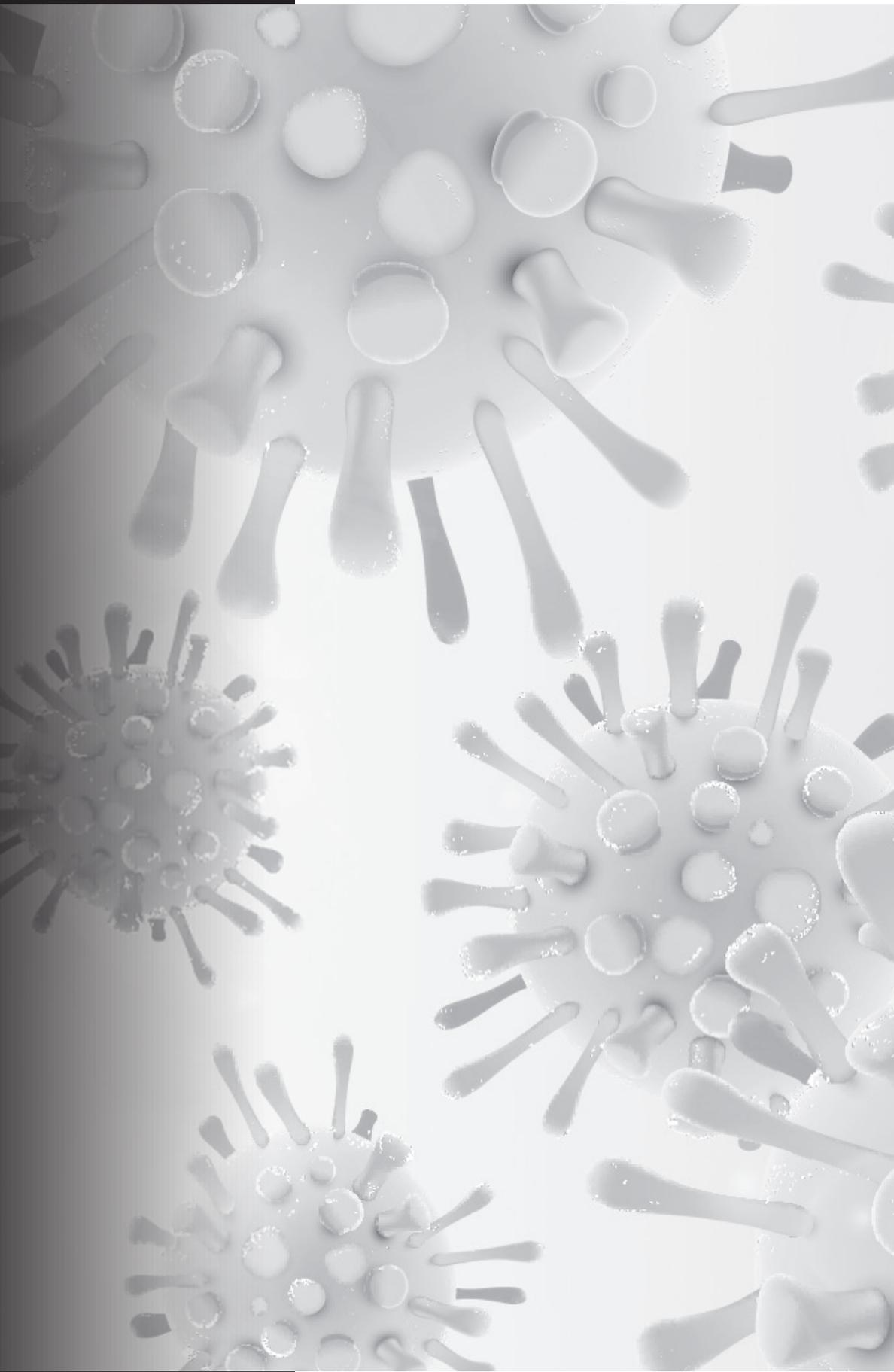


UVLIGHTING

FOR SANITIZATION

disano
illuminazione
www.disano.it



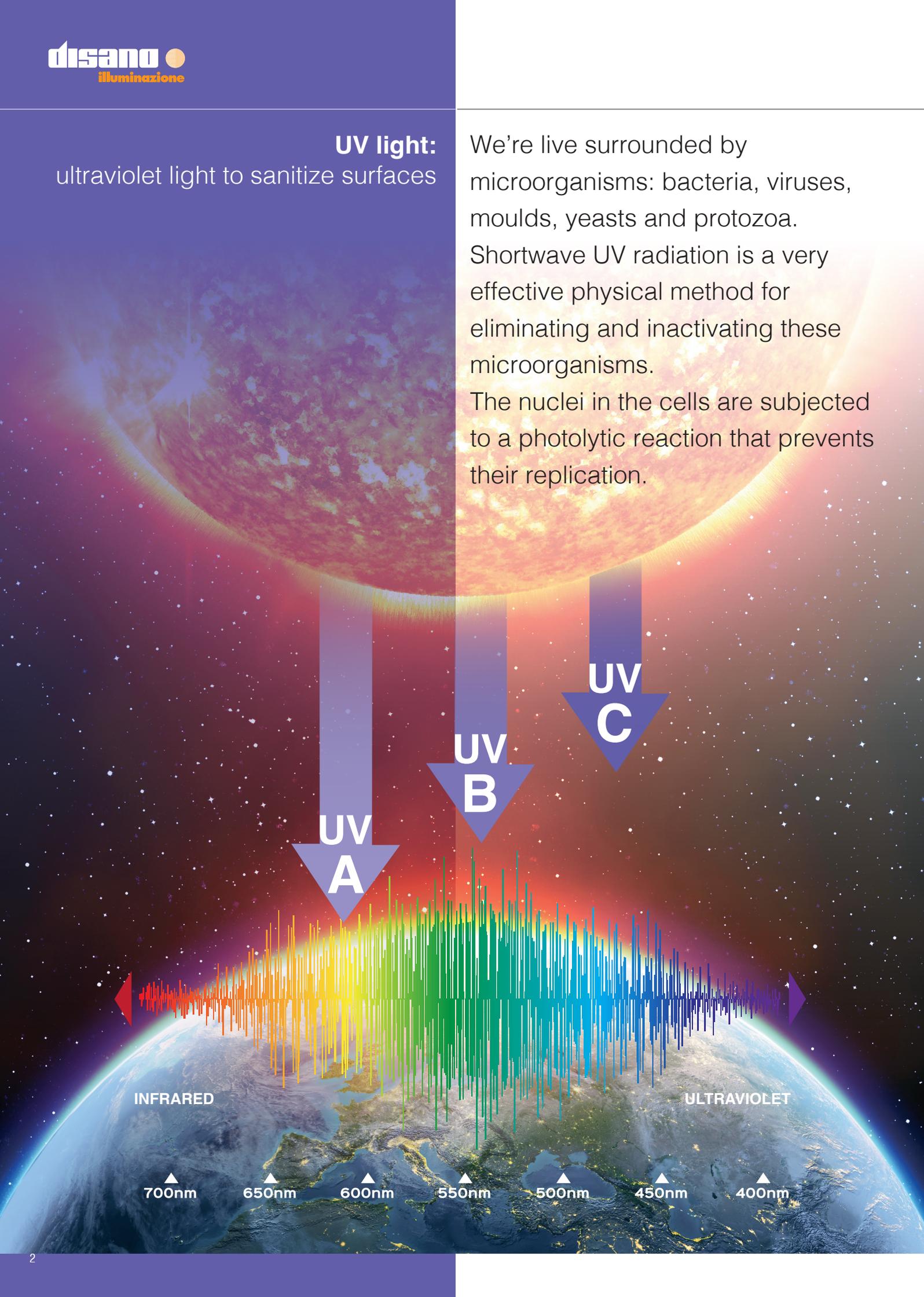
M A D E I N I T A L Y

UV light: ultraviolet light to sanitize surfaces

We're live surrounded by microorganisms: bacteria, viruses, moulds, yeasts and protozoa.

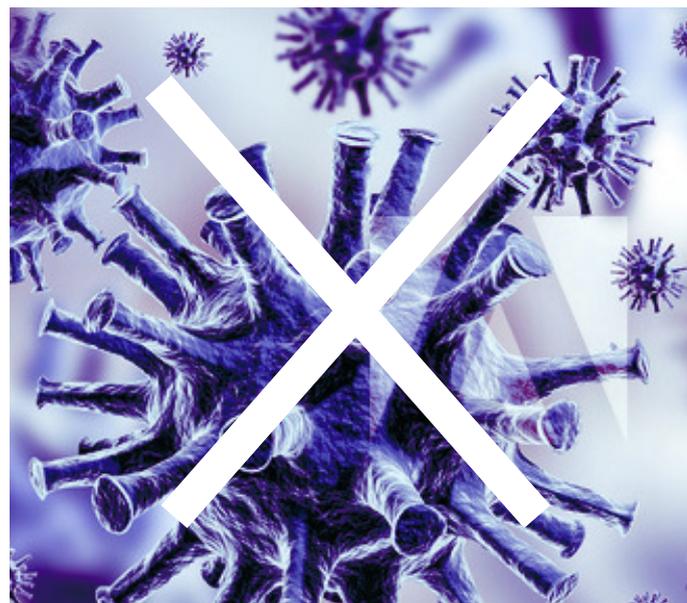
Shortwave UV radiation is a very effective physical method for eliminating and inactivating these microorganisms.

The nuclei in the cells are subjected to a photolytic reaction that prevents their replication.



The germicidal effect of light is provided in the shortwave UV band below 320 nm.

UV irradiation is the most RELIABLE, ECO-FRIENDLY, EASY-TO-USE and LOW-COST method for sanitizing the surfaces in the spaces where we spend most of our time.



MAIN ADVANTAGES



Note: UV does not replace cleaning

Reliable

Scientific research has shown that ultraviolet rays can affect water and air-borne microorganisms, be they bacteria, viruses, fungi, algae, spores, or other (Note: before installing luminaires fitting UV sources, be sure to contact a qualified technician for the design stage).

Ecological

UV radiation is a physical, not a chemical, disinfection system. UV rays act on the nucleus of the cell that, when properly irradiated, is subjected to a reaction that prevents the reproduction process in a completely natural way (without using chemical disinfectants).

Low-cost

Disinfection with ultraviolet lamps is currently the most economical option offered by technology.

Design

The Disano group is happy to offer expert advice to designers when planning the space where the lights will be installed.

Legend



The presence of people is allowed



The presence of people is not allowed



Versions also including general lighting



Versions with UV lighting only

UV light: the ideal sanitization of all spaces

Highly frequented places can be sanitized with UV lamps.

UV rays trigger a photochemical reaction within the microorganisms damaging their protein structure to alter their DNA/RNA.

This makes them harmless and unable to replicate, preventing the spread of contagion, disease or damage.



Ultraviolet germicidal irradiation is a safe, proven and effective technology to eliminate microorganisms like bacteria, viruses, fungi, spores, mites and moulds.

It ensures bacteriologically controlled surfaces and can be used in luminaires for the bacteriological sanitization of:



- offices - schools
- waiting rooms - medical studios
- bars and restaurants
- shopping centres - shops
- gyms - locker rooms
- beauty salons and wellness centres
- hotels
- kitchens and public rest rooms
- common work areas



Before installing UV luminaires, be sure to entrust the lighting design to a professional lighting designer.





UV-A and UV-C LED

The spectral range of ultraviolet radiation is, by definition, between 100 and 400 nm (1 nm = 10⁻⁹ m) and it is not visible to the naked eye.

Thanks to the filtering action of the Earth's atmosphere, most UV in nature is UV-A, a very small portion is UV-B, and UV-C rays are practically absent.

Artificial UV sources have been available on the market for several decades. Based on their wavelength, they can be used in different sectors and applications.

- UV-A (long wave)
315 to 400 nm
(for medical and industrial use)
- UV-B (medium wave)
280 to 315 nm
(for curative medical use)
- UV-C (short wave)
100 to 280 nm
(for sanitization)

schools	 →
gyms	 →
factories	 →
offices	 →
stores	 →
hotels	 →
dentists/beauticians	 →
waiting rooms	 →
shopping malls	 →
hospitals and health centres	 →

The **UV-A** light modules are less aggressive than the UV-C modules and require longer sanitization time. It is therefore necessary to control ON/OFF times based on the absence/presence of people in the room. For example: sanitization can be carried out at night, on weekends, on holidays, on certain weekdays, when certain areas are closed.

The **UV-C** light modules are more aggressive than UV-A modules and allow shorter sanitization time. We recommend equipping the system with “absence devices” (sensors or smart technology) so that the UV-C modules will activate only when nobody is in the room.

UV-A: long sanitization time

at night, weekends, holidays
(in the absence of people)

UV-C: very short sanitization time

temporary absence in a room
(in the absence of people)

- classrooms
- corridors
- gyms
- laboratories

- training areas
- common areas

- production
- storage
- common areas

- open space
- common areas
- restrooms

- sales
- warehouses

- utility rooms
- kitchens
- bars and restaurants

- all areas

- all areas

- all areas

- all areas except patient/visitor rooms

- break
- when exiting the classroom to move to another classroom

- when moving from one lesson to the next
- locker rooms

- assembly chain break
- lunch break

- lunch break
- in rooms between one conference and the next

- fitting rooms (between one customer and the next)

- reception
- when changing room
- when cleaning empty common areas

- when moving from a room to the next

- during short closures to the public

- after cleaning bathrooms and transit areas (before re-opening to the public)

- when the staff leaves their work station for patient visits or rounds



The use of UV sources, especially those in the UV-C wavelength band, require special attention as they can cause inflammation and damage, sometimes even permanently. This is why it is essential that UV sources are used when there are no people and/or animals in the room.

Special mounting tips

The human eye cannot see ultraviolet light.

Exposure to UV-B and UV-C radiation without using skin or eye protection may cause erythema (reddening of the skin) or conjunctivitis (inflammation of the eye).



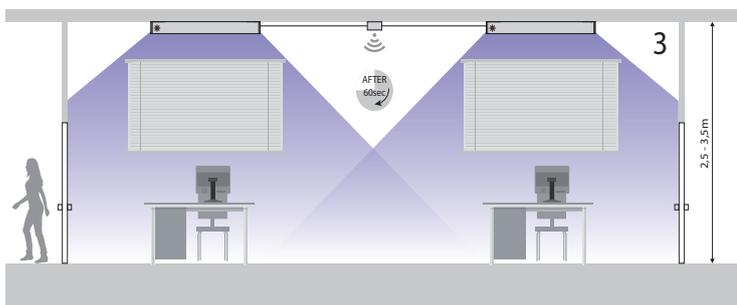
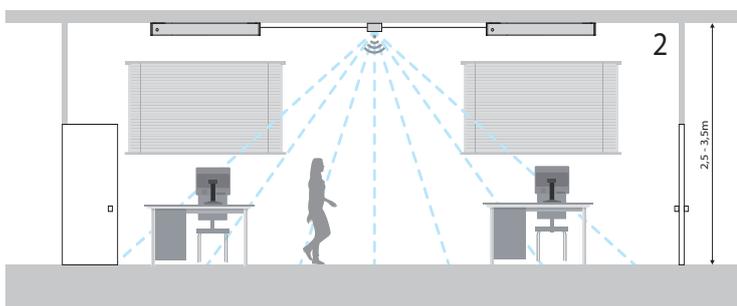
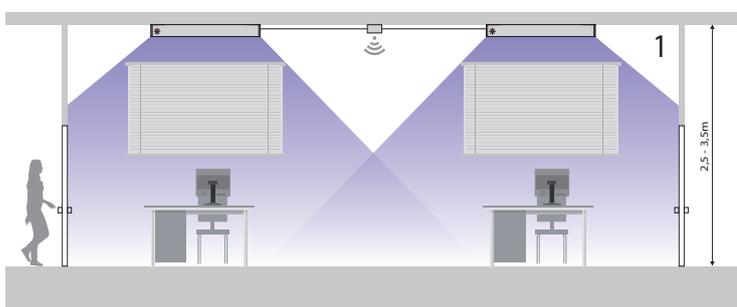
- Use of timers or time switchers (on-off timers)
- Use of “absence” detectors (sensors)
- Use of SMART control devices to control the lighting system

UV luminaires can be installed in a room by simply connecting them to the lighting system.

This type of application requires the supervision of a qualified installer who will assess the safety of the system, based on whether or not people* are inside the room.



Example of installation with “absence” sensors



* NOTE:

- UV light may cause serious damage to the skin or the eyes, therefore avoid direct exposure on humans, animals and plants.
- Lighting fixtures equipped with UV-C LED sources must be **used only in the absence of people**.

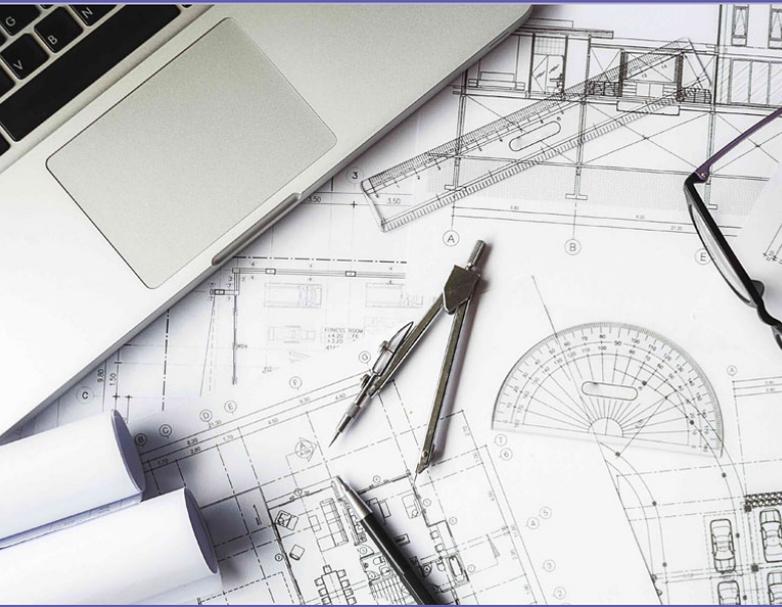
Luminaires must be installed by qualified staff to ensure compliance with safety and radiation protection requirements.



1) When the power supply is switched on and the sensor doesn't detect any presence in the room for 60 seconds, the UV lamp will turn on and a red LED light will be visible.

2) As soon as the sensor detects movement, the UV lamp will automatically go off (together with the red LED light).

3) If 60 seconds go by and no movement is detected, the lamp will turn on again (in the UV mode) and the red LED light will be visible again.



Before installing UV luminaires, **be sure to entrust the lighting design to a professional lighting designer.**

The main factors to consider for a proper use of UV sources are:

- radiated power
- exposure time
- distance



For a UV lamp to be effective on spores, germs, bacteria and viruses, the lighting system must be designed so that the above parameters are correctly combined in order to achieve the desired results according to scientific/academic studies and literature.

N.B.: UV dose varies based on the type of microorganism to be eliminated for the deactivation to be effective (see table).

Microorganisms on surfaces that are not directly exposed to UV radiation (hidden or in shadow) will not be eliminated.

Define the dose and time necessary to eliminate pathogens:

UV dose is based on intensity and time

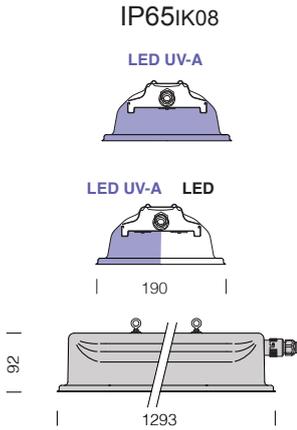
$$\text{Irradiation} \frac{\text{W}}{\text{m}^2} \times \text{Time} \text{ sec.} = \text{UV dose} \frac{\text{J}}{\text{m}^2}$$



Microorganism	(Ho)	(K)
	Radiant Exposure J · m ⁻²	Decay Rate Constant m ² · J ⁻¹
Bacillus anthracis(vegetative)	45,2	0,05
Bacillus anthracis (spores)		0,0031
S. enteritidis	40,0	0,058
B. megatherium sp. (veg.)	37,5	0,061
B. megatherium sp. (spores)	28,0	0,082
B. paratyphosus	32,0	0,072
B. subtilis (mixed)	71,0	0,032
	60,0	0,038
B. subtilis spores	120,0	0,019
Corynebacterium diptheriae	34,0	0,068
Eberthella typhosa	21,4	0,108
Micrococcus candidus	60,5	0,038
Micrococcus piltonensis	81,0	0,028
Micrococcus sphaeroides	100,0	0,023
Neisseria catarrhalis	44,0	0,052
Phytomonas tumefaciens	44,0	0,052
Proteus vulgaris	27,0	0,085
		0,238
Pseudomonas aeruginosa		0,572
	55,0	0,042
Pseudomonas florescens	35,0	0,066
S. typhimurium	80,0	0,029
Sarcina lutea	197,0	0,012
	24,2	0,095
	22,0	0,105
Serratia marcesens	8,3	0,277
		0,221
		0,214
		0,445
Dysentery bacilli	22,0	0,105
Shigella paradysenteriae	16,8	0,137
Spirillum rubrum	44,0	0,052
	21,8	0,106
	49,5	0,047
Staphylococcus aureus		0,089
		0,348
		0,042
		0,960
Streptococcus haemolyticus	26,0	0,089
	21,6	0,107
Streptococcus lactis	61,5	0,037
Streptococcus viridians	20,0	0,115

Microorganism	(Ho)	(K)
	Radiant Exposure J · m ⁻²	Decay Rate Constant m ² · J ⁻¹
Clostridium tetani	49,0	0,047
	21,6	0,107
Streptococcus pyogenes		0,616
		0,107
Streptococcus salivarius	20,0	0,115
Streptococcus albus	18,4	0,125
B. prodigiosus	8,3	0,329
B. pyocyaneus	55,0	0,052
		0,099
		0,472
Mycobacterium tuberculosis		0,213
	100,0	0,023
Mycobacterium kansasii		0,036
Mycobacterium avium-intra.		0,041
Escheria coli		0,093
		0,376
Haemophilus influenzae		0,060
		0,055
Adenovirus		0,0047
Vaccinia		0,153
Vaccina		0,155
Coxsackievirus		0,111
Influenza A		0,119
Cryptococcus neoformans		0,010
Fusarium oxysporum		0,011
Fusarium solani		0,0071
Penicillium italicum		0,013
Penicillium digitatum		0,0072
Rhizopus nigricans spores		0,0086
Cladosporium herbarum		0,0037
Scopulariopsis brevicaulis		0,0034
Mucor mucedo		0,0040
Penicillium chrysogenum		0,0043
Aspergillus amstelodami		0,0034
Fusarium oxysporum		0,011
Fusarium solani		0,0071
Penicillium italicum		0,013
Penicillium digitatum		0,0072





Housing: pressed steel, in a single piece of high mechanical resistance.

Diffuser: in technopolymer plastic specially designed for UV radiation lamps.

- separate switches: one for the general lights, the other for UV sanitization.
- complete with built-in UV module operating indicator to ensure the safety of people.

983 Forma

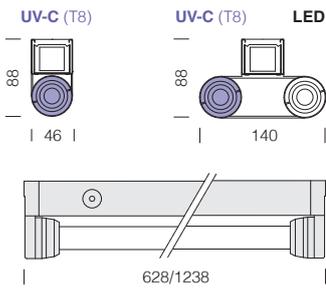
mm	colour	weight	code	CLD			CELL (T8)		
				LED	W tot	LUMEN OUTPUT (tq= 25 °C)	UV-A	W tot	UV-A (W) RADIATION
190x1293 mono.	s. silver	7.20	162465-65	-	-	-	1x	66	21
190x1293 bil.	s. silver	7.20	162466-65	1x	43	4000K - 5820 lm - CRI 80	1x	66	21

Single version (1-lamp): intended solely for sanitization, not for general lighting.





IP40IK07



6401 Rapid System T8 - with knife switch

mm	colour	weight	code	CLD			CELL (T8)		
				LED	W tot	LUMEN OUTPUT (tq=25°)	UV-C	W tot	UV-C (W) RADIATION
46x628	white	0.90	238040-69	-	-	-	1x	21	4,5
46x1238	white	1.40	237531-69	-	-	-	1x	38	15

Single version (1-lamp): intended solely for sanitization, not for general lighting.

Fixture housing: galvanized steel previously stove-enamelled with UV-stabilised white polyester resin; rounded edges to prevent cutting; polycarbonate end caps.

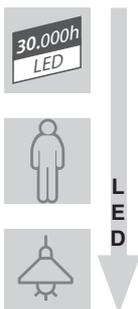
Standard supply: nylon fastening pawl supplied with power terminal block.

- separate switches: one for the general lights, the other for UV sanitization.
- complete with built-in UV module operating indicator to ensure the safety of people.

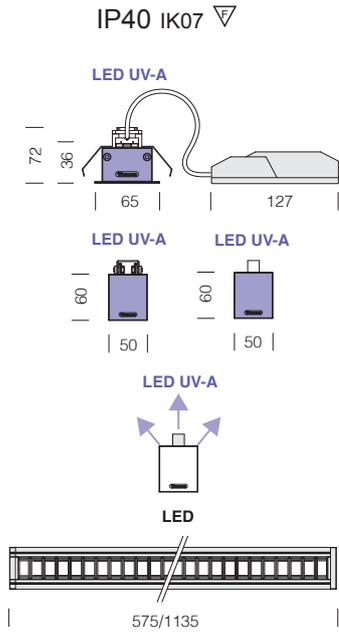


6501 Rapid System T8 - with knife switch

mm	colour	weight	code	CLD			CELL (T8)		
				LED	W tot	LUMEN OUTPUT (tq=25°)	UV-C	W tot	UV-C (W) RADIATION
140x628	white	0.95	238045-69	1x	8	4000K - 800lm - CRI 80	1x	21	3.95
140x1238	white	1.90	237536-69	1x	15	4000K - 1600lm - CRI 80	1x	38	13



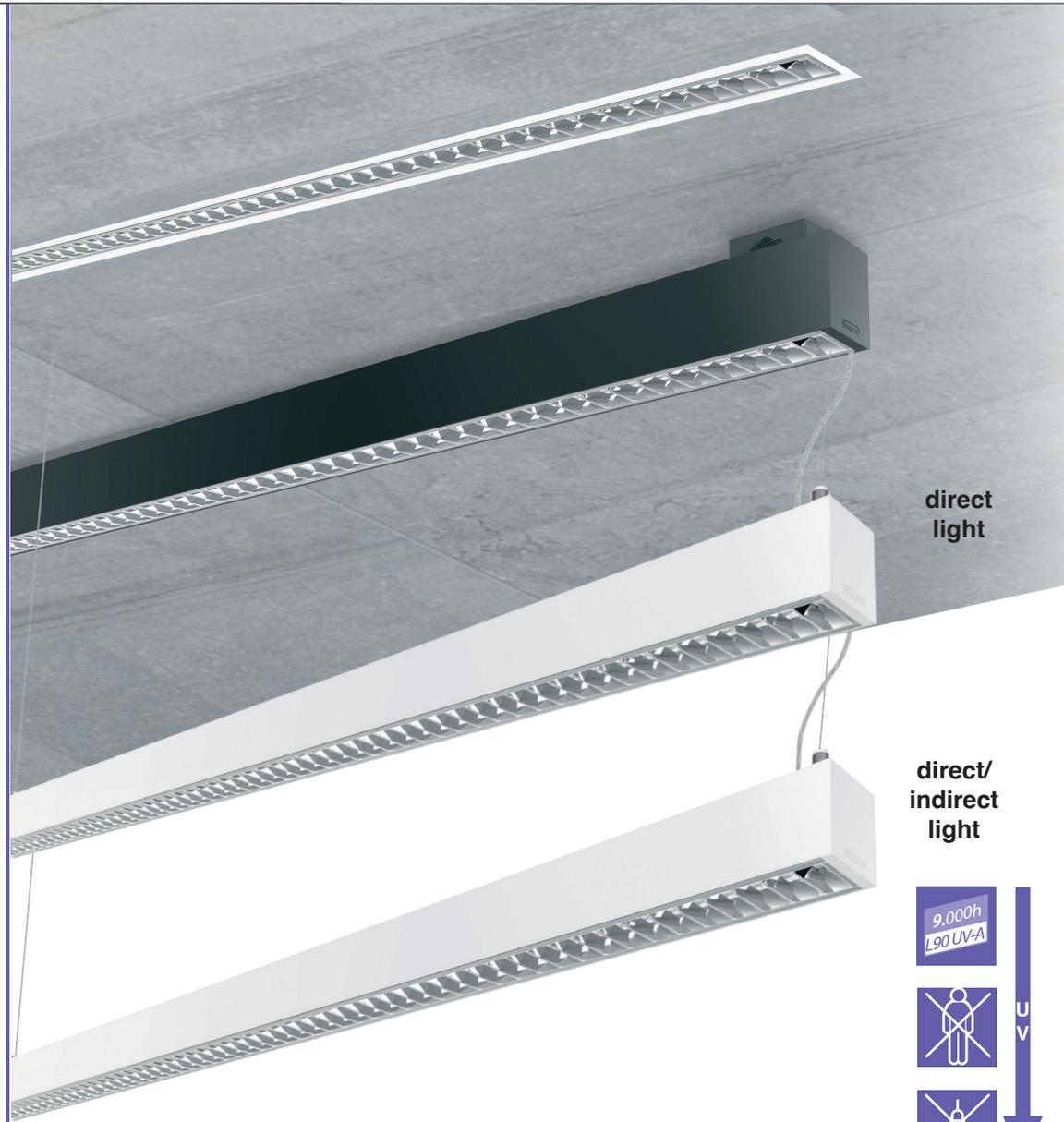




Housing: extruded aluminium.

Terminal ends: die-cast aluminium.

- one switch for UV sanitization.
- complete with built-in UV module operating indicator to ensure the safety of people.



Suspension version:
only direct light

direct/indirect light: ideal near air conditioning systems for the sanitization of the air exhausted from the conditioning system

Subcode to order:
LED **UV-A** = -65

direct
light

direct/
indirect
light



UV LIGHTING

FOR SANITIZATION



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