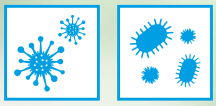
UV-C luminaires and devices

Spaces free of viruses and bacteria

Disinfection of microorganisms



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LUXIONA

LUXIONA

ALWAYS ALERT TO THE DEMANDS OF THE SECTOR

Due to the great problems as a result of the COVID-19 disease, we have been boosted to develop a new range of **UV-C germicidal** disinfection products.
This method of disinfection has been recommended by the **WHO (World Health Organization)**.

We are supported by our extensive experience in the production and marketing of lighting systems for Health & Care spaces.

CSQ MED
www.imq.it

CISQ is a member of IQNet
www.iqnet-certification.com

IQNet, the association of the world's first class certification bodies, is the largest provider of management System Certification in the world. IQNet is composed of more than 30 bodies and counts over 150 subsidiaries all over the globe.

CERTYFIKAT NR.
CERTIFICATE N. **9124.LUXP**

ZAŚWIADCZA SIĘ, ŻE SYSTEM ZARZĄDZANIA JAKOŚCIĄ WDROŻONY PRZEZ
WE HEREBY CERTIFY THAT THE QUALITY SYSTEM OPERATED BY

LUXIONA POLAND S.A.

Jacentów 167, 27 – 580 SADOWIE – POLSKA

JEDNOSTKI OPERACYJNE
OPERATIVE UNITS

Jacentów 167, 27 – 580 SADOWIE – POLSKA

JEST ZGODNY Z NORMĄ
IS IN COMPLIANCE WITH THE STANDARD

EN ISO 13485:2012

W NASTĘPUJĄCYM ZAKRESIE
FOR THE FOLLOWING ACTIVITIES

Projektowanie i wytwarzanie opraw oświetleniowych do zastosowań medycznych
Design and production of luminaries for medical purposes

Dalsze wyjaśnienia dotyczące zastosowania wymagań EN ISO 13485:2012 mogą być uzyskane poprzez konsultacje z organizacją
Further clarifications regarding the applicability of EN ISO 13485:2012 requirements may be obtained by consulting the organization

NINIEJSZY CERTYFIKAT POWINIEN BYĆ WYKORZYSTYWANY ZGODNIE Z ZASADAMI WYMIENIONYMI W REGULAMINIE CERTYFIKACJI SYSTEMÓW ZARZĄDZANIA
THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE REQUIREMENTS OF THE RULES FOR CERTIFICATION OF MANAGEMENT SYSTEMS

DATA: *DATE:*	PIERWSZA CERTYFIKACJA *FIRST CERTIFICATION*	BIEŻĄCE WYDANIE *CURRENT ISSUE*	WAŻNOŚĆ *EXPIRY*
	2014-04-03	2017-04-02	2020-04-02

The Organization shall obtain the certification according to EN ISO 13485:2016 within 2019/02/28; otherwise the validity of this certificate will expire
Organizacja powinna uzyskać certyfikację na zgodność z EN ISO 13485:2016 do 2019/02/28; w przeciwnym razie ważność tego certyfikatu wygaśnie

IMQ S.p.A. - VIA QUINTILIANO, 43 - 20138 MILANO ITALY
Management Systems Division - Flavio Omago

Only the English text is authentic

CISQ è la Federazione Italiana di Organismi di Certificazione dei sistemi di gestione aziendale.
CISQ is the Italian Federation of management system Certification Bodies.

FEDERAZIONE CISQ
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ACCREDIA

Ważność certyfikatu jest uzależniona poprzez coroczne audity kontrolne i recertyfikację
The validity of the certificate is submitted to annual audit and a reassessment of the entire Management System within three years

Jacentow production plant, , Poland

We have an ISO 13485 certified manufacturing plant for the production of medical devices.

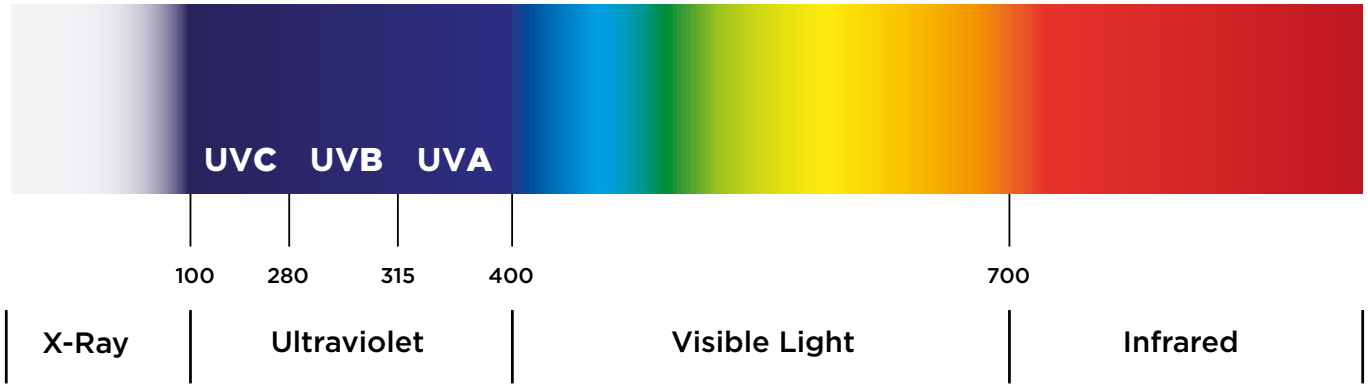
ISO CERTIFIED 13485

WHAT IS **UV-C** TECHNOLOGY?

TYPES OF UV SPECTRUM AND THEIR PROPERTIES

Light spectrum

Wavelength (**nm**)



UV ultraviolet radiation is part of electromagnetic wave radiation, **as are X-rays**, radio waves, or **visible light**.

From a practical point of view, **the UV spectrum** is divided into three categories:

UV-C - short wave 100v nm - 280 nm
This has a strong bactericidal and germicidal effect. It has a high photobiological risk since it can cause severe burns to the skin and eyes.

UV-B - medium wave 280 nm - 315 nm
Its applications are mainly in radiotherapy. It creates provitamin D. It has a low photobiological risk, increases pigmentation and can cause the appearance of small thermal erythemas on the skin.

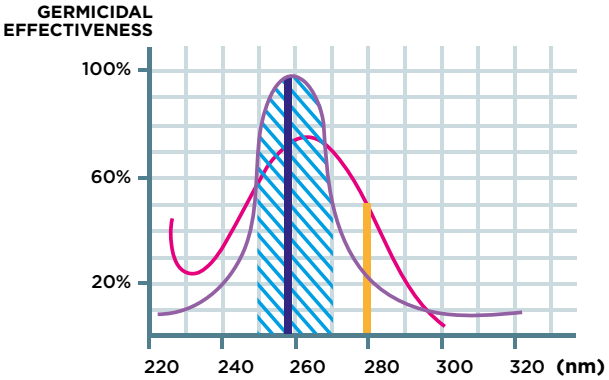
UV-A - long wave 315 nm - 400 nm
Corresponds to the natural rays of the sun. It is involved in phytochemical processes, pigmentation, etc. The photobiological risk on the skin is negligible.

WHY DOES UV-C DISINFECT?

The **UV-C** radiation of a **low pressure lamp** consists of a single spectral line of radiation at 254 nm, which is located in the area of maximum germicidal effect of the UV-C: between the wavelengths of 250 and 270nm
The **UV-C** radiation emited by **LED** consists of a wave radiation between 275 and 280 nm, with very low germicidal effect.

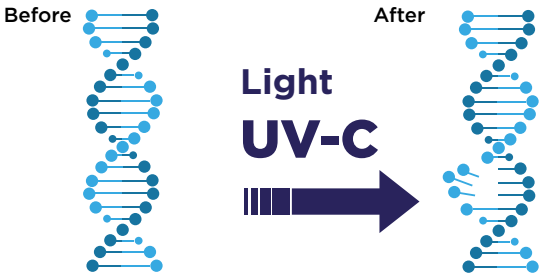
The bactericidal mechanism results from the absorption of energy from **UV-C radiation** by **ribonucleic acids** and **proteins**, which induces chemical reactions that affect the **molecular structure** of the microorganisms until they are eliminated: **DNA+ RNA breakage**.

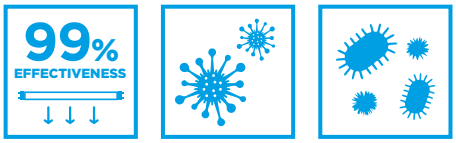
UV-C Spectrum Germicidal effectiveness



- Optimal germicidal effect curve
- DNA absorption curve
- Area of greatest germicidal effect of **UV-C** radiation in the **250-270nm**wavelength range
- **UV-C Low Pressure Radiation at 254nm**
- **UV-C LED** radiation in a **280nm wavelength with very low germicidal effect**

Molecular structure (DNA+RNA)

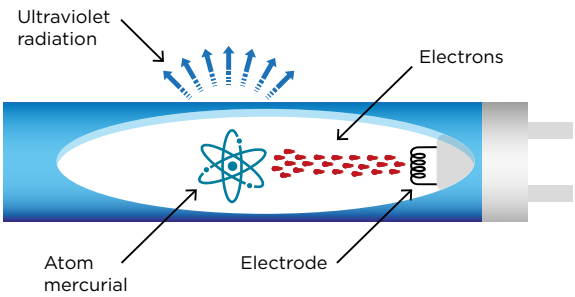




99.9% effectiveness against microorganisms

WHY DID WE CHOOSE LOW-PRESSURE RADIATION AS THE SOURCE?

Sources of **low pressure UV-C radiation** are **more effective** than LEDs in their germicidal effect.



Low-pressure UV-C radiation lamps are currently the **only source of light** for applications **in large spaces.**

Large spaces with **UV-C Low Pressure**

Small applications with **UV-C LED**

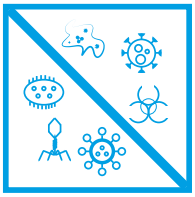
WHAT TYPES OF **UV-C** SOLUTIONS DOES LUXIONA OFFER?

THE PRODUCTS OF THIS NEW UVC RANGE ARE **SPECIALLY MANUFACTURED** TO STAND UP TO ULTRAVIOLET RADIATION.

NOTABLE FEATURES OF OUR PRODUCTOS ACCORDING TO EACH MODEL

Bactericidal coating

LUXIONA sets the standard by offering the option of including a bactericidal coating in accordance with the same technology as our Health&Care class I, II and III luminaires.



Motion sensor

To ensure the safety of people and animals, our luminaires include a motion sensor.
If the sensor detects a human or animal presence in the room, it automatically disconnects the power source.

Timer

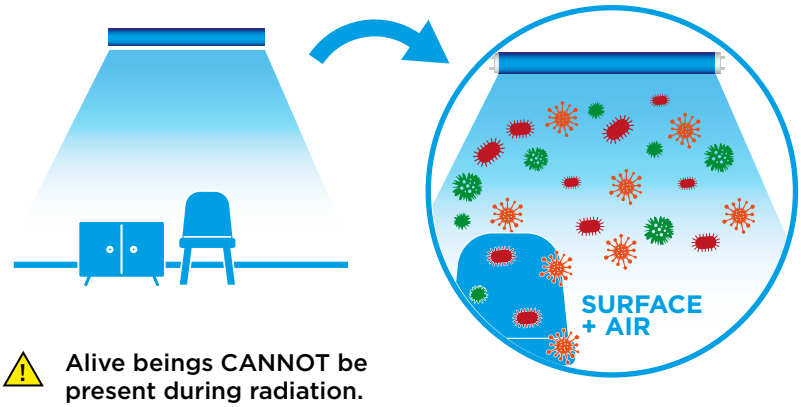
In the case of portable luminaires, they also incorporate a timer, thus delaying their operation until the person has left the room and reconnecting again before the person enters.

DISINFECTION BY DIRECT RADIATION

Air and surface **disinfection** by **direct UV-C radiation.** The germicidal action is produced by direct exposure to UV-C radiation.

Characteristics

—Short disinfection time.
—Bad odour elimination.
—Multiple devices connected to a single control..
—Hidden areas from direct emission will not be desinfected.
—Immediate use of the space once the radiation is over (no need to ventilate as in the case of the ozone disinfection system)
—May affect materials not resistant to UV-C radiation (e.g. some types of polymers).
—Photobiological hazard class RG3.



⚠ **Alive beings CANNOT be present during radiation.**

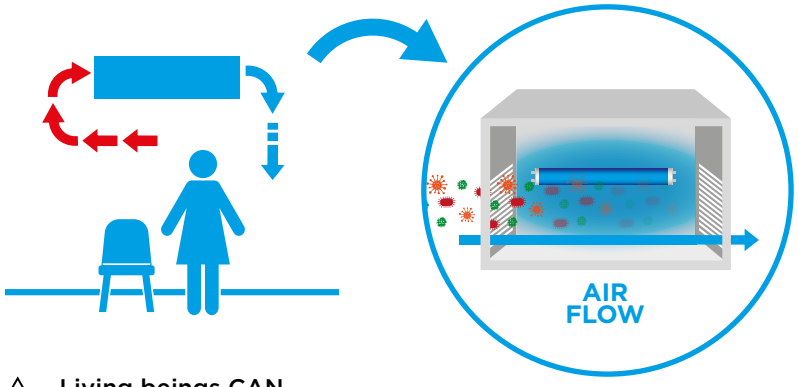
Professional use only. Please read the operating and installation instructions carefully.

UVC-FLOW AIR DISINFECTION

Disinfection of the **air** through UV-C radiation
The germicidal action is carried out by forced air circulation inside the disinfection chamber.

Characteristics

—Longer disinfection time than direct radiation.
—Bad obours elimination.
—Especially indicated solution for closed spaces.
—Easy filter maintenance. Open device not needed.
—Electrical components are protected against dust and UV-C radiation.
—Low noise emission fan.



⚠ **Living beings CAN be present during its operation.**

DIRECT RADIATION

AGALINE UV-C

Source of light: T8
Lamp wattage: 1x15 / 1x30/ 1x36 W
2x15 / 2x30 / 2x36 W
Duration: 9000 hours
Installation: Surface, wall, mobile base
Construction: Steel

Lamp	Power	Coverage area
1 x	15 W:	up to 6m²
1 x	30W:	up to 10m²
1 x	36W:	up to 12m²
2 x	15W:	up to 12m²
2 x	30W:	up to 18m²
2 x	36W:	up to 25m²

According to each model:
- Timer
- Motion sensor

On demand:
- Operating hours counter
- Lamp function indicator
- Broken lamp protection
- Bactericidal paint

SURFACE / WALL

ROLLER BASE (Wheel accessory)

DIRECT RADIATION

OKTAN UV-C

Source of light: TCL
Lamp wattage: 2x36 / 2x55 W
Duration: 9000 hours
Installation: Surface, wall, mobile base
Construction: Steel

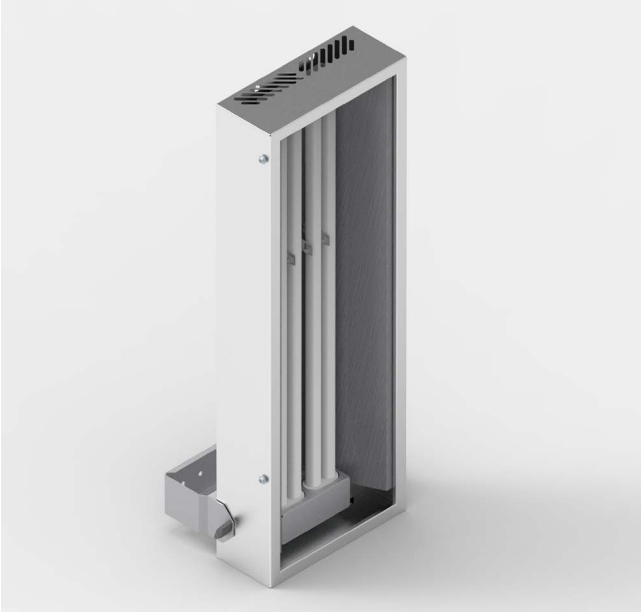
Lamp	Power	Coverage area
2 x	36W:	up to 25m²
2 x	55W:	up to 30m²

According to each model:
- Timer
- Motion sensor

ON-OFF

On demand:
- Operating hours counter
- Lamp function indicator
- Broken lamp protection
- Bactericidal paint

SURFACE / WALL



ROLLER BASE (Wheel accessory)

DIRECT RADIATION

UV-C UNIVERSAL

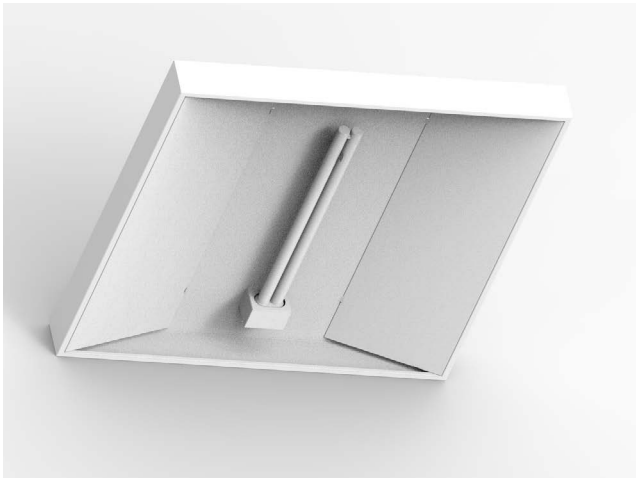
Source of light: TCL
Lamp wattage: 36 / 55 W
Duration: 9000 hours
Installation: SURFACE / MODULAR
Construction: Steel

Lamp	Power	Coverage area
1 x	36W:	up to 12m²
1 x	55W:	up to 15m²
2 x	36W:	up to 25m²
2 x	55W:	up to 30m²

According to each model:
• Motion sensor

On demand:
• Timer
• Operating hours counter
• Lamp function indicator
• Broken lamp protection
• Bactericidal paint

SURFACE / MODULAR



DISINFECTION BY UVC-FLOW AIR

AIRSTREAM UV-C

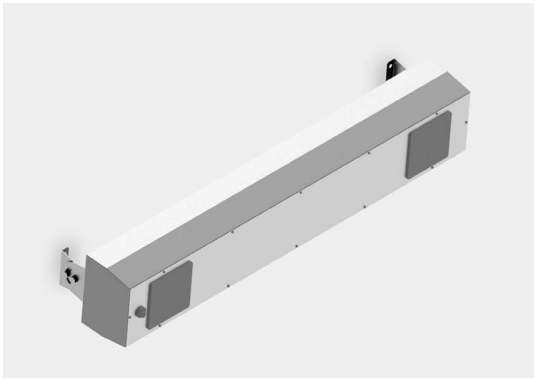
Source of light: T8
Lamp wattage: 1x30 / 1x36 W
2x30 / 2x36 W
Duration: 9000 hours
Installation: Surface, wall, portable devices for the floor, base or mobile
Construction: Steel with anti-bacterial paint, can be built it in stainless steel
Air intake filters Included

According to each model:
• 1 or 2 filters

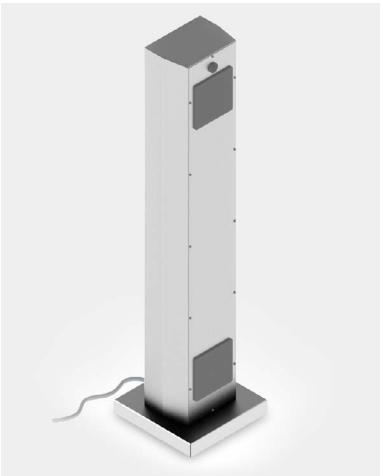
On demand:
• Operating hours counter
• Lamp function indicator
• Broken lamp protection

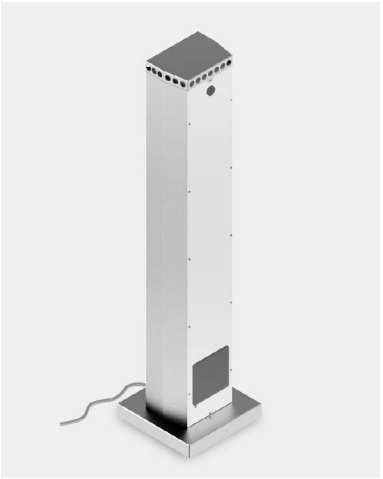
Lamp	Power	Coverage area
1 x	30W:	up to 25m²
1 x	36W:	up to 30m²
2 x	30W:	up to 50m²
2 x	36W:	up to 60m²

CEILING OR BASE-WALL

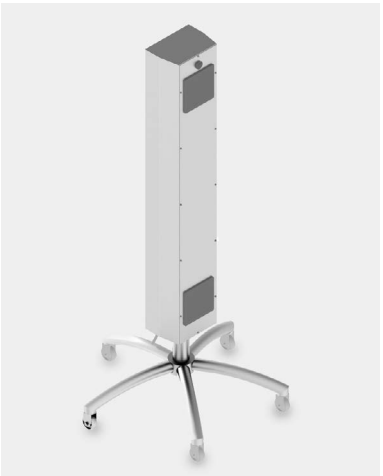


BASE





ROLLER BASE (Accessory wheels)



WHERE CAN WE USE OUR LUMINAIRES?

HEALTH & CARE

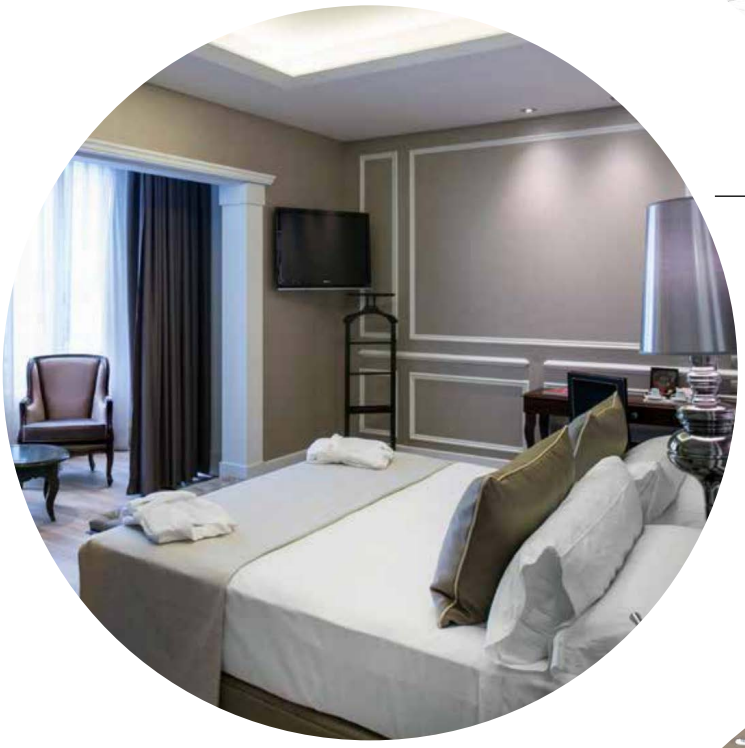
- Operating rooms
- Treatment rooms
- A&E
- Consultancy rooms
- Outpatient clinics
- Dentists
- Hospital corridors
- Laboratories
- Physiotherapy
- Ophthalmology
- Psychiatry
- Beauty salons
- Spa
- Veterinarians
- Geriatrics
- Day centres for the elderly

INDUSTRY

- Food industry
- Pharmaceutical industry
- Cosmetics industry
- Electronics industry
- Silos, drying rooms and ripening rooms
- Packaging areas
- Warehouses
- Dressing rooms
- Eating areas

PUBLIC BUILDINGS

- Train and bus stations
- Cinemas
- Schools
- Offices
- Trains and buses
- Airports
- Sports facilities
- Gymnasia
- Post Office
- Churches and worship centres



HOSPITALITY

- Common hotel spaces
- Hotel reception
- Hotel rooms
- Restaurants
- Kitchens
- Bars
- Dance halls

RETAIL

- Fashion stores
- Food stores
- Retail stores
- Shopping arcade
- Hypermarkets

FAQS ON **UV-C** GERMICIDAL DEVICES

- **DOES ULTRAVIOLET RADIATION AFFECT ALIVE BEINGS? HOW CAN THESE DEVICES BE USED SAFELY?**

  Ultraviolet radiation is naturally emitted by the sun. Our atmosphere absorbs the most dangerous radiation, such as some UV-B and all UV-C radiation. The latter, between 100 and 280 nm wavelengths, are extremely harmful to alive beings.

  Our air purification devices keep the source of radiation completely isolated from the outside, so they can be used in areas where living beings are present.

  Our direct emission products must be used by qualified professional personnel. To minimize risks, our devices have on and off timing systems, so that no human being is required to use them.

- **DOES ULTRAVIOLET RADIATION AFFECT FOOD?**

  The interaction of ultraviolet radiation with food is minimal and it is an ideal disinfection, since it does not use any type of chemical agent, so it eliminates microorganisms in complete safety, with the food being suitable for consumption immediately after treatment.

- **UV-C DISINFECTION DEVICES. ARE THEY SUITABLE FOR DISINFECTING SURFACES?**

  Our direct radiation devices are suitable for disinfecting surfaces directly exposed to radiation, being more effective depending on how much radiation reaching these surfaces. This radiation is inversely proportional to the square of the distance, so it varies exponentially as we move away from the source of radiation.

  Our air disinfection devices collect the air from the room and subject it to intense radiation at close range, thus returning decontaminated air to the room. Therefore, they reduce the risk of surface contamination by airborne germs, but do not disinfect already-contaminated areas.

- **CAN OBJECTS IN THE ROOM TO BE DISINFECTED BE DAMAGED BY THE USE OF THESE DEVICES?**

  Our air purification devices have no direct emission of ultraviolet light, so they do not act a threat to the environment, living beings or objects.

  In the case of direct radiation devices, they can interact with certain materials, just as with continuous exposure to the sun's rays. UV type C rays can alter some materials. This is another reason why they should be used by competent personnel to minimize these risks.

- **WHAT IS THE ADVANTAGE OF UV-C DISINFECTION SYSTEMS OVER OTHER SYSTEMS?**

  The main advantage is that the disinfected areas can be used immediately after disinfection, provided that the direct radiation has stopped.

  Moreover, in the case of our air purification products, they can be used in the presence of living beings in the area to be purified, since no direct radiation is produced and no chemicals are emitted that interact with them.

- **HOW LONG DO YOU HAVE TO WAIT BEFORE ENTERING A ROOM THAT HAS BEEN DISINFECTED BY UV-C?**

  In the case of the AIRSTREAM UV-C, since it is a device that decontaminates the air without direct radiation, it is immediate, even being compatible with the presence of living beings.

  With regard to the direct radiation models, AGALINE, OKTAN and UNIVERSAL, the room can be used immediately after the disinfection process, provided that the radiation from the lamps has stopped.

Sources of documentation used:
- **IES** https://www.ies.org/standards/committee-reports/
- **CLEVELAND UNIVERSITY** https://elautoclave.files.wordpress.com/2020/03/cleveland-2020.pdf
- **UNIVERSITY OF SANTIAGO DE COMPOSTELA** https://www.medrxiv.org/content/10.1101/2020.04.07.20057224v2.full.pdf

ARE THERE MANY APPLICATIONS ON THE MARKET THAT USE LEDS IN THEIR DEVICES. ARE THEY ALSO SUITABLE?

There are LEDS that emit at UV-C wavelength, but they do so at a wavelength of 275-280 nm, greater than that emitted by our devices, 254 nm. Radiation with this wavelength is the most effective in eliminating viruses, bacteria, fungi and microorganisms in general. In addition, this length is the best absorbed by ribonucleic acids in particular, being much more effective in RNA-type viruses, such as COVID-19.

On the other hand, the optical efficiency of the lamps used in LUXIONA devices is approximately 30 times higher than that of LEDs.

IF UV-C RADIATION IS HARMFUL TO LIVING BEINGS, HOW DO I CONNECT THE DEVICE WITHOUT BEING AFFECTED?

Our portable devices are equipped with a timer for switching on and off, so that we have enough time to switch on and off before it starts, and after the radiation time is complete it will switch off automatically.

The fixed device must be fitted with appropriate safety measures, which may include presence detectors, safety key switches, open door detectors, etc.

WHAT IS THE RANGE OF ACTION OF THE DEVICES? HOW MANY DO I NEED TO DISINFECT A ROOM?

It depends if we are talking about air purification or direct emission devices. If we are talking about air purification, it is between 23-50 m^3/h, taking into account that its use is compatible with the presence of living beings in the area, so that its use can be uninterrupted.

For direct radiation devices, as a general rule, we can give an initial approximation according to the following table:

Lamp	Power	Surface
1.	15 W:	up to $6m^2$
1.	30W:	up to $10m^2$
1.	36W:	up to $12m^2$
1.	55W:	up to $15m^2$
2.	15W:	up to $12m^2$
2.	30W:	up to $18m^2$
2.	36W:	up to $25m^2$
2.	55W:	up to $30m^2$

To determine the number of devices and their effectiveness more precisely, you can request a more detailed study from our staff.

HOW LONG SHOULD THE DEVICES BE USED FOR SAFE DISINFECTION?

The exposure time of the radiation for the correct elimination of microorganisms, depends on the type of device.

For our air purifier model, AIRSTREAM, the time depends on the volume of the room, so we can calculate it according to its disinfection power, 23-50 m^3/h.

In direct radiation devices, it depends on the type of microorganism to be eliminated and the radiation that reaches the surface to be disinfected. In most cases, 15 minutes at a distance of approximately 1 m may be sufficient, but you can consult with LUXIONA to properly size the installation. Our air disinfection devices collect the air from the room and subject it to intense radiation at close range, thus returning decontaminated air to the room. Therefore, they reduce the risk of surface contamination by airborne germs, but do not disinfect already-contaminated areas.

ARE UV-C DEVICES EFFICIENT FOR THE INACTIVATION OF THE VIRUS RESPONSIBLE FOR COVID-19?

Yes, when the virus is directly irradiated by UV-C rays with sufficient energy. The energy reaching the surface will depend on the distance to the emission lamp and the irradiation time.

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