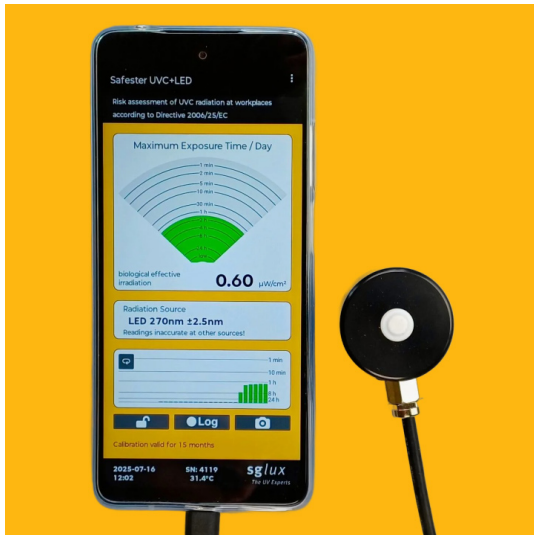


# Safester UVC+LED

Instrument to detect harmful UVC radiation according to Directive 2006/25/EC

## GENERAL FEATURES



### Properties of the Safester UVC

The Safester UVC+LED is an instrument to detect harmful UVC radiation in workplaces according to the “Directive 2006/25/EC of the European Parliament and of the Council of 5 April 2006 on the minimum health and safety requirements regarding the exposure of workers to risks arising from UVC radiation.” According to DIN 5031-11, the Safester UVC+LED fulfills the highest requirements of quality class 1 for actinic radiometer and can therefore be used for precision measurements. The instrument measures and displays the maximum time a person can be exposed to a given UVC irradiation anticipating that this irradiation will not change over time. It consists of a calibrated UV sensor with calibration certificate, an Android Smartphone,

a battery charger and a carry case. The instrument must not be used to detect other UV radiation sources than UVC low pressure tubes or KrCl 222nm excimer sources or UVC LEDs.

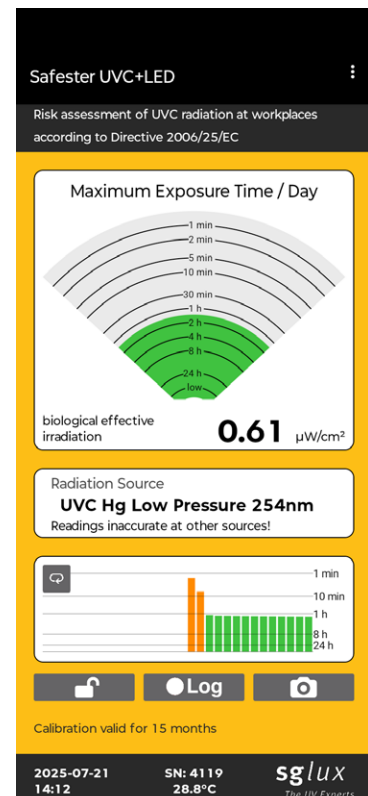
## GETTING STARTED

Protect eyes and skin and switch on the UVC low pressure source.

## USING THE SAFESTER UVC

Connect the sensor to the Smartphone’s USB terminal and power on the Smartphone. The app will start automatically. Then please select the UVC radiation source. Point the sensor to a place where UVC radiation is suspected, move it and turn it, observe the display and enter the shortest exposition time displayed into your Risk Assessment Protocol.

In addition to the max. exposition time, the currently measured biologically effective irradiation according to TROS IOS / ICNIRP is displayed.



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## SCIENTIFIC BACKGROUND

### Occurrence of harmful UV radiation

Harmful UV radiation is generated by UV light sources used in industrial processes such as curing or welding machines or end user devices such as UV sterilizers for air and water or ozone generators. In case of improper shielding some of these devices emit a radiation such strong that just a few seconds will irreversibly damage the human eye. During normal use these devices usually protect the operator from this radiation. However, defective or unsuited devices and devices in maintenance mode emit harmful UV radiation.

### Functional Principle of the Safester UVC

The Directive 2006/25/EC defines a maximum daily dose of harmful artificial UV radiation with  $H_{\text{eff}} = 30 \text{ J/m}^2$ .  $H_{\text{eff}}$  is defined by the following formula:

$$H_{\text{eff}} = \int_0^t \int_{\lambda = 180 \text{ nm}}^{\lambda = 400 \text{ nm}} E_{\lambda}(\lambda, t) \cdot S(\lambda) \cdot d\lambda \cdot dt$$

where:

- t time of exposure
- $\lambda$  wavelength of UV irradiation between 180 nm and 400 nm
- $E_{\lambda}$  spectral irradiance of the source
- $S_{\lambda}$  spectral weighting taking into account the wavelength dependence of the health effects of UV radiation on eye and skin, (according to Table 1.2 of the Directive)

The Safester UVC+LED works with a Silicon Carbide (SiC) UV photodiode combined with a filter to suppress the influence of the sun's UV radiation. The spectral responsivity of this photodiode is close to the wavelength dependence of the health effects of UV radiation, but it is not identical. Thus, the Safester UVC+LED must not be used to measure other sources than UVC low pressure tubes or KrCl 222nm excimer sources or UVC LEDs.

The calibration of the sensor is done using up to four traceable UVC reference sources. Please find further information in the Calibration Certificate that comes with the instrument.

### Directive 2006/25/EC - artificial optical radiation

This Directive aims to improve the health and safety of workers by laying down limit values for exposures of workers to artificial optical radiation to eyes and skin. Exposure to natural optical radiation (sunlight) and its possible health consequences are not covered by the Directive. The Directive gives legal definitions on optical radiation, on wavelength ranges (visible, ultraviolet, infrared), on kinds of artificial optical radiation (laser radiation and non-coherent radiation), on exposure limit values whose compliance ensures the physical health of workers who are exposed to artificial optical radiation at work, and on parameters for measurement such as irradiation, radiance and radiant exposure. The employer is obliged to assess and to measure (and/or to calculate) the levels of exposure to artificial optical radiation to which workers are likely to be exposed.

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## Further Information

The following links guide to a “Non-binding guide to good practice for implementing Directive 2006/25/EC” issued by the European Commission. We recommend to study this document carefully before using the Safester UVC.

[ec.europa.eu/social/BlobServlet?docId=6790&langId=en](http://ec.europa.eu/social/BlobServlet?docId=6790&langId=en) (English language)

[ec.europa.eu/social/BlobServlet?docId=6790&langId=fr](http://ec.europa.eu/social/BlobServlet?docId=6790&langId=fr) (French language)

[ec.europa.eu/social/BlobServlet?docId=6790&langId=es](http://ec.europa.eu/social/BlobServlet?docId=6790&langId=es) (Spanish language)



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