

**Before use, please take the time to read this datasheet and to make sure you understood the advices and caution of use.**



### Security of the user

- Do not watch directly the beam of light or through any optical instrument.
- Avoid any contact with the LEDs or its lens.
- Code IP40: protected against solid corpses larger than 1 mm and non-protected against water intrusion.
- Use the product in an environment where the working temperature is between 0°C and +35°C and there is little humid air (<80%): if those conditions are not respected the product can be damaged.
- Do not use the product in an environment where smokes and oil vapors are present.
- Never try to repair by yourself any potential damages on the product.
- Make sure to use the right power supply before connecting the product.
- Do not reverse the electrical polarity – check your connections and the conventions before turning on the product.
- Make sure you have the correct connector to link the product to the power supply.

**Any incorrect use cancels the warranty.**

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## Eyes & Skin Safety



UWAVE products come under the standard DIN EN 62471:2008 which classified sources of optical radiation into risk groups subject to their potential photo biological hazard. Due to the emission of high UV irradiation, our products belong to Risk Group 3 (hazardous even for momentary exposure) therefore special safety measures, detailed in the following, must be observed.



To protect the eyes and skin staff everyone in the area must wear **protective equipment**. Protective **goggles** should comply with the standard EN 170 (Personal eye-protection - Ultraviolet filters - Transmittance requirements and recommended use). The goggles must protect eyes against direct and side irradiation.



Don't look directly at the product's output window because of a risk of becoming blind.  
Don't expose skin too long without protection to avoid skin burning or cancer.



Due to the high emission power, the area near the LEDs can reach high temperature during operation.  
Avoid touching directly the product and especially the output window.



## Legal obligations

Under the law at present, workers' exposure must be lower than the Exposure Limit Value (Directive 2006/25/EC of the European Parliament). Depending on the wavelength of the product and the body part insolated, **Limit Values are summarized in the tables below:**

	Eye	Skin
Wavelength	315 – 400 nm (UVA)	180 – 400 nm (UVA, UVB, UVC)
Exposure Limit Value	10 000 J/m <sup>2</sup>	30 J/m <sup>2</sup>

### Case study with a LED at 365 nm with an Optical Power of 10 mW/cm<sup>2</sup>:

For the **eyes**, the maximal exposure time ( $\Delta t$ ), the Exposure Limit Value ( $ELV$ ), and the Optical Power ( $P$ ) of a UV product are linked by the formula:

$$\Delta t = \frac{ELV}{P}$$

For **skin**, the Optical Power is normalized by skin's sensitivity factors for each wavelength.

The maximal exposure time per day is calculated below:

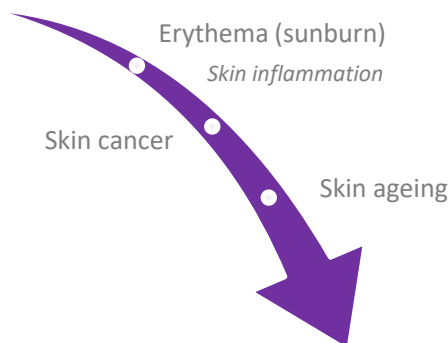
	Eyes	Skin
Optical Power (normalized for skin)	10 mW/cm <sup>2</sup>	4,7 μW/cm <sup>2</sup>
<b>Maximal exposure time per day</b>	<b>1 min 40 s</b>	<b>12 min</b>

With a UV product with an optical power of 10 mW/cm<sup>2</sup>, the Exposure Limit Value per day is **reached in 2 minutes for eyes and 12 minutes for skin** without any safety equipment. Therefore, protective equipment is needed when a UWAVE UV LED equipment is used.



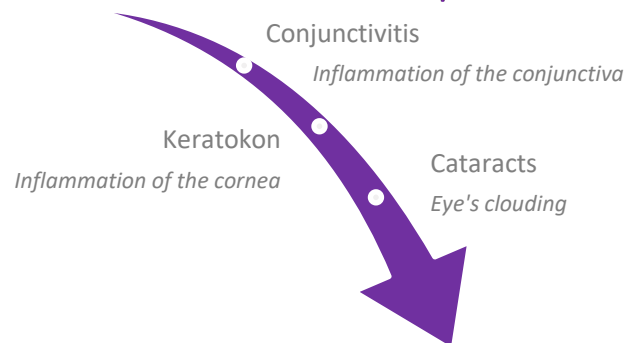
## Possible health damages

### Effects on skin along unprotected UV exposure



**Burning, inflammation, chronic diseases**

### Effects on eyes along unprotected UV exposure



**Visual strain, inflammation, blindness**



## Protective equipment



### Eyes protection



**Safety goggles** prevent UV damages to eyes.

REF: UGLASS-02

- Certified NF EN 170 absorbing 99,9% of UV radiation and visible light up to 532nm
- Protect against side irradiation
- Resist to chemical products and scratches

**Beyond 2 minutes per day of eye UV LED exposure at 10 mW/cm<sup>2</sup>, protective goggles are necessary according to the European Directive 2006/25/EC.**



**Safety face shield** prevents UV damages to eyes and skin's face.

REF: UMASK-01

- Certified NF EN 170 absorbing 99,9% of UV radiation and visible light up to 400nm
- Protect against side irradiation
- Resist to scratches

**Beyond 12 minutes per day of face UV LED exposure at 10 mW/cm<sup>2</sup>, protective mask is necessary according to the European Directive 2006/25/EC.**



## Body protection



**Safety gloves** prevent UV damages to exposed skin.

REF: UGLOVE-01

- High protection against UV radiation
- Resist to chemical products and scratches

**Beyond 12 minutes per day of hands UV LED exposure at 10 mW/cm<sup>2</sup>, protective gloves are necessary according to the European Directive 2006/25/EC.**



**Safety jacket and trousers** prevent UV damages to exposed skin, especially arms & legs.

- Certified UPF 50+ absorbing more than 90% of UV radiation
- Durable and resistant

REF (jacket): UJACK-01

REF (trouser): UTROUS-01

**Beyond 12 minutes per day of arms & legs UV LED exposure at 10 mW/cm<sup>2</sup>, protective clothes are recommended according to the European Directive 2006/25/EC.**



**Protection suit** prevents UV damages to entire body, especially neck.

REF: USUIT-01

- Certified UPF 50+ absorbing more than 90% of UV radiation
- Resist to chemical products

**Beyond 12 minutes per day of neck UV LED exposure at 10 mW/cm<sup>2</sup>, protective suit is recommended according to the European Directive 2006/25/EC.**



## UV source isolation



**UV shields** are protective windows which isolate the UV insulated zone to protect all workers around.

They are made to measure to fit with your constraints.

REF: USHIELD-01

**Beyond 2 minutes per day of eye UV LED exposure and 12 minutes of skin UV exposure at 10 mW/cm<sup>2</sup>**, protective shields are necessary to protect staff without safety equipment according to the European Directive 2006/25/EC.



## Warning stickers



**Warning stickers** inform workers of radiation danger and invite them of wearing protection equipment. They are available in 3 sizes:

- 55 mm x 25 mm
- 165 mm x 75 mm
- 290 mm x 130 mm

REF: USTICK-01

REF: USTICK-02

REF: USTICK-03



## Expertise

Our UV LED experts from UWAVE can come and check your production lines to:



Measure UV irradiance to **determine the maximum UV personal exposure time** compared with limits (European Directive 2006/25/EC).



Determine the most **adapted solution** to protect workers' eyes and skin.








**Contact us to get our expertise. We will find together the equipment which fits with your application.**



## Technical Overview

The UFIBER™ is the only UWAVE product where the electronical board is not integrated directly into the lamp. It allows the UFIBER to be compact and integrated into complex environment. Optical system on this UV LED head can be changed by the user.

<b>Electronics</b>  	<i>Power supply</i>	Direct LED control
	<i>Illumination mode</i>	Refer to the UPOWER datasheet.
	<i>Connector</i>	Male LEMO connector 4 Pins
	<i>Power consumption</i>	3W maximum
<b>Optics</b>  	<i>Wavelength</i>	365 or 385 or 395 or 405 nm For other wavelengths, feel free to ask us.
	<i>Irradiance</i>	Up to 1600 mW/cm <sup>2</sup>
	<i>Optical system</i>	WINDOW / LARGE / MEDIUM / FOCUS
<b>Mechanics</b>  	<i>Diameter</i>	12mm
	<i>Length</i>	95mm with focus optic and 92mm with window / large / medium optic.
	<i>Material</i>	Device body: Aluminum alloy
	<i>Weight</i>	17g
<b>Thermal</b>  	<i>Cooling system</i>	Passive air cooling
<b>Environment</b>  	<i>Working temperature</i>	10°C to 40°C
	<i>Working humidity</i>	< 80% for temp < 30°C
	<i>IP code</i>	IP40

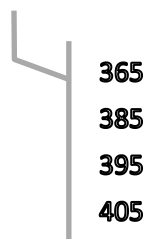




Product reference

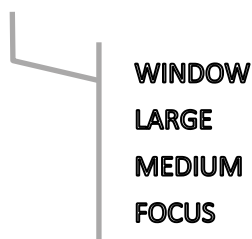
*UFIBER reference:*

UFIBER - **XXX**



*Optical system reference:*

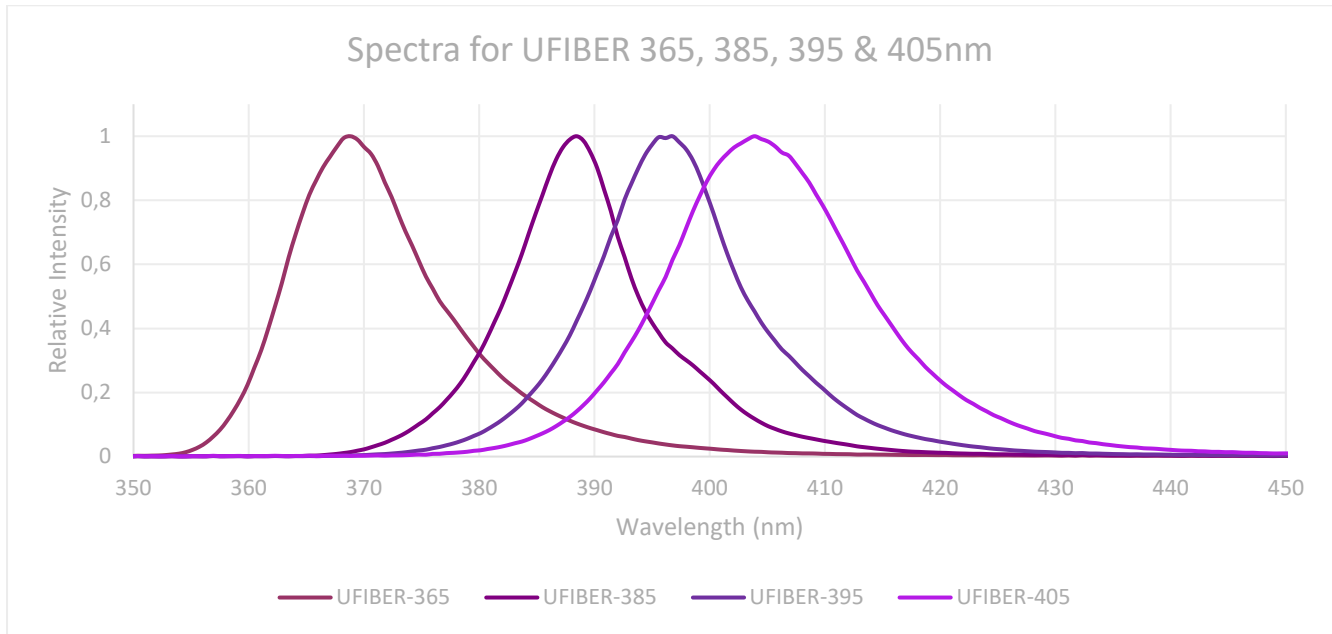
OPTIC - **YYY** - UFIBER





**Optical characteristics**

**Spectra**



 For other wavelengths (UVC / UVB / UVA / VISIBLE / IR), feel free to ask us!

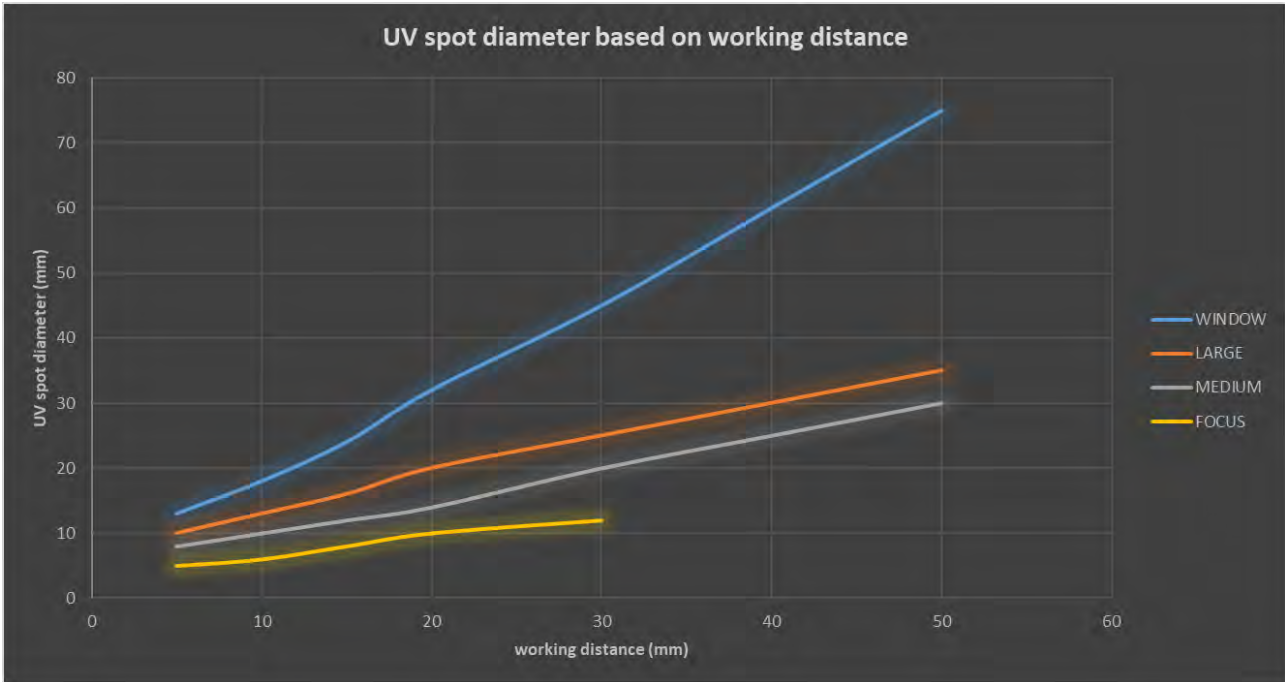
**Available optical system**

The UFIBER™ can be used with 4 different lenses which adjust the size of the beam depending on your needs.

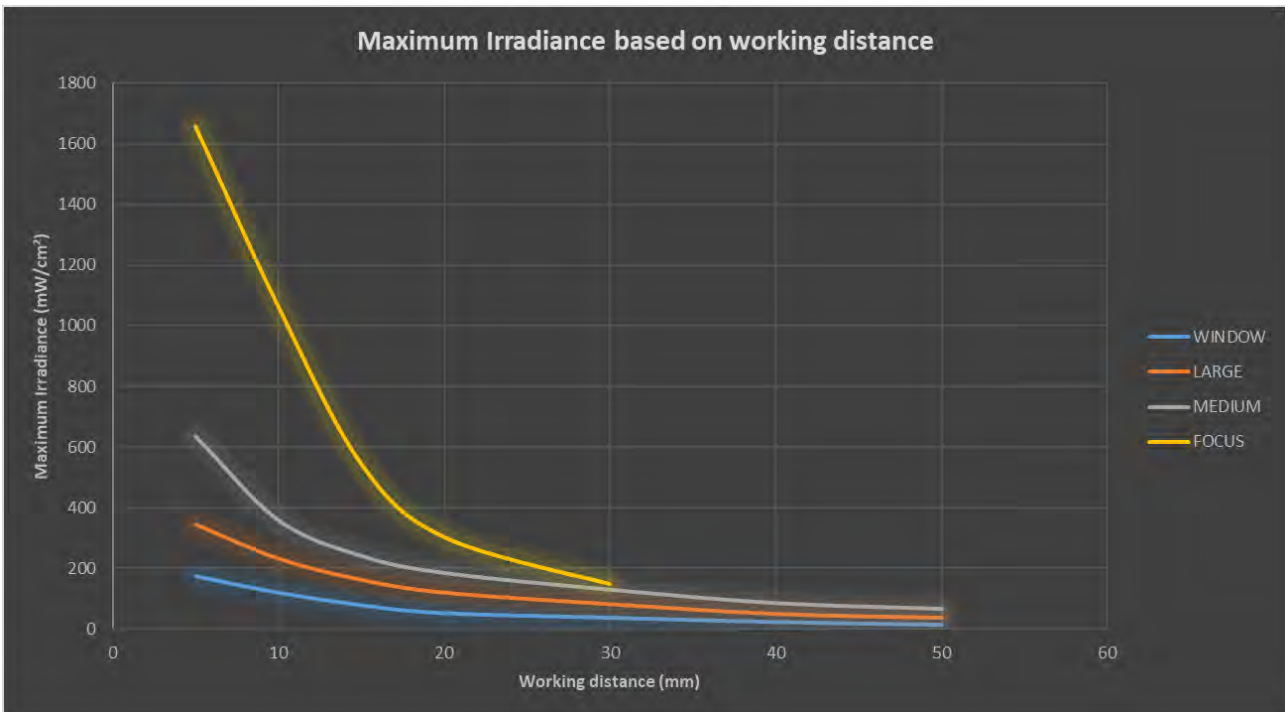
- Window (no optics → Quartz window / extra-large UV spot)
- Large
- Medium
- Focus
- Another need? Feel free to ask us



**Beam size**

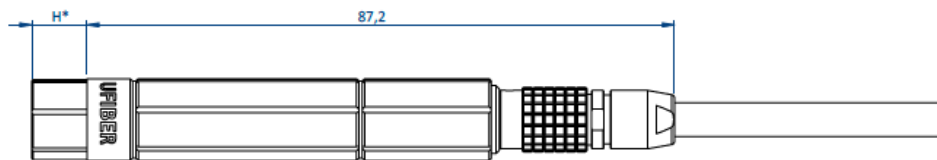
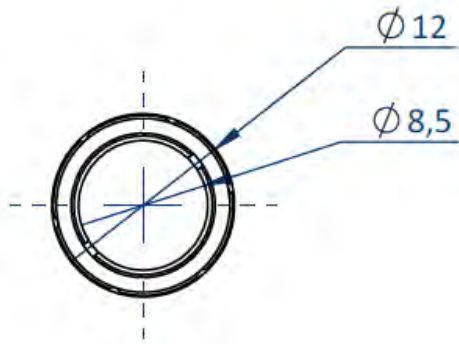


**Photometry**





Mechanical dimensions







Optical system	H* (mm)	Total length (mm)
Large & Medium	4,8	92
Focus	8,2	95,4



How to use: with the UPOWER

As the UFIBER™ does not contain LED control electronics, the user must control it thanks to a UPOWER™. In order to correctly use the product, please read the following steps:

Steps	Photo description
<p>Fix the product using the dimensions given in the mechanical dimensions part.</p>	
<p>Put the UPOWER™ in place. Pay attention to leave a 10cm space next to the ventilation.</p> <p><i>NB: Please note that this UPOWER-0200-24-SCREEN is not provided and must be purchased separately.</i></p>	
<p>Connect the product to the UPOWER™ with a UCAB-M8LEMO-FM-4-DD-LXX where XX is the cable length.</p> <p>Side UFIBER™: LEMO 4 pins female Side UPOWER™: M8 4 pins male</p>	
<p>Please refer to the UPOWER™ datasheet to know how to manage UFIBER™ illumination.</p>	

UWAVE has also developed a compact driver box which integrates LED control electronics: UDRIV-UFIBER

➔ Please refer to page 16 of this datasheet for more information.



**Accessories**

**UPOWER™:**



UWAVE can provide any kind of power supply adapted to your need, from the number of connectors, to the power through illumination mode & synchronization.

Reference of this power supply: UPOWER-0200-24-SCREEN

To build the one adapted to your needs please contact us at sales@uwave.fr

**Optics:**



The UFIBER™ can be used with 4 different lenses which adjust the size of the beam depending on your needs.

- **Window** (Ref: OPTIC-WINDOW-UFIBER)
- **Large** (Ref: OPTIC-LARGE-UFIBER)
- **Medium** (Ref: OPTIC-MEDIUM-UFIBER)
- **Focus** (Ref: OPTIC-FOCUS-UFIBER)

Check out the section “Optical characteristics” for more information.

**Cables for the UFIBER™:**



Both sides connectors (UPOWER™ link):

Reference: **UCAB-M8LEMO-FM-4-DD-L5** } Depending on the length you want (in meters)  
 2 }  
 10 }

**Heat-sink body:**



The heat sink allows the UFIBER to produce a more powerful light by improving the heat management.

Ref: HEATSINK-UFIBER

**DRIVER box:**



The driver box allows the user to control one UFIBER with a PLC instead of installing a UPOWER™. It can be interesting for compact environment or machinery manufacturer.

Ref: UDRIV-UFIBER

➔ Driver box Input: Cable M12 4 pins male connector with signals below.

Pin number	Cable color	Input / Output signal	Designation	Signal
1	Brown	In	Power supply +	24V
2	White	-	Not used	-
3	Blue	In	Power supply -	0V
4	Black	In	Intensity Control - DIM	Direct [0 – 24V]

➔ Driver box Output: Female M8 4pins connector for connecting UCAB-M8LEMO-FM-4-DD-LXX where XX is the cable length.

**Labo Mechanics:**



Mechanical fixations which fit with laboratories optical bench.

Ref: LAB-MEC-UFIBER

**Indus-mechanics:**



Mechanical fixations which fit with industrial integration needs.

Ref: INDUS-MEC-UFIBER