

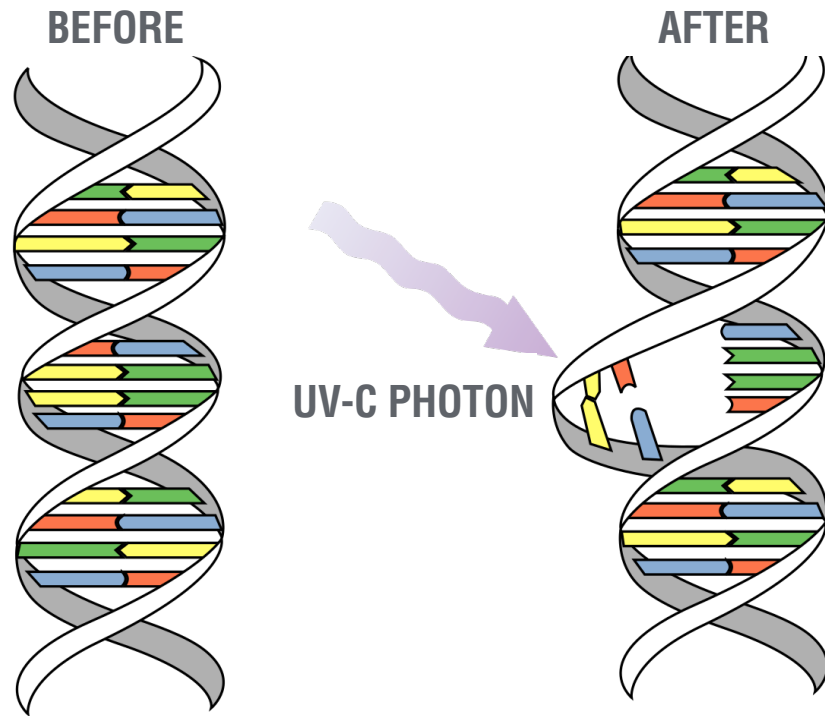
Welt Electronic SpA

**NEW UV-C LED
SOLUTIONS**

Is it possible to sanitize environments and surfaces using UV-C LEDs?

- **Already known the antibacterial and antiviral power of ultra-violet light, LEDs represent for sure an efficient solution for sterilization of environments and surfaces.**
- **The UV-C LEDs are suitable for water, air and surface treatments application, in skin treatments, in medical spectroscopy, in fluorescence analyzers, in food and pharmaceutical transformation, in horticulture lighting.**
- **The COVID-19 infection can be caused touching contaminated surfaces, where the virus can survive up to three days (both on plastic and steel), for this reason it becomes essential to minimize this risk.**
- **The UV-C light, in wavelengths from 200nm to 280nm, inactivates and kills at least two more near-relatives of COVID-19's viruses, the SARSCOV-1 and MERS-CoV, so it's conceivable that it can be equally useful to inactivate COVID-19 as well.**

Efficient against 99,99% of germs and bacteria



From a scientific study about the antimicrobial power of UV-C LEDs we know that they have an efficiency of 4 Log with the elimination of 99,99% of tested microorganisms: E. Coli, Staphylococcus Aureu (MRSA) and Monilia Albican.

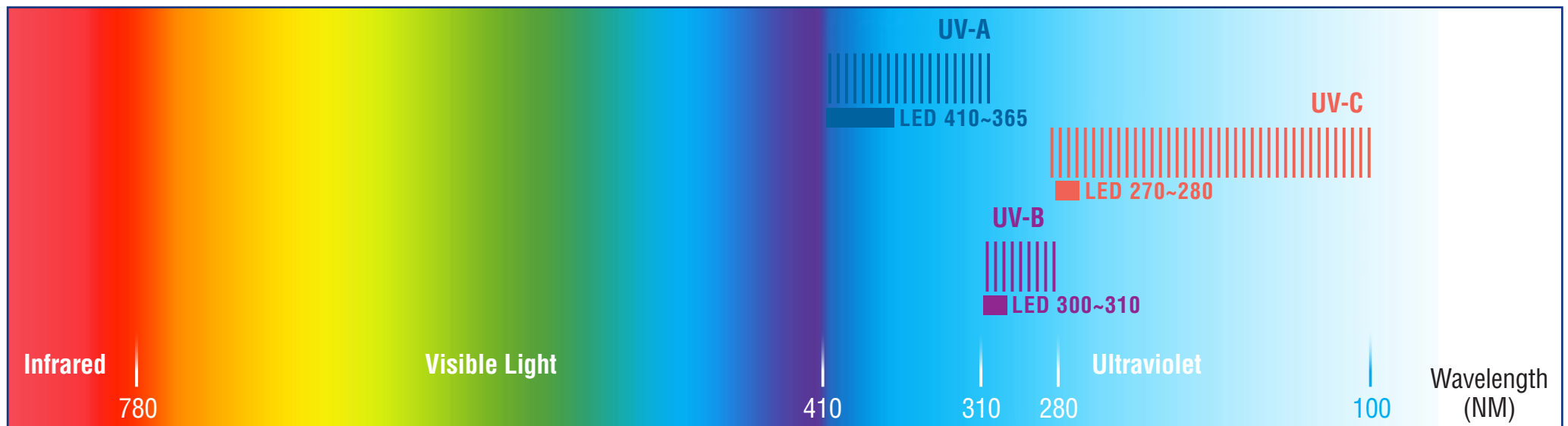
The ultraviolet UV-C LED ray starts a photochemical reaction inside the germs that destroys their DNA, RNA and/or proteins making them unable to reproduce.

| Irradiation Time | 0 sec. | 10 sec. | 20 sec. |
|-----------------------------|--------|---------|---------|
| E.coli (10,000 dilution) | | | |
| Peak Wavelength 280nm | | | |
| Radiant Flux 59mW | | | |

*Note: This data is a reference value, hence Nichia cannot make guarantee these results, Please treat this data the as reference
Information from Nichia Model No, NCSU334BT Product Specification

UV Applications

The UV technology employed to LED lamps can be very useful in lots of applications and it's used in a different way depending on the intensity and wavelength (UV-A, UV-B, UV-C). In particular, it can be very efficient to reduce the quantity of bacteria, the virulence of harmful organisms, the presence of pathogens and bad smells in general.



| Industrial | Residential | Bio |
|--|---------------------|---------------|
| Counterfeit money detector/Entertainment | Sterilization | Horticulture |
| Ink (Adhesion/Ink/Nail) | Indoor Tanning | Dentist |
| | Surface Distinction | |
| | Photocatalyst | Sterilization |
| | Water Distinction | |
| | Mosquito Killer | |

Main UV LED applications



WATER DISINFECTION

Drinkable water for domestic use

Waste water

Swimming pool

Water purifier



AIR DISINFECTION

Air conditioning system

Office

Healthcare facilities



SURFACES DISINFECTION

Food and pharmaceutical packaging

Aseptic area

Medical equipment

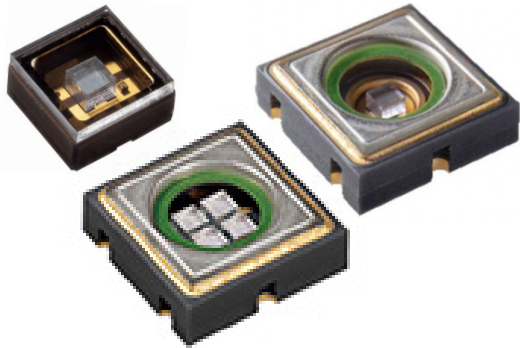
Restaurant and kitchen

Docking station for mobile phones

Beauty equipment

Baby bottle sterilizer

UV-C LED components solutions

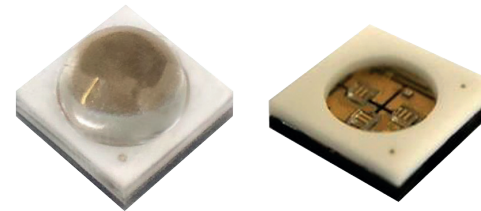


LED UVC NC4U334BRT

LED UVC NCSU334BT

LED UVC NCSU434BT

LED UVC NCSU434AT



UVK5050Q11-B20

UVK5050037-G0



LED UVC PU35CL1-V1

LED UVC PU35CM1-V3

LED UVC PU35CM1-V6

LED UVC PU35CM2-V0

LED UVC PU35CM3-V0

LED UVC PU35CM4-V0

LED UVC PU35CM7-V0

LED UVC PU35CH1-V0

LED UVC PU68CH1-V0

LED UVC PU35CH1-V1



S3535-DR100-W275-P40-V6.5

S6060-DR250-W275-P100-V6.5

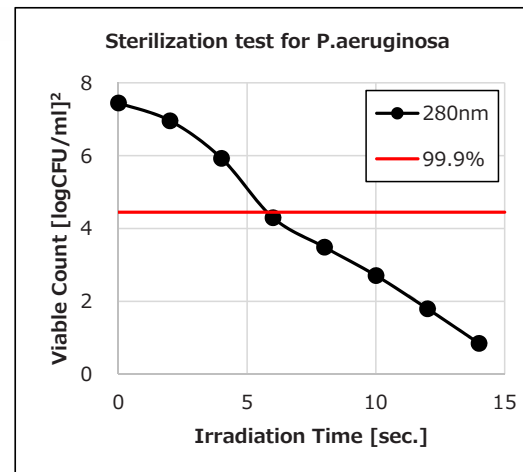
S6060TL-DR250-W275-P90-V6.5

NICHIA UV-C LED

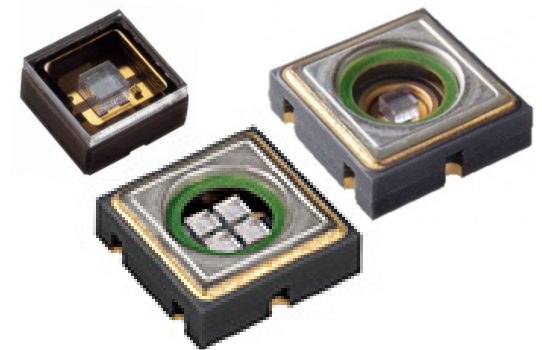
The Nichia's UV-C LED (334 and 434 series) are designed to satisfy the sterilization mass market demand through the solid-state lighting. These small size but highly efficient LEDs guarantee 40% more efficiency than competitors. This solution ensures the maximum miniaturization system and long-time performances more stable than the actual UV-C technologies on market.

| | | | | |
|-------------------------------|------------------------|--------------|-----------|------|
| Part No. | | NCSU334B | | Unit |
| Wavelength Rank | | 280 | | nm |
| Test Condition | Number of LED | | 1 | pc. |
| | Forward Current | | 350 | mA |
| | Peak Wavelength | | 280 | nm |
| | Radiant Flux | | 59 | mW |
| | Working Distance | | 50 | mm |
| Irradiation ¹ Time | Gram Negative Bacteria | E.coli | 14 | sec. |
| | | P.aeruginosa | 6 | |
| | Gram Positive Bacteria | S.aureus | 11 | |

¹ Irradiation time for 99.9% sterilization.



² log = Logarithm
CFU = Colony Forming Unit



| Irradiation Time | 0 sec. (10,000 dilution) | 2 sec. (10,000 dilution) | 4 sec. (10,000 dilution) | 6 sec. (10,000 dilution) | 8 sec. (10,000 dilution) |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| P.aeruginosa Peak Wavelength 280nm Radiant Flux 59mW | | | | | |

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NICHIA UV-C LED

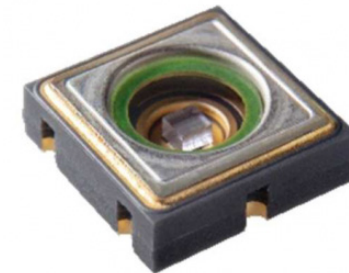
SMD NC4U334BRT UV-C LED features

- High performances with typical radiant flux 200mW
- Peak wavelength 280nm
- Typical voltage 22.5 V, typical current 350mA, maximum current 500mA
- Typical power consumption: 7.87W
- 110° deg viewing angle
- Dimensions (LxWxH): 6.8x6.8x2.12mm



SMD NCSU334BT UV-C LED features

- High performances with typical radiant flux 70mW
- Peak wavelength 280nm
- Typical voltage 5.5 V, typical current 350mA, maximum current 500mA
- Typical power consumption: 1.92W
- 115° deg viewing angle
- Dimensions (LxWxH): 6.8x6.8x2.12mm



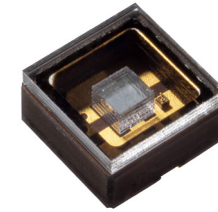
Applications

- Disinfection
- Sterilization

NICHIA UV-C LED

SMD NCSU434BT UV-C LED features

- High performances with typical radiant flux 17,5mW
- Peak wavelength 280nm
- Typical voltage 5.3 V, typical current 350mA, maximum current 500mA
- Typical power consumption: 1.99W
- 110° deg viewing angle
- Dimensions (LxWxH): 3.5x3.5x1.72mm



SMD NCSU434AT UV-C LED features

- High performances with typical radiant flux 17,5mW
- Peak wavelength 280nm
- Typical voltage 5.3 V, typical current 100mA, maximum current 150mA
- Typical power consumption: 0.53W
- 110° deg viewing angle
- Dimensions (LxWxH): 3.5x3.5x1.72mm

Applications

- Disinfection
- Sterilization

LEXTAR UV-C LED

The LEXTAR UV-C LED series includes many different types and powers to be suitable for everyday objects and many other applications.

Test Method: JIS Z 2801
UV LED Model: PU35CM1 V1

| Test Bacteria | Concentration of Bacteria (CFU/mL) | Concentration After Testing (CFU/mL) | | Antibacterial Efficacy (%) |
|------------------------------------|------------------------------------|--------------------------------------|---------------------|----------------------------|
| | | Reference | Treated | |
| Escherichia coli (ATCC 8739) | 9.5×10 ⁵ | 7.9×10 ⁵ | 3.3×10 ⁴ | 95.82 (1 min) |
| | | | 1.7×10 ⁴ | 97.85 (3 min) |
| | | | 6.5×10 ³ | 99.18 (5 min) |
| Staphylococcus aureus (ATCC 6538P) | 4.3×10 ⁵ | 3.8×10 ⁵ | 2.5×10 ³ | 93.42 (1 min) |
| | | | 2.3×10 ³ | 99.39 (3 min) |
| | | | 1.6×10 ³ | 99.58 (5 min) |
| Pseudomonas aeruginosa (ATCC 9027) | 7.2×10 ⁵ | 6.7×10 ⁵ | 1.1×10 ⁴ | 98.36 (1 min) |
| | | | 2.8×10 ³ | 99.58 (3 min) |
| | | | 9.6×10 ² | 99.86 (5 min) |



LEXTAR UV-C LED

APPLICATIONS



High power Air disinfection

- Ultra-high radiant intensity
- High flow rate (>2L/min)



Mid power Water disinfection

- High radiant intensity
- Low flow rate (1-2L/min)



Low power Surface disinfection

- Wide angle
- High performance/cost ratio
- Static state



PU35CL1-V1
3,5 mW
125° - 3535



PU35CM2-V0
12 mW
35° - 3535



PU35CM1-V6
14 mW
60° - 3535



PU35CM1-V3
14 mW
125° - 3535



PU35CM7-V0
25 mW
125° - 3535




PU35CM4-V0
20 mW
35° - 3535



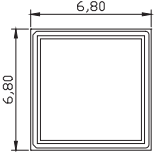
PU35CM3-V0
24 mW
125° - 3535



PU35CH1-V0
50 mW
125° - 3535



PU35CH1-V1
100 mW
125° - 3535



PU68CH1-V1
60 mW
125° - 6868

| | | | | | |
|-----------------|------|-------|-------|-------|-------|
| Typical current | 20mA | 100mA | 200mA | 350mA | 500mA |
| Maximum current | 60mA | 150mA | 300mA | 600mA | 600mA |

LEXTAR UV-C LED

Features

- SMD standard package
- UV-C Wavelength from 270nm to 290nm
- Different emitting angle options from 35° to 125°
- High reliability, long life
- Environmentally friendly, RoHS compliance



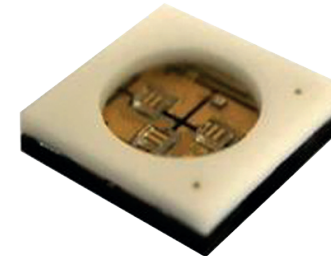
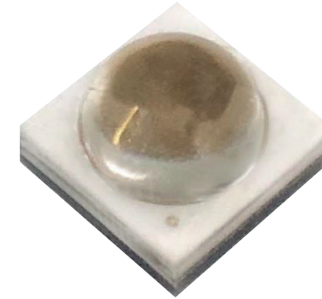
Applications

- Surface sterilization
- Food and pharmaceutical processing
- Air and water disinfection

CT MICRO UV-C LED

Features

- SMD standard package
- UV-C Wavelength from 270nm to 280nm
- Different emitting angle options from 60° to 120°
- High reliability, long life
- Environmentally friendly, RoHS compliance



Applications

- Surface sterilization
- Food and pharmaceutical processing
- Air and water disinfection

BOLB UV-C LED modules

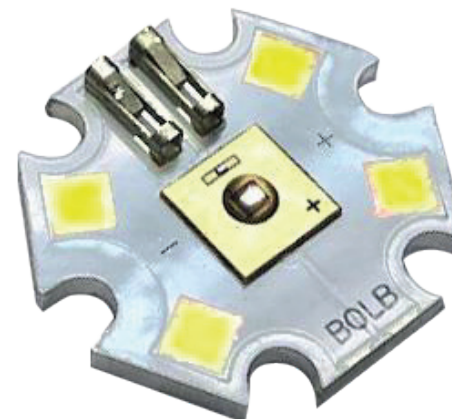
BOLB, Inc. is the new reliable UV-C LED partner specialized in germicidal LED (GLED) which offers significantly higher performance than similar products from other manufacturers and ensures the sterilization of air, water and surfaces.

Features

- SMD standard package
- UV-C Wavelength 275nm
- Different emitting angle options from 40° to 150°
- High reliability, long life
- Environmentally friendly, RoHS compliance

Applications

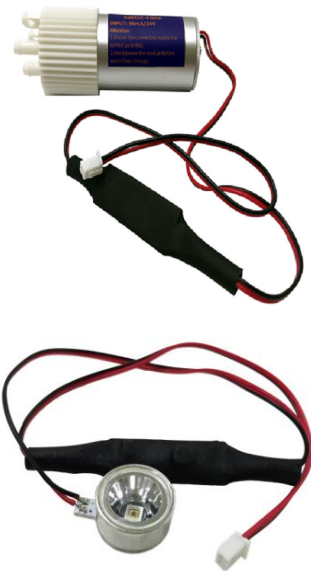
- Surface sterilization
- Food and pharmaceutical processing
- Air and water disinfection



Modules available on request

HARVATEK

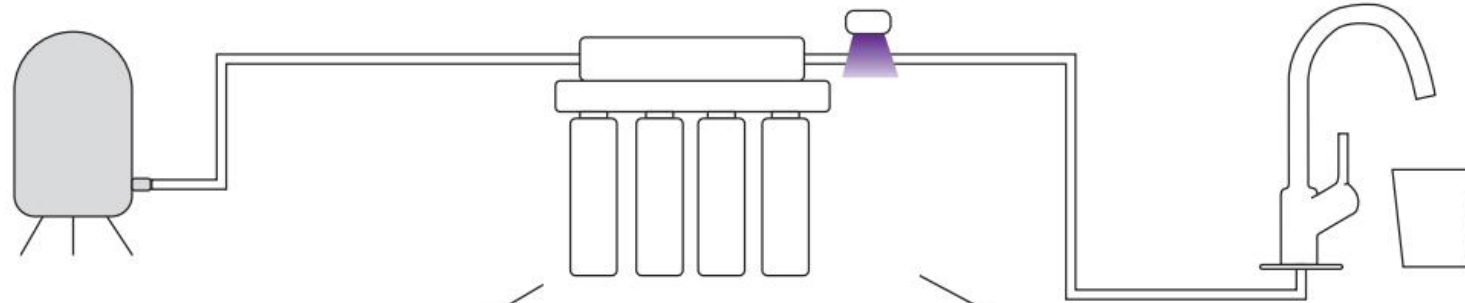
UV-C LED MODULE



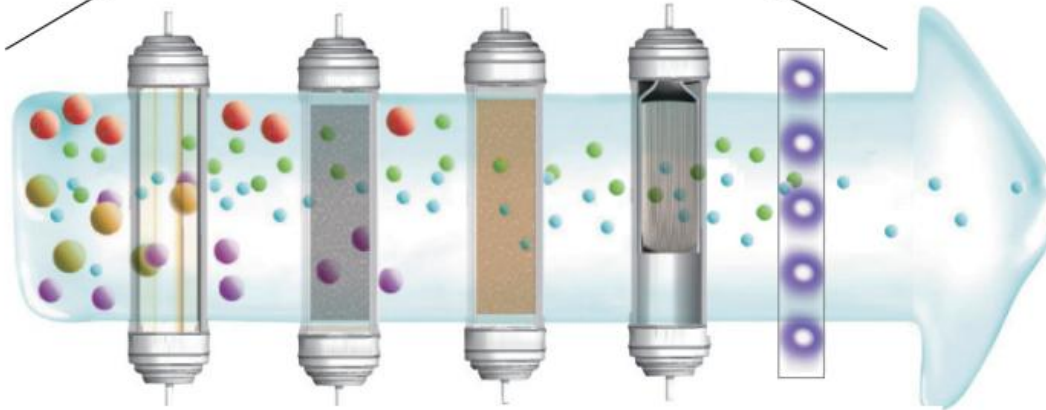
UV-C LED MODULE



HARVATEK UV-C LED MODULES



- Dust, Sand, Rust ●
- Chlorine, Organic, Substance ●
- Odor, Chemicals ●
- Mold, Virus, Bacteria, Germ ●
- Mineral ●



4 Stage Filters

UV-C



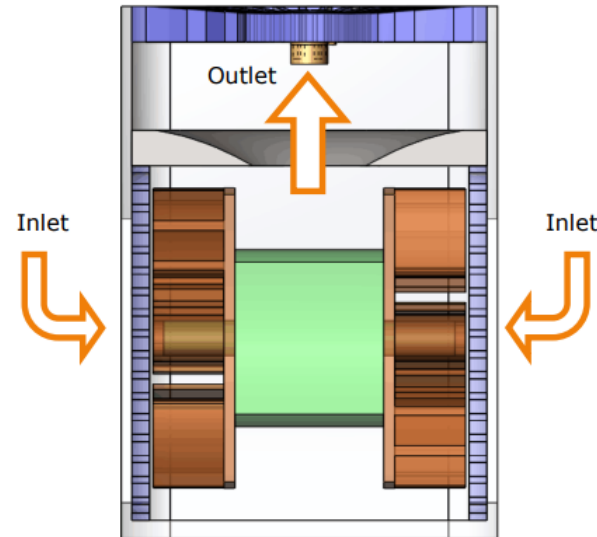
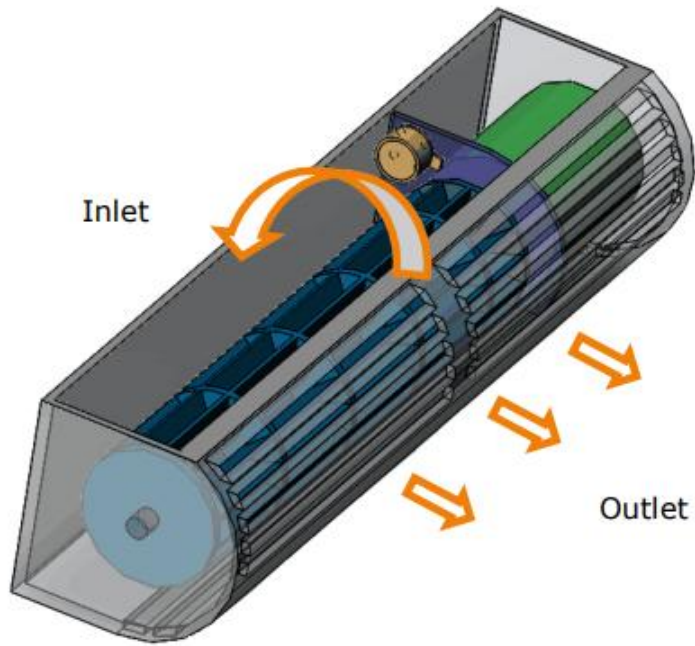
Water flux type

TEST RESULT(S):

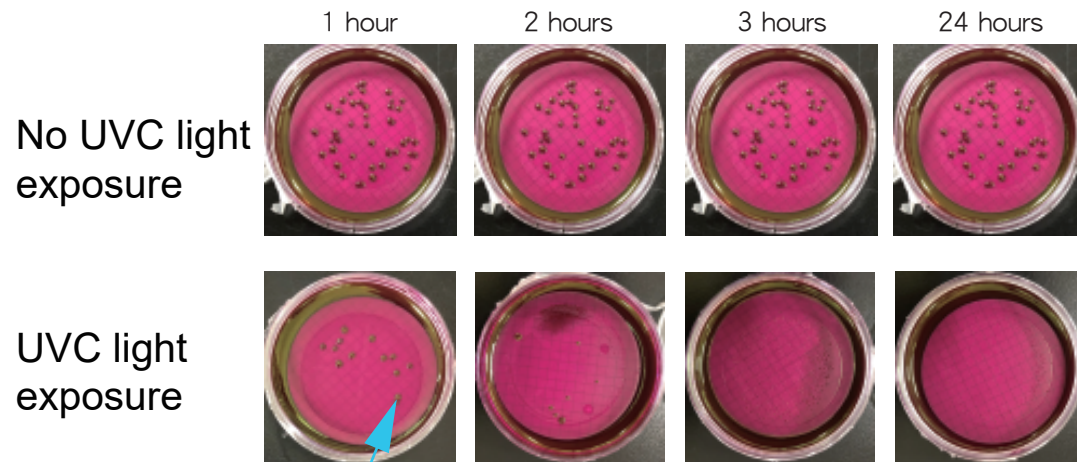
| Test item(s) | Unit(s) | Test method(s) | Test result(s) | | Removal rate(s)(%)** |
|------------------|-----------|-------------------|-----------------------|--------------------------|----------------------|
| | | | Influent spiked water | Effluent filtrated water | |
| Total coliforms* | cfu/100mL | GB/T 5750.12-2006 | 8.0×10^4 | <1 | >99.99 |



HARVATEK UV-C LED modules



Air type sterilization



100% sterilization rate in petri dishes after UVC LED irradiation

Bacterial contamination presence

LUX LUCIS UV-C LED modules

LUX LUCIS offers UV-C LED modules designed with highly dissipative materials and completely customized in dimension, LED wheelbase and total radiant power.

Possibility to realize spots or driven strips in 12/24Vdc voltage and different dimensions and shapes modules as well. Suitable with NICHIA, LEXTAR, CT MICRO and BOLB components depending on the required application type. Suitable with a wide range of LEDiL optics.

- IMS material aluminum-based with 1/1.2/1.6 mm thickness
- Copper circuit with up to 70 μm of thickness
- Surface in passivated copper
- cUL/CE marking
- Customizable with customer mark



Optics for UV-C LED modules and components

LEDiL[®]

VIOLET



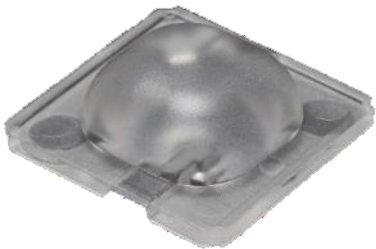
STELLA



ZORYA



JENNY



SAGA



G2-ROSE-UV / G2-NIS033U



SAKURA



LEDIL optics for UV-C LEDS



VIOLET

- 12 up lens,
- Clusters or single LEDs 3535, 6868, CSP

UV-A

UV-B

UV-C



STELLA

- Clusters up to 30 mm
- 3535, 6868 packages, CSP

UV-A

UV-B

UV-C



ZORYA

- Big clusters
- Clusters 3535, 6868, CSP

UV-A

UV-B

UV-C



JENNY

- Clusters up to 11 mm
- 3535, CSP

UV-A

UV-B



SAGA

- Clusters up to 14 mm
- 3535, 6868, CSP

UV-A

UV-B



G2-ROSE-UV / G2-NIS033U

- Single LEDs 3535/6868

UV-A

UV-B



SAKURA

- Clusters up to 25 mm
- 3535, 6868, CSP

UV-A

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C.F. e P.I. 03714360488

Social Capital: € 2.000.000 i.v.

Registro Pile: IT19040P00005244