



# SpeedyCare™ 750

## SARS-COV DISINFECTING ROBOT

### Single Placement Disinfection

SpeedyCare™ 750 is an innovative robot emitting UV-C light in the germicidal range of 254 nm, overcoming the rising threat of pathogens like viruses, bacteria & fungi. This technology ensures proper surface and airborne disinfection, destroying the ability of microorganisms to reproduce by causing photochemical changes in nucleic acids. Designed in 2020, SpeedyCare™ 750 robot has been engineered to be easy and safe to operate in hospitals, hotels, shops, gyms, care homes



#### AIR & SURFACE

##### UV-C DISINFECTION

UV-C light is a non-invasive disinfection method, delivering instantly a lethal dose of radiation to pathogens both in surface and air, deactivating their capabilities to reproduce.

#### 25 M2 IN 5 MIN

##### 99% DISINFECTION

SpeedyCare™ 750 robot is a disinfection device which delivers UV-C light omnidirectionally to all the objects in the room. 99% of pathogens are eliminated from surface and air within minutes.

#### CERTIFICATION

##### SAFETY ACCORDING ISO15878:2016

SpeedyCare™ 750 disinfection performance has been certified by an accredited laboratory that guarantees the UV-C radiation performance and hence the disinfection capabilities. The device is also designed following the standards according ISO 15878:2016.

#### DISINFECT IN MINUTES

##### FROM A SINGLE PLACEMENT

SpeedyCare™ 750's robot hi-output UV lamps allows a single placement operation for a complete room disinfection. Large areas to be disinfected in several cleaning cycles.

#### LED LIGHTS & ACOUSTICS

##### FOR OPERATION AND SAFETY

A multicolor LED omnidirectional light provides color-codes for extra safety and information about the operation of the SpeedyCare™ 750 robot. Acoustic signal brings extra information to the robot user.

#### MOTION SENSORS

##### AUTO-STOP FUNCTION

Four built in motion sensors are located at the top of the robot, for a 360° auto-stop safety function, avoiding unprogrammed light exposures.

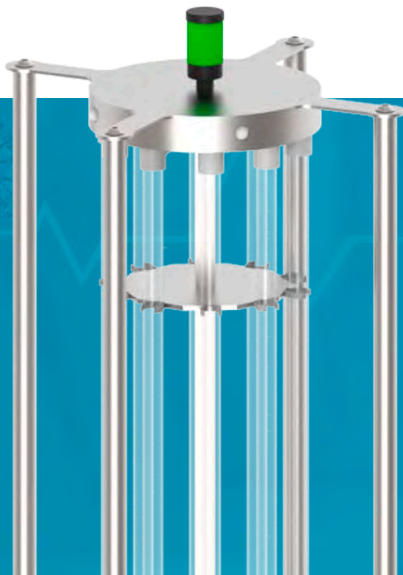


**UV IS A SCIENTIFICALLY PROVEN TECHNOLOGY FOR DISINFECTION**

**Features & Characteristics**

**SpeedyCare™ 750** is an innovative robot emitting UV-C light in the germicidal range of 254 nm, overcoming the rising threat of pathogens like viruses, bacteria & fungi. This technology ensures proper surface and airborne disinfection, destroying the ability of microorganisms to reproduce by causing photochemical changes in nucleic acids.

**SpeedyCare™ 750** is an advanced robot designed in 2020, engineered to be easy and safe to operate several applications as hospitals, hotels, shops, gyms, care homes and any habitable space.



**EFFICIENT UV-C DISINFECTING ROBOT**

**Hi-Output UV-C lamps**

A set of 20 hi-power lamps in cylindrical disposition emit UV-C light to ensure efficient and fast virus deactivation. More powerful UV-C devices improve and reduce the exposure times to disinfect, representing a more efficient and cost effective equipment.

**PHILIPS**

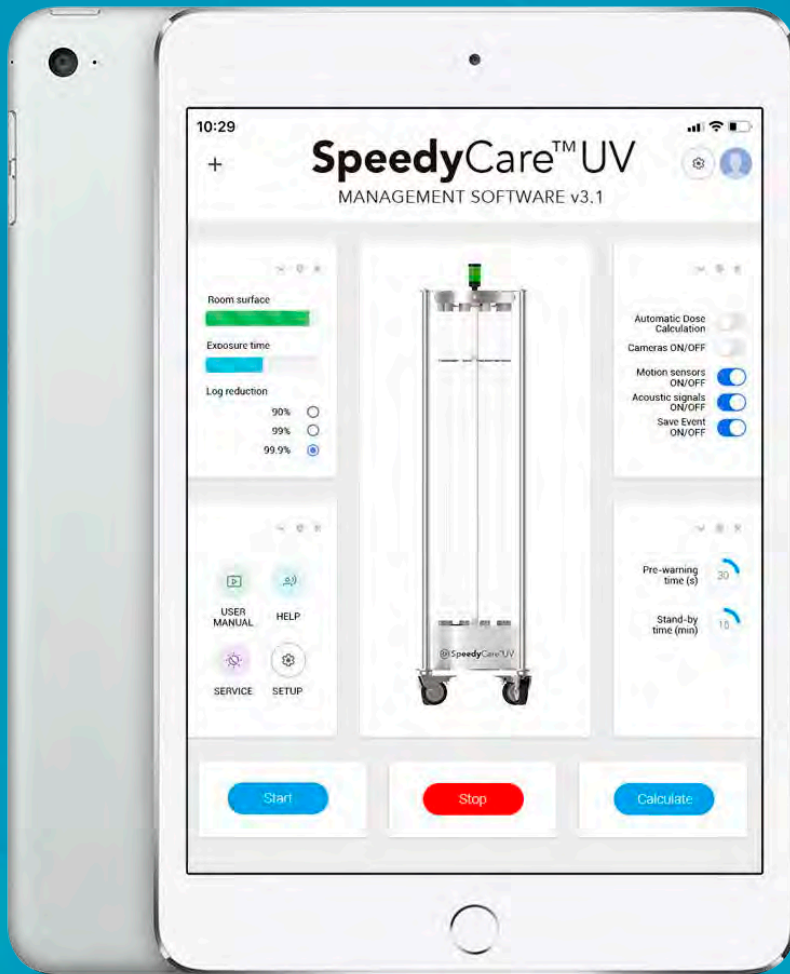
**A 99% PATHOGENS INACTIVATION**

**Fast Disinfection**

**SpeedyCare™ 750** robot features a set of UV-C lamps delivering the right dose of radiation to effectively deactivate pathogens in both air and surface. User selects the LOG factor, meaning the % percentage of disinfection. Typical used values are 90%, 99% and 99.9%.

The larger is the room and the higher is the LOG factor, the longer will be the disinfection time.

Room Dimensions	99% disinfection	99.9% disinfection
20 m <sup>2</sup>	3 min	5 min
30 m <sup>2</sup>	6 min	10 min
50 m <sup>2</sup>	10 min	16 min



## EFFICIENT UV-C DISINFECTING ROBOT

### Controlled by phone or tablet



**SpeedyCare™ 750** generates its own WiFi network so can wirelessly be controlled by a conventional tablet or smartphone. Our own app - **SpeedyCare™ UV Management Software** provides access to all the necessary functions such as - delay time definition in accordance to user's preferences, user manual and more.

The **SpeedyCare™ 750** disinfection robot, after connecting to any WAN, offers an integrated maintenance and remote diagnostic capability.



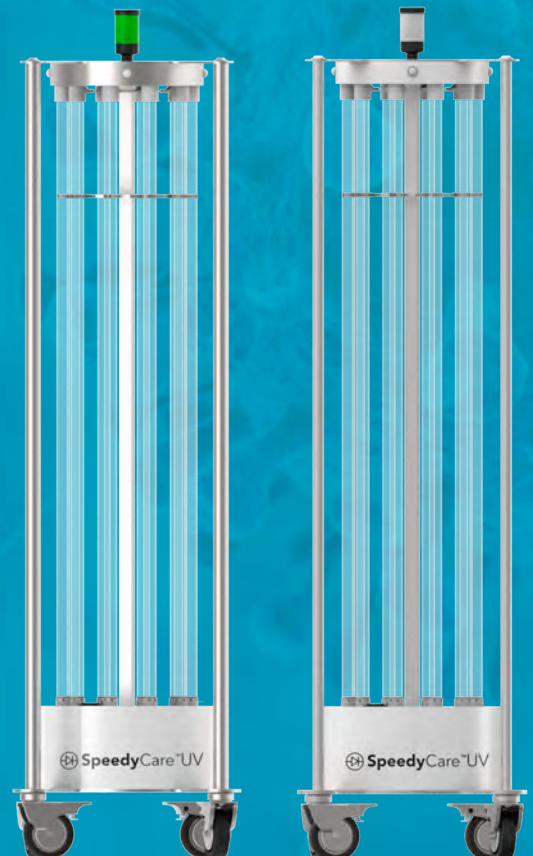
A NON-TOXIC  
ANTIMICROBIAL AGENT

### UV-C is a non-toxic light

UV-C Light is a non-toxic antimicrobial agent that inactivates pathogens both in air and surfaces. UV-C Light produces photochemical reactions that kills viruses, bacteria and fungi, avoiding the need of using aerosols or harsh chemicals. This makes SpeedyCare UV a safe disinfection device for the operating staff, without the need of ventilating or waiting before bringing the space back to service.

UV-C Light is a non-toxic antimicrobial agent that inactivates pathogens. UV-C Light produces photochemical reactions that kills viruses, bacteria and fungi, avoiding the need of using aerosols or harsh chemicals.

## CHEMICAL FREE



# SpeedyCare™ 750

## PROFESSIONAL UV-C DISINFECTING ROBOT

**SpeedyCare™ 750** is an innovative robot emitting UV-C light in the germicidal range of 254 nm, overcoming the rising threat of pathogens like viruses

### 1.67 M

SpeedyCare™ 750 features a total height of 1.67 m, allowing homogeneous light exposure along the room surfaces.

### LED Lights & Acoustics

A multicolor LED omnidirectional light provides color-codes for extra safety and information about the operation of the SpeedyCare™ 750 robot. Acoustic signal brings extra information to the robot user.

### Cylindrical Base

A cylindrical base with 4 wheels ensures robot stability and easy access to rooms through standard doorways.

### 254 nm

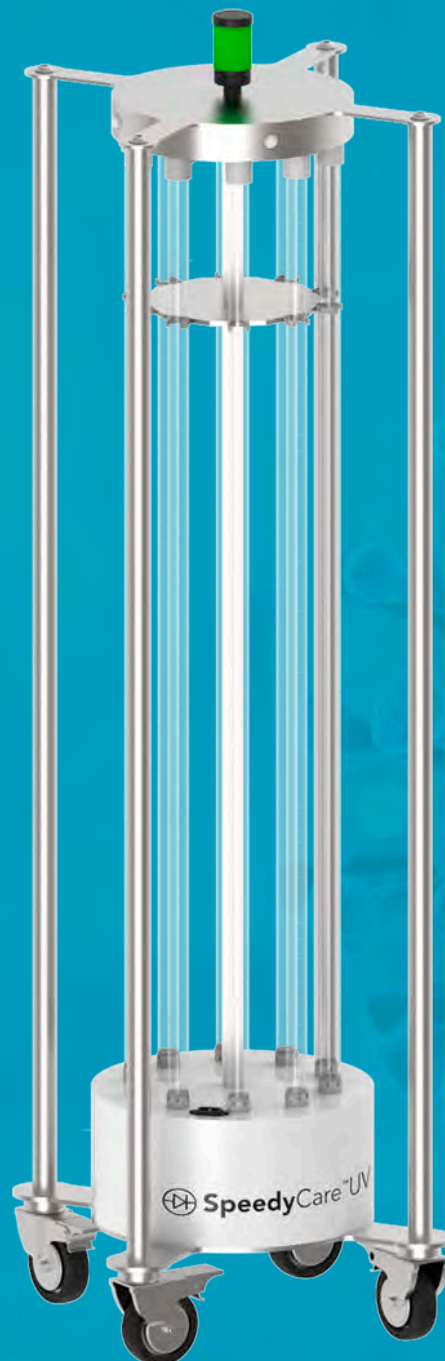
A germicidal wavelength that inactivates pathogens in both air&surfaces. Disinfects 99.9% in minutes.

### Motion sensors. Auto-Stop

Four embedded motion sensors for a 360° auto-stop safety function, avoiding unprogrammed light exposures to operators.

### Hi-power UV-C lamps

A set of 10 hi-power lamps in cylindrical disposition emit UV-C light to ensure efficient and fast virus deactivation.





## TECHNICAL SPECIFICATIONS

# SpeedyCare™ 750 Technical Specifications

### UV-C Light Source

UV light source	Hi-Power Mercury Lamps
UV-C peak wavelength	254 nm (nanometers)
Lamps Life (60.000 cycles @ 15 min)	9-10.000 h

Disinfection speeds*	@99%	@99.9%
20 m2	3 min	5 min
30 m2	6 min	10 min
50 m2	10 min	16 min

### Physical

Dimensions (LxWxH)	167 x 60 x 60 cm
Total Weight	39 kg
Material	Chasis based on stainless steel & aluminum
Support	Structure with 4 wheels
Transport flight & protection case	70x70x170 mm

### Computer

Type	Industrial computer
Memory	4GB RAM
CPU	Quad-core ARM-8 1,5 GHz

### Connectivity

WI-FI connectivity	Dual band 2,4 GHz & 5 GHz
Mode	AP & STA

### Safety & Sensors

Auto-stop function	Yes, by motion sensors & cameras
Visual alarms	Yes, RGB LEDs strip with blinking indicator
Acoustic alarms	Yes, Beeper/ Voice synthesizer in option

### Motion Sensors

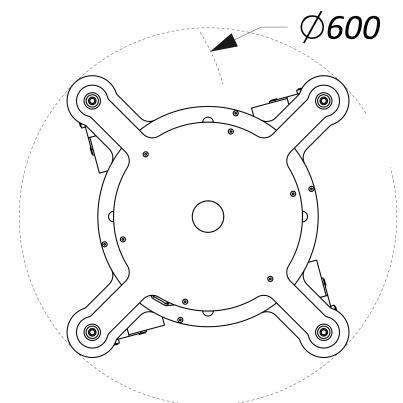
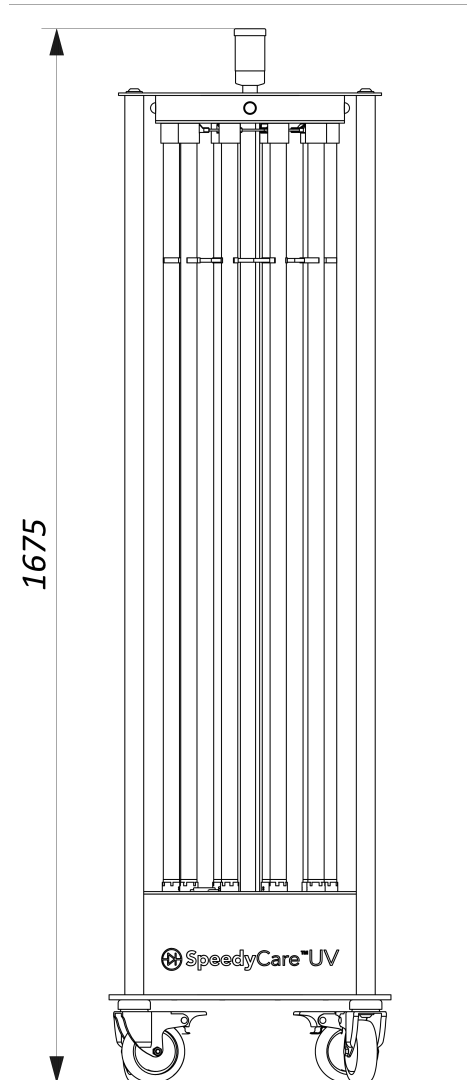
Number of sensors	Yes, 4 @ 90°
Type	PIR
Eye Safe	Yes (infrared)
Measurement range	10 m

### Power requirements

Voltage	230 V/50 Hz – 110 V/60 Hz
Mains requirement	E-type or Std. Schuko wall socket
Conection	5 m power cord with V-lock system

### Power Supply

Voltage	220 V
Power	1700 W
Mains requirement	Std. Schuko wall socket



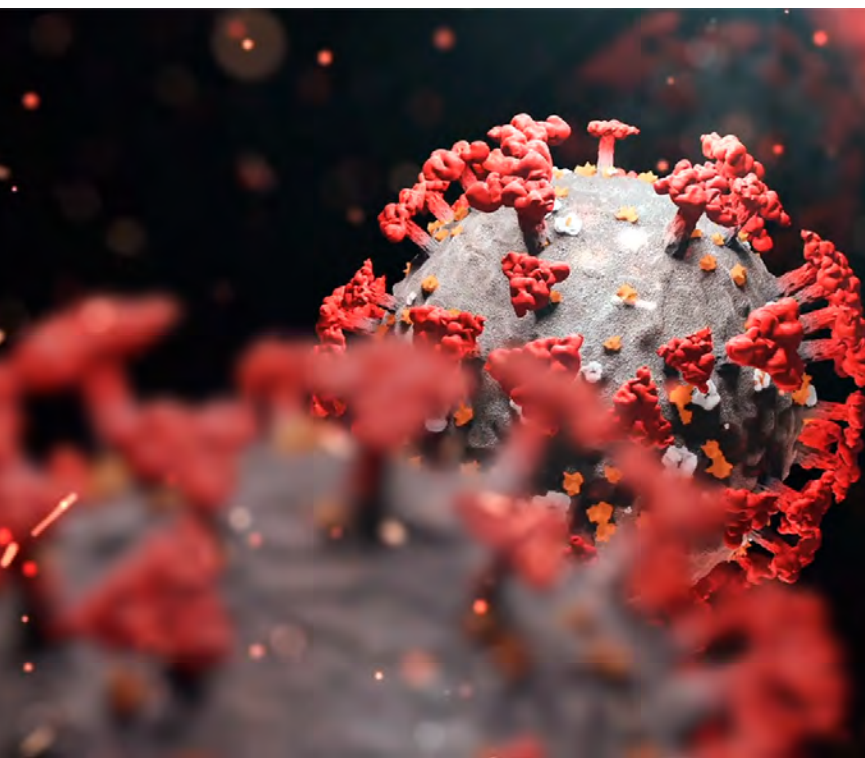
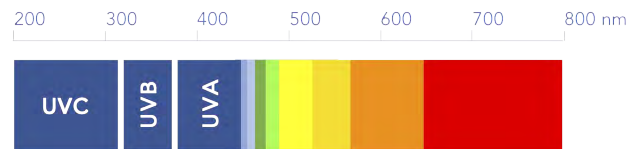
## UV LIGHT IS AN ELECTROMAGNETIC RADIATION

### What is UV-C?

Ultraviolet (UV) light is an electromagnetic radiation. Its wavelength spectrum falls in the region between visible light and X-Rays. It is invisible and ranges from 100 nm to 400 nm has been traditionally subdivided in 3 categories or regions.

Natural UV radiation is of course coming from the Sun. Around 10% of all that energy falls within the UV range, and only 4% is capable of crossing our atmosphere and reaching the Earth's surface where we live. The rest is absorbed by the oxygen (O<sub>2</sub>) and ozone (O<sub>3</sub>) in stratosphere, blocking most of the UV-B and all the UV-C component of the UV light.

<b>UV-C</b>	100 nm to 280 nm	Germicidal radiation - inactivates pathogens
<b>UV-B</b>	280 nm to 315 nm	Actinic radiation - causes photochemical reactions
<b>UV-A</b>	315 nm to 400 nm	Considered non-germicidal



### UV-C DISINFECTING ROBOT

## Why UV-C Deactivates Viruses?

UV-C is an electromagnetic radiation that destroys the ability of microorganisms to reproduce by causing photochemical changes in nucleic acids. Wavelengths in the UV-C range are especially damaging to cells because they are absorbed by nucleic acids, disabling their ability to perform vital cellular functions. The germicidal effectiveness of UV-C peaks at about 250–265 nm, this corresponds to the UV absorption by bacterial DNA. The germicidal effectiveness of UV-C radiation can vary between pathogens, and the broader range wavelengths that include UV-B also make a small contribution to inactivation (Webb and Tuveson 1982).

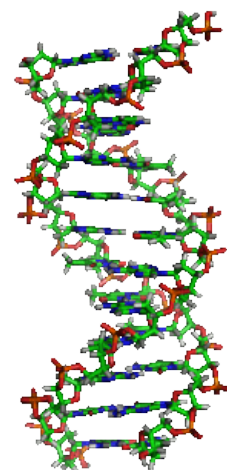
UV-C radiation has been proven as an effective disinfection method for 80 years now.

## UV IS A WELL-KNOWN TECHNOLOGY IN THIS FIELD

### Has UV been used before for Inactivation of Viruses?

Yes, in fact UV is a well-known technology in this field. It is reported that Hart in 1937 used an array of UV lamps to sterilize supply air in a surgical operating room. Hart employed direct, high-intensity UV for the disinfection of hospital operating room air at the Duke University Hospital, after traditional methods had failed. Riley, in 1972, installed UV lamps in a school ventilation system dramatically reducing the incidence of measles, and subsequent applications enjoyed similar successes. Since then, UV-C has been successfully implemented in a number of appliances and devices to support inactivating microorganisms, such as bacteria, viruses and fungi.

The first UVC continuous disinfection robots were built ca. 15 years ago, mainly to decrease the number of HealthCare-Associated Infections (HAIs).





## Disinfecting Speeds for SpeedyCare UV Robot

SpeedyCare™ UV robot disinfection capabilities are proportional to the exposure time. The UV-C lamps work at maximum output and is lighting time what defines the degree of pathogens deactivation.

But disinfection rate is not an absolute variable. Microbiologists use the log reduction factor to express the level of microorganisms' disinfection, and this reduction factor conditions the exposure time of a given disinfecting UV-C device.

### SPEEDYCARE™ UV DISINFECTING PERFORMANCE

## The Log Reduction Concept explained

Log Reduction is a mathematical term that is used to express the percentage or proportion of microorganisms deactivated in a disinfection process. It is calculated by the 10-base logarithm of the relation between the pathogen's units before and after the UV light exposure.

This table shows the reduction after disinfection for every given Log Reduction factor.

Log Reduction	Reduction Factor	Percent Reduced
1	10	90%
2	100	99%
3	1,000	99.9%
4	10,000	99.99%

### A FUNCTION OF MAINLY 4 VARIABLES

## How light exposure time is calculated

Exposure time to disinfect a room is a function of mainly 4 variables, these are:

1. Pathogen UV-C susceptibility (microbe-fluence)
2. Log Reduction Factor (LRF)
3. UV-C device radiation power (DRP)
4. Distance from UV-C device to the exposed microbial

Exposure Time =  $\Phi$  (microbe-fluence, LRF, DPR, Distance)

## Disinfection times for SARS-CoV-2

It is expected that fluence for the SARS-CoV-2 virus to be similar to any other enveloped coronavirus.

According several susceptibility studies, it is proven the right dose to disinfect 90% of coronaviruses ranges from 6 mJ/cm<sup>2</sup> (mili-Joule per square cm) to 24 mJ/cm<sup>2</sup>. To be on the safe side, we assume 25 mJ/cm<sup>2</sup> as expected fluence to kill 90% (Log Factor 1) of SARS-CoV-2 in surfaces.

To achieve 99% (Log Factor 2) average increase of fluence for most of the known coronaviruses is 100%, so it is considered 50 mJ/cm<sup>2</sup> as the minimum dosage to deactivate 99% of SARS-CoV-2.

Log Factor 3, this is, 99,9% reduction would recommend exposing the virus to 75 mJ/cm<sup>2</sup>.

Room Dimensions	99% disinfection	99.9% disinfection
30 m <sup>2</sup>	3 min	5 min
50 m <sup>2</sup>	5 min	8 min
100 m <sup>2</sup>	9 min	15 min
200 m <sup>2</sup>	18 min	27 min

## About COVID19 & SARS-CoV-2

COVID-19 is the respiratory disease caused by the SARS-CoV-2 virus that has generated outbreaks worldwide. Structurally, this virus is not unique and is similar to other coronaviruses such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS). The SARS-CoV-2 has been identified as a new variant in the betacoronavirus family (Fisher 2020).

Every virus requires a certain dose of UV-C energy to disable their ability to perform vital cellular functions. The SARS-CoV-2 virus is now under ongoing ultraviolet susceptibility studies, but there is a common understanding that due to the fact that is a typical enveloped RNA virus, the dosage is expected to be similar to SARS-CoV-2, but many other tests on related coronaviruses have been conducted over the years. Many tests on related virus have concluded that coronaviruses are highly susceptible to ultraviolet inactivation. This report reviews these studies and provides an estimate of the ultraviolet susceptibility.

Virus type	Deactivation Dose (90%)	Source
<b>Coronavirus</b>	<b>0,70</b> (mJ/cm2)	Walker <b>2007</b>
<b>Berne virus (coronaviridae)</b>	<b>0,70</b> (mJ/cm2)	Weiss <b>1986</b>
<b>Murine coronavirus (MHV)</b>	<b>1,50</b> (mJ/cm2)	Hirano <b>1978</b>
<b>Canine Coronavirus (CCV)</b>	<b>2,90</b> (mJ/cm2)	Saknimit <b>1988</b>
<b>Murine coronavirus (MHV)</b>	<b>2,90</b> (mJ/cm2)	Saknimit <b>1988</b>
<b>SARS Coronavirus CoV-P9</b>	<b>4,00</b> (mJ/cm2)	Duan <b>2003</b>
<b>Murine coronavirus (MHV)</b>	<b>10,30</b> (mJ/cm2)	Liu <b>2003</b>
<b>SARS Coronavirus (Hanoi)</b>	<b>13,40</b> (mJ/cm2)	Kariwa <b>2004</b>
<b>SARS Coronavirus (Urbani)</b>	<b>24,10</b> (mJ/cm2)	Darnell <b>2004</b>

As soon as SARS-CoV-2 virus deactivation dose is measured, SpeedyCare™ UV robot would incorporate that value into its database to recalculate the right timing. In the meantime, SpeedyCare™ UV robot would consider a dose of 50 mJ/cm2 for a deactivation rate of 99%.

### INTERNATIONAL STANDARD SPECIFIES

## Safety Standards: ISO 15858:2016

This International Standard specifies minimum human safety requirements for the use of UVC lamp devices. It is applicable to in-duct UVC systems, upper-air in room UVC systems, portable in-room disinfection UVC devices, and any other UVC devices which may cause UVC exposure to humans. It is not applicable to UVC products used for water disinfection.

Maximum daily dose per person is set in 6 mJ/cm2. SpeedyCare UV robot includes a set of safety features, including motion sensors which ensure an immediate switch-off to prevent the operator from UV-C exposure. However, in case of direct exposure to UV-C and according this standard, any operator could be safely exposed every day to 1 min at a distance of 4 m from the device.

Despite of the evident low risk of exposure, we recommend the use protective clothing and goggles, typically used for occupational safety and health purposes.