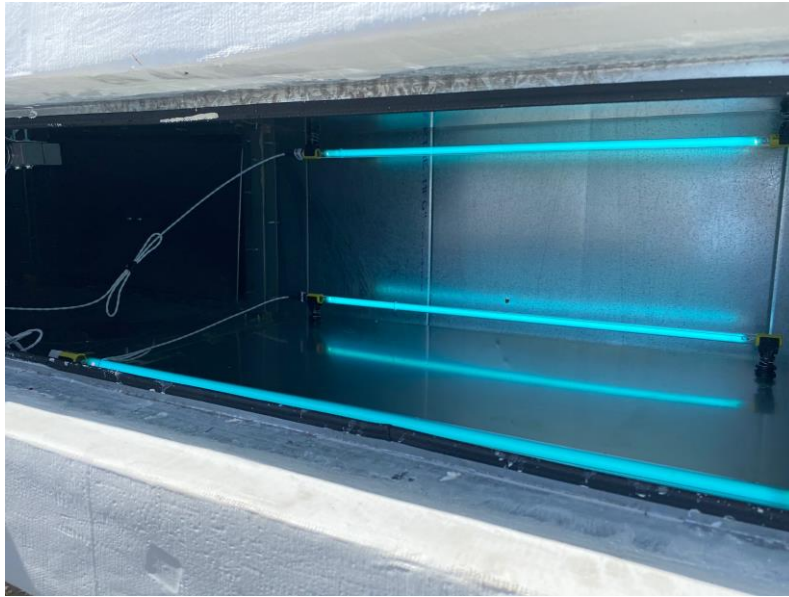


V-Max Grid

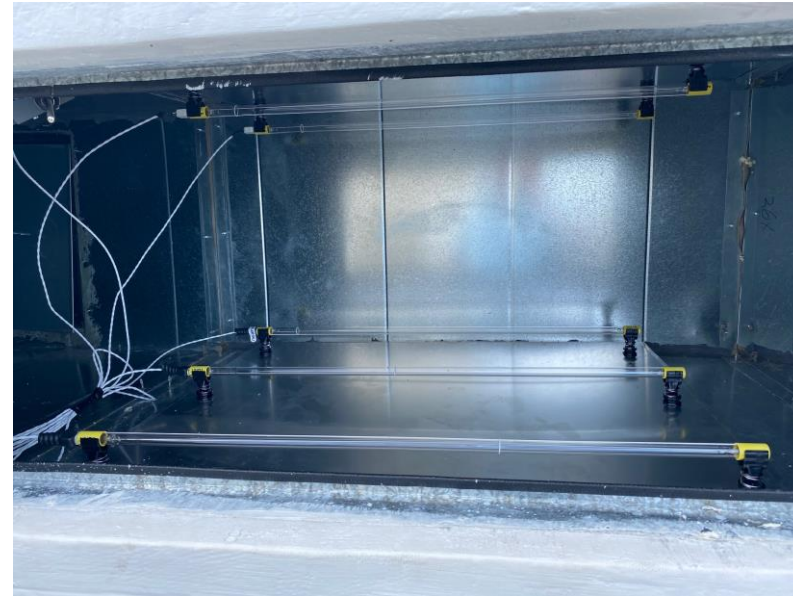
Installation of a V-Max Grid
for Air Disinfection.



V-Max Duct Installations



V-Max Duct Installation



Specification & Selection

Provide a minimum dose of 1,940 $\mu\text{J}/\text{cm}^2$ for first pass disinfection of at least 90% Influenza and over 99% SARS-CoV. Minimum allowable intensity shall be based on performance after one year of continuous lamp use. Manufacturer to provide validated modeling.

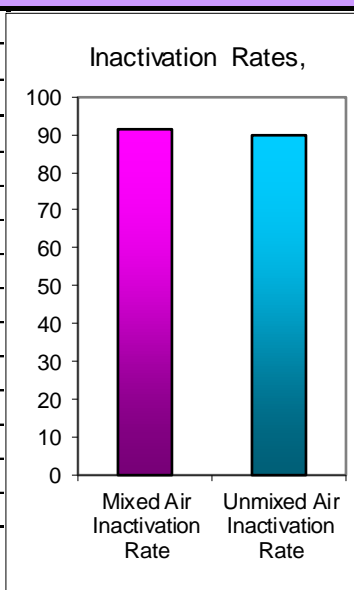
Modeling

Target Microbe and Dose for 90% Inactivation		
Microbe	<i>Influenza A virus</i>	
Microbe Rate Constant	0.0011870	cm ² /μJ
Dose for 90% Kill (D90)	1940	μJ/cm ²

UV Exposure Dose =	2092	μJ/cm ²
URV =	13	

- Duct size Modeled
 - 22”Hx88”Wx60”L
 - 18,000 CFM / ~1,339 FPM
 - 99.9%+ Removal SARS-CoV

SUMMARY OF RESULTS		
Target Microbe	<i>Influenza A virus</i>	
Target Dose for 90% Inactivation	1940	μJ/cm ²
Number of Lamps	14	
Average Direct Irradiance	4432	μW/cm ²
Average First Reflection Irradiance	3130	μW/cm ²
Average Inter-reflection Irradiance	1774	μW/cm ²
Total Average Irradiance	9336	μW/cm ²
URV (UVGI Rating Value)	13	
Overall Exposure Time	0.22	sec
Air Velocity	6.80	m/s
Total Dose	2091.93	μJ/cm ²
Mixed Air Inactivation Rate	91.7	%
Unmixed Air Inactivation Rate	90.1	%
Average Inactivation Rate	90.9	%



UV Coil Cleaning Example

- UV systems destroy bacteria, mold and organic matter that grows and collects on cooling coils
- The resulting increase in HVAC cooling capacity and decreased pressure drop results in energy savings of up to 15% in some systems
- UV is a 24/7 maintenance system that eliminates the need for periodic mechanical coil cleaning



Clogged Coil



UV destroys biofilm

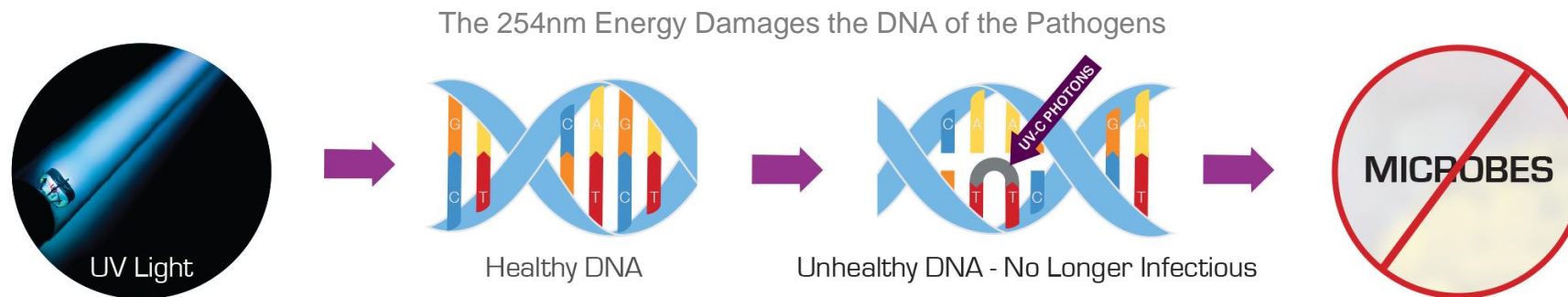


Clean Coil after 3 months

Ultraviolet Germicidal Irradiation

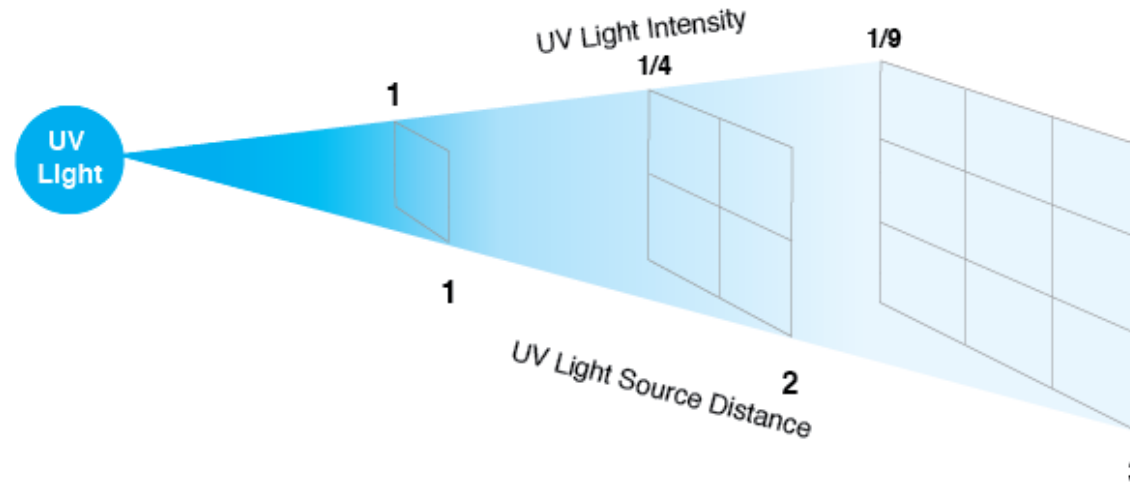
How UV Disinfects

UV-C energy alters the DNA of microorganisms preventing them from reproducing and causing them to become non-pathogenic, or incapable of causing disease.



UV-C Intensity Characteristics

Inverse-Square Law of Light

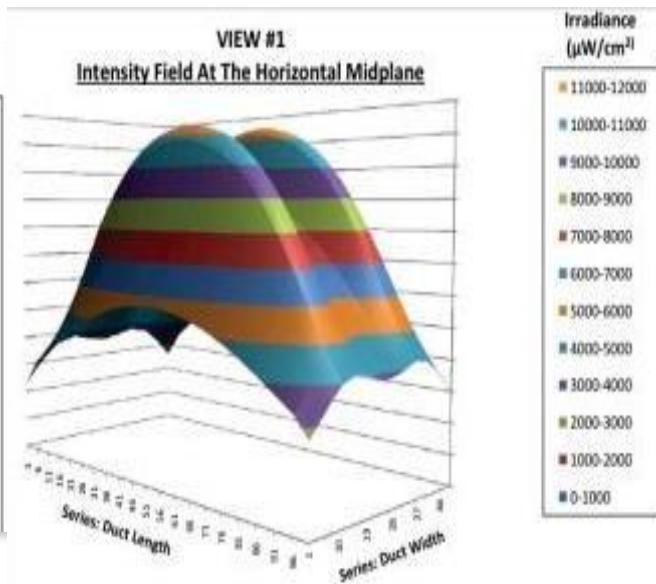
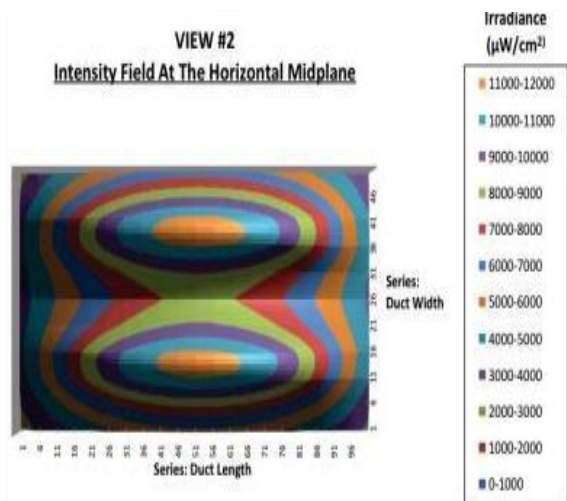


UV-C irradiation also obeys the inverse-square law of light, where the intensity at a given point is inversely proportional to the square of its distance from the light source.

Proper Dose Is Critical For Application

$$Dose \left(\frac{\mu J}{cm^2} \right) = Intensity \left(\frac{\mu W}{cm^2} \right) \times Time (s)$$

- Dosage = Intensity x Time
- UVDI has developed sophisticated UV system modeling tools that have been validated by Pennsylvania State University



Intensity vs Time

