

Light is germ fighting

AirZing™ UV-C Fixture for Disinfection

Powered by OSRAM PURITEC® HNS® UV-C Lamps

Customer Presentation | August 25, 2020

AGENDA

What is UV-C

What is AirZing™

How to Use AirZing™

Areas of Application

What is UV-C

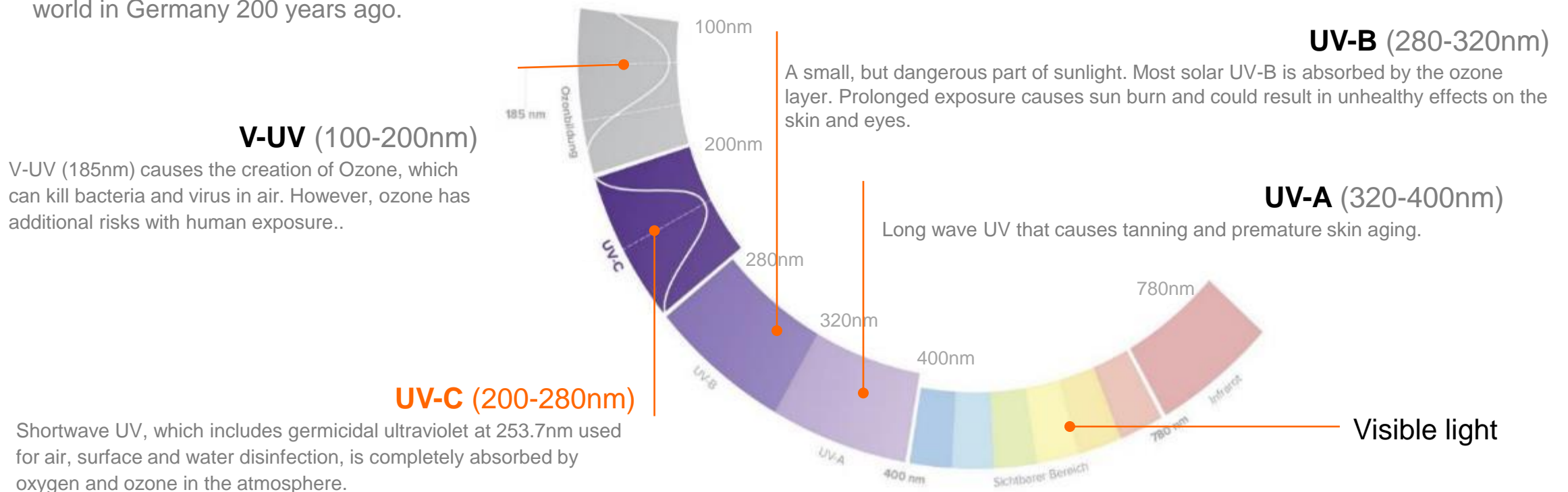
What is AirZing™

How to Use AirZing™

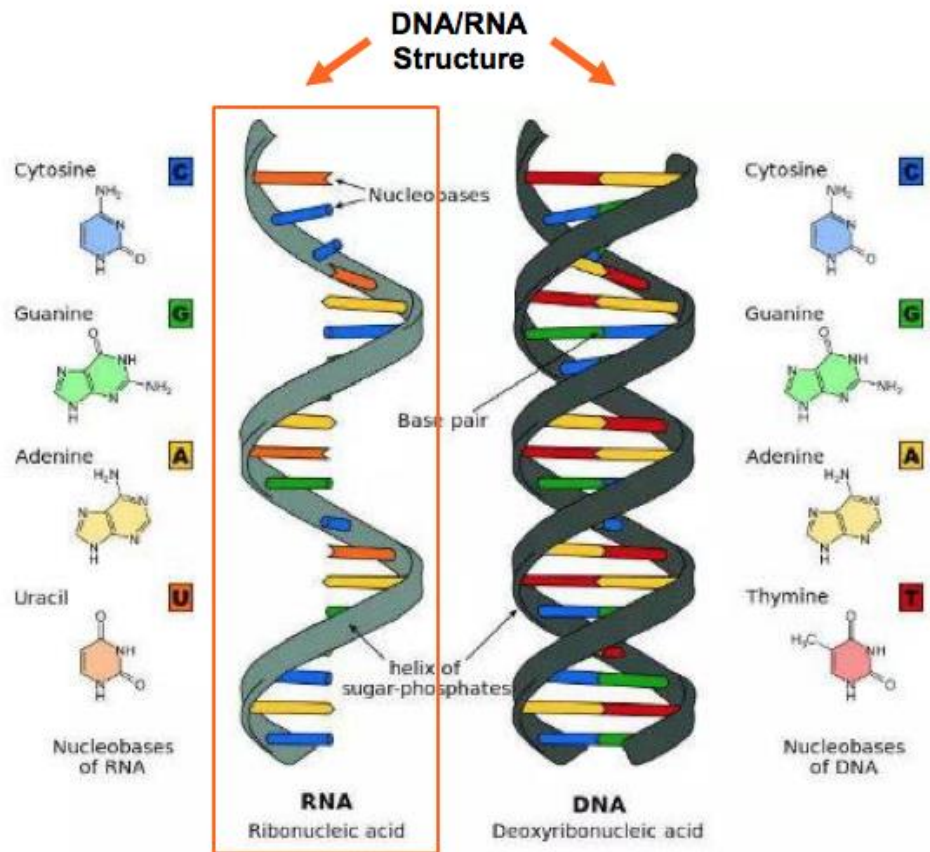
Areas of Application

What is UV-C?

- The sun emits radiant energy at various wavelengths, which are represented by the electromagnetic spectrum.
- UV radiation is part of the non-visible portion of the spectrum, with wavelengths between 100-400nm, and is defined into distinct categories, including UV-A, UV-B, UV-C and V-UV.
- UV-C is completely absorbed within the ozone layer and is not part of the sun's energy that reaches the Earth's surface.
- For germicidal disinfection UV-C radiation is created using artificial light sources, with the first UV-C light source being introduced to the world in Germany 200 years ago.

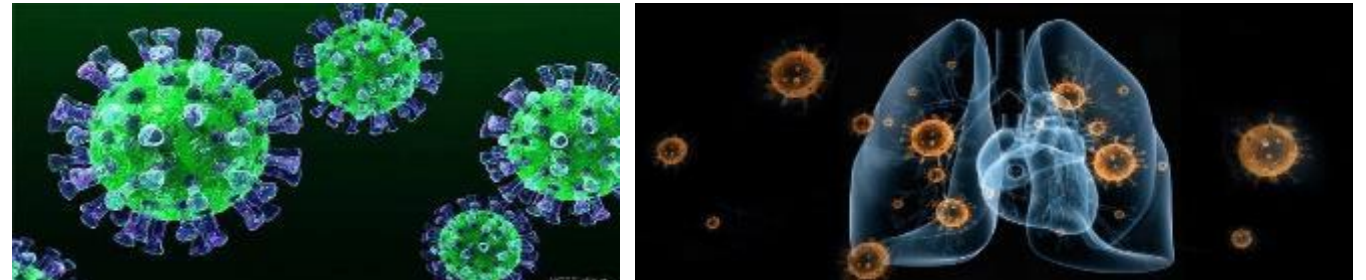


UV-C: An Industry Proven Technology for Disinfection



The cell nucleus of microorganisms (bacteria and viruses) contains thymine, a chemical element of the DNA/RNA. This element absorbs UV-C at a specific wavelength of 253.7nm and changes to such an extent (formation of thymine dimers) that the cells are no longer capable of multiplying and surviving.

- UV-C (253.7nm) penetrates the cell wall of the microorganism
- The high energy photons of the UV-C are absorbed by the cell proteins and DNA/RNA
- UV-C damages the protein structure causing metabolic disruption
- DNA/RNA is chemically altered so organisms can no longer replicate
- Because microorganisms are now unable to metabolize and replicate, the UV-C light has effectively and safely disinfected the UV-C workspace.



Coronavirus (SARS-CoV-2) has typical RNA structure

**Over the years, testing on UV-C for disinfection of water, air and surfaces has been conducted, and effectiveness of UV-C against viruses and bacteria have been well documented. Helpful industry references include: IUVA, IES, and CIE.

UV-C: Is it Effective Against Coronavirus (SARS-CoV-2)?

Industry sources indicate that SARS-CoV-2 is sensitive to UV-C:

IUVA – International Ultraviolet Association

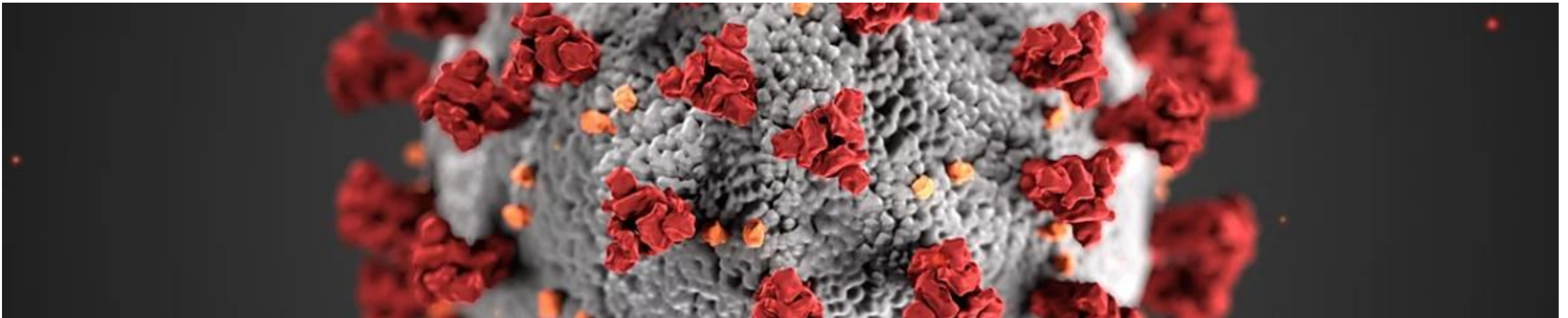
- http://www.iuva.org/resources/IUVA_Fact_Sheet_on_COVID_19.pdf

IES - Illuminating Engineering Society (IES CR-2-20-V1)

- <https://media.ies.org/docs/standards/IES%20CR-2-20-V1a-20200507.pdf>

Study at the University of Milan

- <https://www.news-medical.net/news/20200608/Irradiation-with-UV-light-kills-SARS-CoV-2.aspx>



What is UV-C

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Areas of Application

AirZing™ UV-C Light Fixture for Disinfection

powered by OSRAM UV-C Germicidal PURITEC® HNS® lamp

Designed in
GERMANY

Key Benefits

- Simple, yet high performance fixture
- Cost effective
- Easy to install
- Safety shutoff feature using IR motion sensor technology
- Does not generate ozone
- 3-year warranty

Effective
99.9%
Disinfection
Effectiveness

Precise
253.7nm
UV
Wavelength

Premium
0
Ozone-free
Emission

Powerful
360°
Coverage
Area

Smart
IR
Motion
Sensor

OSRAM PURITEC® HNS® UV Lamp

- Premium quality
- 253.7nm UV-C light output
- Ozone-free emissions

Integrated OSRAM Ballast

- Specially designed ballasts to optimize performance of OSRAM HNS UV-C lamps

IR Sensor – Safety Kit

- 30s delayed start
- IR motion sensor switches off lighting system immediately when it detects people coming into the UV workspace
- Coverage area between 864-1,614ft² (80-150m²), depending on installation height

Metal Screw

- UV-C resistant coating

Lamp Holder

- Easy lamp installation

Special Plastic Housing

- UV-C resistant coating



AirZing™ PRO 5030 UNIV

Technical data



Product Name	AirZing PRO 5030 UNIV
Product Number	55028
Input Voltage	100-277V
Output Current	360 mA
Input Current	0.30A @ 120V
Power Consumption	34W
Lamp Wattage	30W
Power Factor	>0.9
Total Harmonic Distortion (THD)	<20%
UV-C Output (253.7nm)	11-12W
Initial UV-C Irradiance	>0.13W/ft ² @ 3ft (>1.2W/m ² @1m)
UV-C Irradiance @ 9000 hrs	>0.11W/ft ² @ 3ft (>0.96W/m ² @1m)
Lamp Lifetime	9000 hrs
Dimensions (l x w x h) (in)	40.0 x 3.2 x 2.2
Dimensions (l x w x h) (mm)	1015 x 81 x 75
Weight (Fixture with lamp)	2.9 lbs (1.3 kg)
Operational Temperature	14°F to 95°F (-10°C to 35°C)
Storage Temperature	-4°F to 140°F (-20°C to 60°C)
Fixture Warranty	3 years
OSRAM Lamp Name	G30T8/OF (PURITEC HNS 30W G13)
OSRAM Lamp Product Number	21080

Replacement Lamp for AirZing™ PRO 5030 UNIV OSRAM G30T8/OF (PURITEC® HNS® 30W G13)



Product Number	21080
Product Name	G30T8/OF (PURITEC HNS 30W G13)
Brand	OSRAM
Nominal Wattage	30W
Nominal Voltage	96V
Current	0.37A
Average Rated Life	9,000 hrs.
Base	G13
Maximum Overall Length	908.8mm / 35.8in
Diameter	26mm / 1.0in

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Understanding UV-C Application & Safety Precautions

WARNING

Exposure to UV-C light can cause injury to the eyes and skin. To prevent possible injury, eyes and skin should not be exposed to direct or reflected ultraviolet light emitted by this lamp. This lamp is in Risk Group 3 per IEC 62471-2. Adequate protection should be provided by clothing, gloves, opaque materials, UV-C blocking eyewear and ordinary window glass.



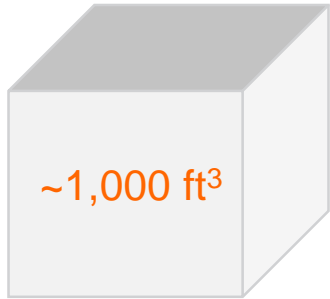
Important application notes:

- ✓ This product should only be installed by a licensed electrician, and safety measures such as interlocking devices, lockouts, safety switches or separating on/off switches for the product from other on/off switches are recommended.
- ✓ Although the lamp will operate in standard fluorescent fixtures, it should not be used for general lighting applications.
- ✓ The workspace should be clear of people and animals during operation.
- ✓ This product is most effective on surfaces directly exposed to the UV-C light; soiled surfaces, porous materials or recessed areas may not be disinfected.
- ✓ UV-C can age non-metallic materials such as plastic, rubber, paint, etc., and can damage plants. Shield all non-metallic materials exposed under UV-C light when using this product.
- ✓ This product is not suitable for the cleaning, disinfection or sterilization of medical devices.

UV-C Exposure Times

Air disinfection (test result)

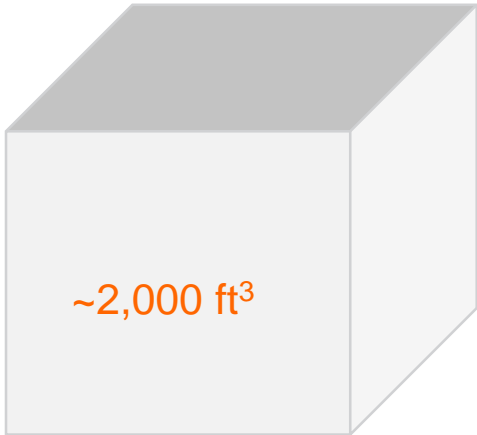
PRO
5030



+



deactivating
>99%
of microorganisms



+



deactivating
>99%
of microorganisms

Test result shows:
Doubling the operation duration can achieve up to 99.9% disinfection

Application Recommendation based on air disinfection

AirZing™ can be **ceiling mounted** or **wall mounted**, the installation height of a general space is between **8 - 13ft (2.5 - 4m)**.

30W

The coverage area of one fixture is **129ft² – 161ft² (~12-15m²)**

Exposure time for one fixture if the workspace is:

- **< 86ft² (<8m²)** - 30 min recommended
- **86-129ft² (8 - 12m²)** - 45 min recommended
- **129-161ft² (12 - 15m²)** - 60 min recommended
- **> 161ft² (>15m²)** - multiple fixtures recommended



At height ~ 10ft



Note: to reduce exposure times or treat larger spaces, additional fixtures may be used.

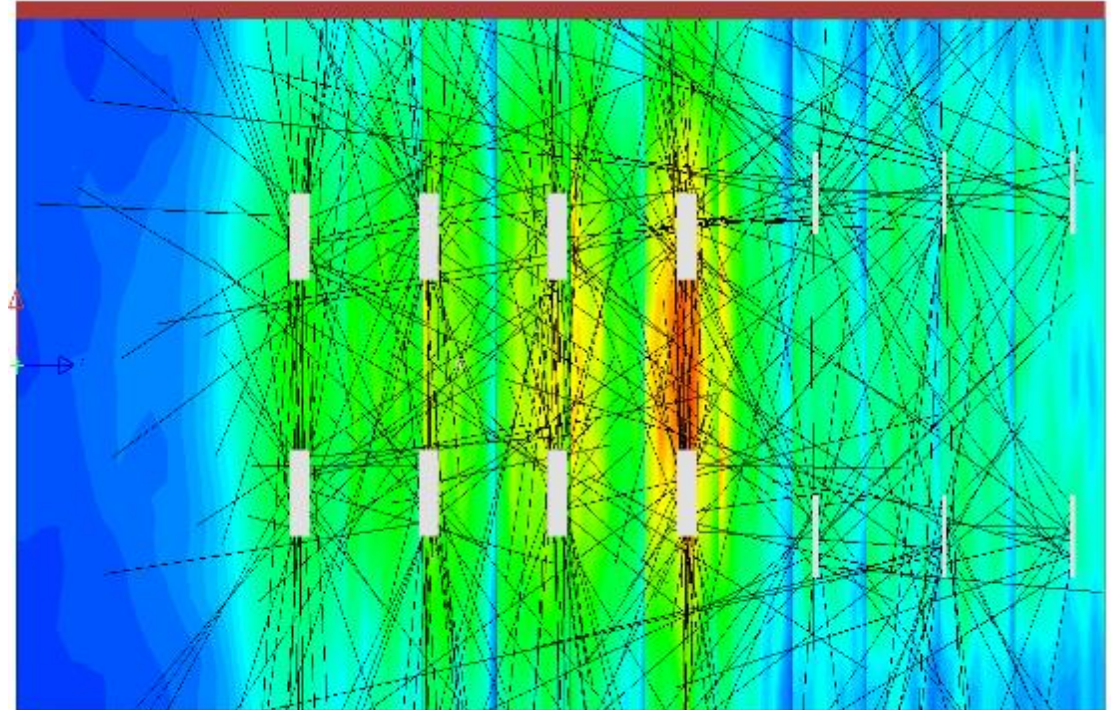
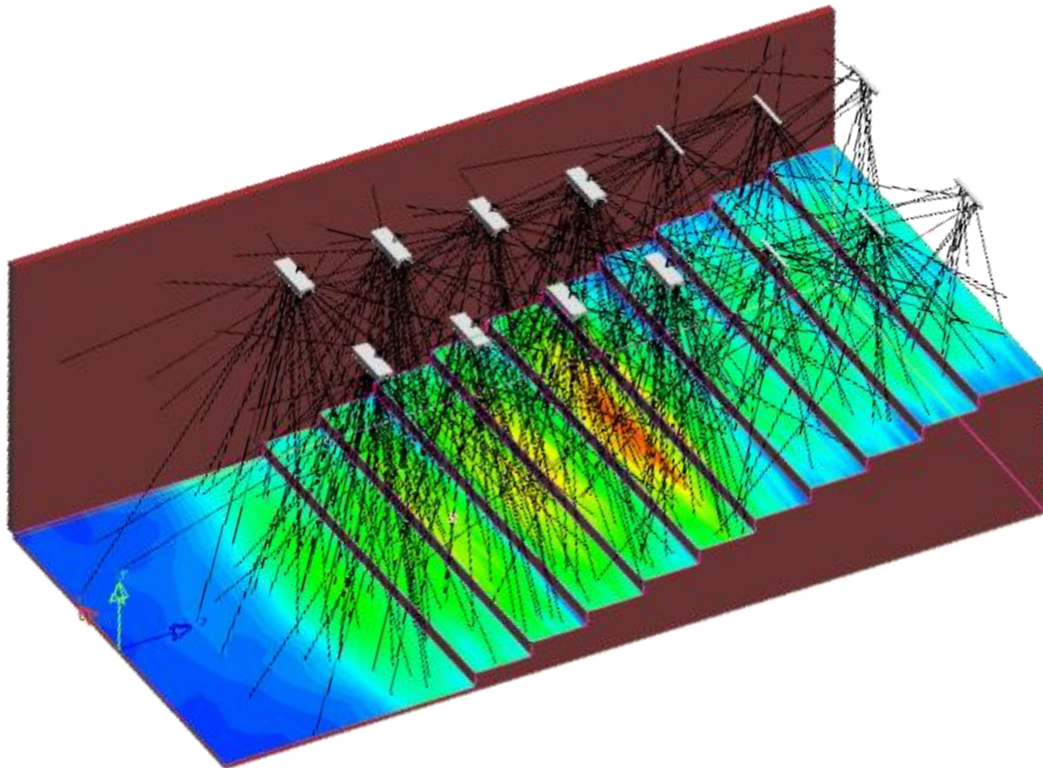
Additional Application Support

LightTools

For more complex spaces additional application support can be provided.

Example: Ceiling mounted medium to large hall application

$H_{\max} \leq 25\text{ft}$



Application Recommendation based on surface disinfection

Exposure time needed depends on:

Microorganism's UV Susceptibility

A microorganism's structure and inherent ability to recover from damage induced by UV-C light



Important note:

- UV-C is most effective on surfaces directly exposed to the UV-C light; soiled surfaces, porous materials or recessed areas may not be disinfected.

UV Dose = Exposure Time x UV Irradiance

Microorganism	J/m ²
Microorganism	99%
Bacillus anthracis (vegetative)	90.4
S. enteritidis	80
B. megatherium sp. (veg.)	75
B. megatherium sp. (spores)	56
B. paratyphosus	64
B. subtilis (mixed)	142
B. subtilis spores	240
Corynebacterium diptheriae	68
Eberthella typhosa	42.8
Micrococcus candidus	121
Micrococcus piltonensis	162
Micrococcus sphaeroides	200
Neisseria catarrhalis	88
Phytomonas tumefaciens	88
Proteus vulgaris	54
Staphylococcus aureus	99

Source: CIE 155:2003 UV Air Disinfection

s	W/m ²
How long do we need to operate our AirZing?	30W
	1.2 @ 1m
	0.20 @ 2.5m
	0.075 @ 4m

For example:

- We use 30W (AirZing PRO 5030 UNIV)
- The installation height is 2.5m
- Our target is to kill 99% of Staphylococcus aureus
- We need to operate:

0.20 W/m²

99 J/m²

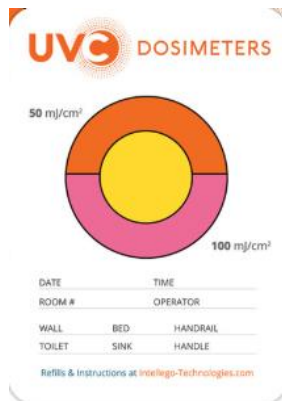
8.25 mins

$$495s = 99J/m^2 \div 0.20 W/m^2$$

Measuring UV-C: Qualitative and Quantitative Methods

Qualitative Method

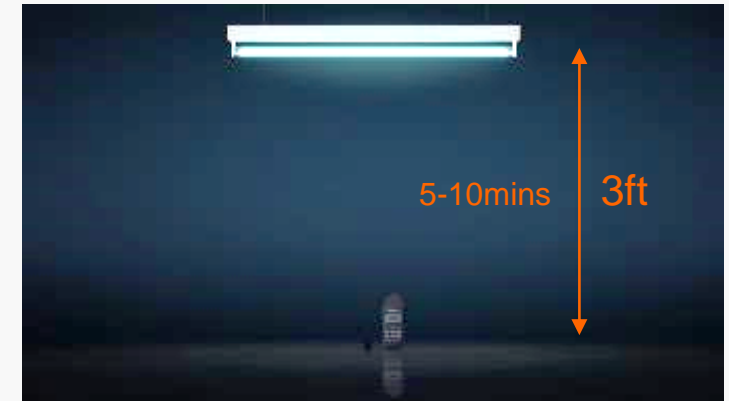
Test paper of UV-C irradiation



Color changes provide indication of UV-C dose

Quantitative Method

UV-C Radiometer



UV-C radiometers are readily available for purchase with a range of features and prices:

- Data storing models are optimal, since they can be operated in the room without a person needing to be present to view the results live. Stored results can be reviewed after the chosen exposure time is completed.
- For models that do not store data, the person operating the radiometer must wear full protective clothing and UV-C blocking eyewear to protect eyes and skin from UV-C exposure during testing.

Numeric result provide measure of UV-C dose

IR Motion Sensor Safety Feature

General Safety Guidelines:

1. Install the fixture following the guidelines in the Installation & Safety Manual.
2. Ensure staff is trained to operate AirZing safely.
3. Display signage to alert people that UV-C is in service.
4. As an added safety precaution the AirZing is equipped with a high performance IR Motion Sensor.



Exclusive technology: High performance IR Motion Sensor

Introduced by OSRAM, the IR motion sensor can help to avoid unexpected UV-C exposure to people and animals in the UV-C workspace. Once people walk into the space, the IR motion sensor will detect it and switch off the fixture.

- 30-second delayed start provides time to exit the workspace
- Sensor switches off the fixture when motion is detected in the UV-C workspace
- The fixture will not turn back on automatically; it should be powered off for 5 sec and then turned back on.
- Coverage area of the sensor is between 864-1,614ft², depending on installation height
- UV-C resistant coating

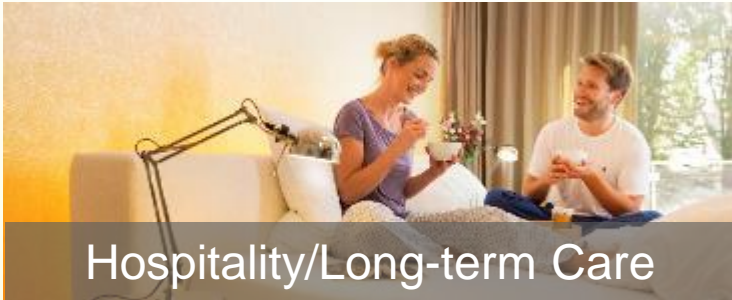
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Area of Applications

AirZing™ can be used in ...



AirZing™ Application Examples



Thank you!