

## ■ LED UV curing radiometer X1-1-RCH-116-4

Handheld meter for **high-intensity LED irradiance** for monitoring and setting the intensity of LEDs for UV-A and blue light radiation curing

The X1-1 radiometer from Gigahertz-Optik features an RCH-116-4 detector and is ideal for measurement of the irradiance of high power LEDs in the UV-A and blue light range. The device can accurately measure irradiance levels of up to 40,000 mW/cm<sup>2</sup>.

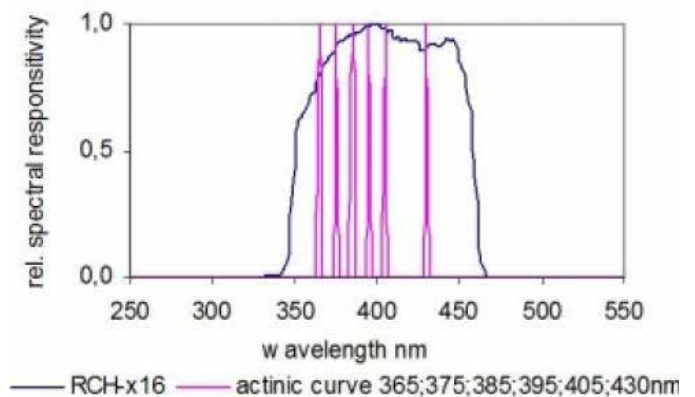
One of the outstanding features of the RCH-116-4 detector is its proven concept of a passive radiation absorber coupled to a UV sensor. This provides stability even in high temperature and intense UV radiation environments. In addition to the passive radiation absorber, the device also has a cosine-corrected field of view. The sensor's housing also serves as a handle.

The battery-powered X1-1 optometer supports a usable dynamic range from less than 1 mW/cm<sup>2</sup> to 40,000 mW/cm<sup>2</sup> thanks to its high-end signal amplifier. It can be used to perform precise measurements of up to 6 standard LED wavelengths for which the detector was calibrated for active irradiance. In addition to the CW measurement function, the device also has a dose measurement function.

The X1 radiometer can be used with other detectors from the RCH series. e.g. for gas discharge lamps. Remote control of the device is possible via its user software and a software development kit is offered for integration of the device in the user's own software.



X1-1 Handheld radiometer with a separate RCH-116-4 detector for measurement of high-power LED lamps in UV-A and blue light radiation curing



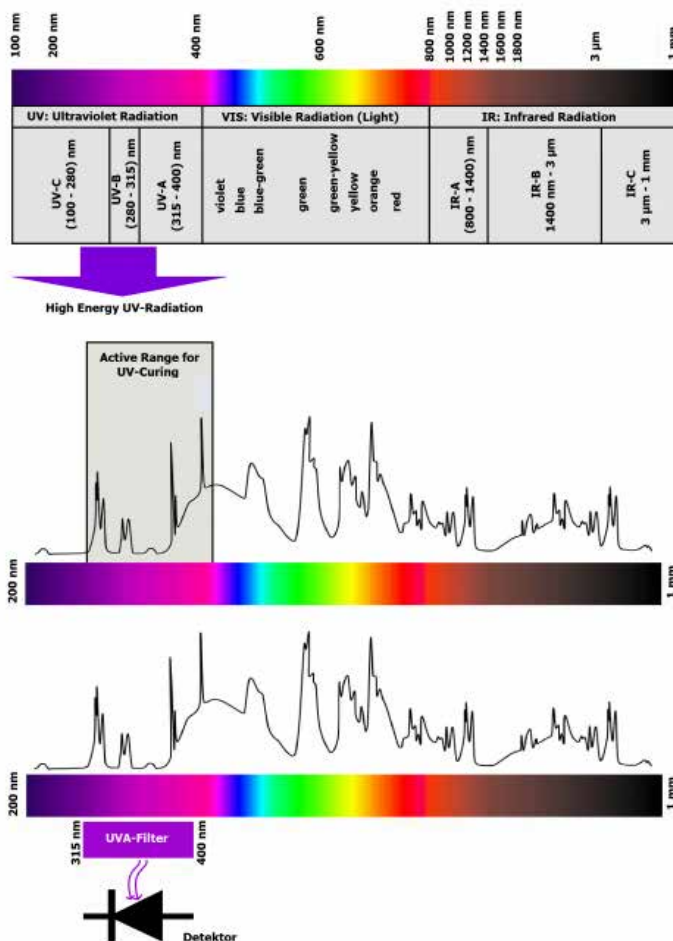
Typical spectral responsivity of detector RCH-116 with the six calibration wavelengths for common LEDs in UV and Blue-light curing applications

## RCH-Series detector technology

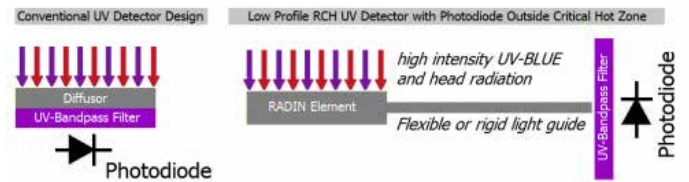
In UV-A and blue light radiation curing, liquids (e.g. inks, coatings and adhesives) are excited by irradiation with high-intensity UV-A and blue light radiation.

The curing process is activated by photoinitiators absorbing the UV or blue light energy which triggers the polymerization reactions (crosslinking). In the past, only gas discharge lamps provided sufficient intensity within the photoinitiators' wavelength range for this purpose.

Today, these are increasingly being replaced by LEDs that emit in the UV and blue spectral range. In order to ensure optimal triggering of the polymerization, the irradiance of the UV lamp must be set in accordance with the corresponding process parameters. In continuous operation, the constancy of the irradiance must be regulated and readjusted when necessary depending on the aging of the lamps. The required UV radiometer, especially its detector, must be able to withstand the high-intensity UV and blue light radiation as well as the relatively high temperatures.



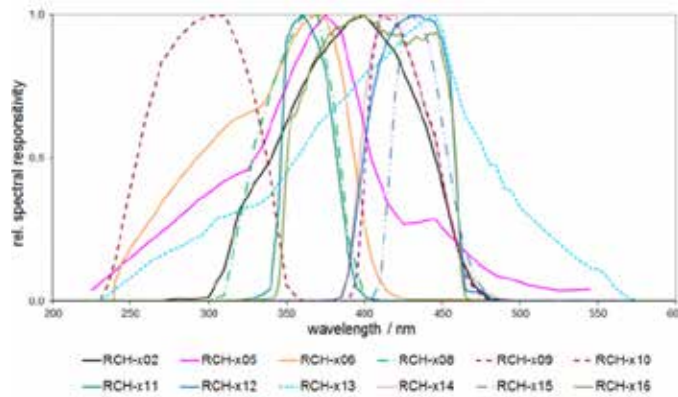
Optical radiation is spectrally defined as covering from UV-C to far infrared. In UV Curing applications only the high energy radiation in the UV-C to BLUE range is initialization the polymerization. UV Curing detectors should only detect UV within the specified wavelength range of the irradiation source.



Conventional UV detectors are built with a diffuser, UV bandpass filter and photodiode which are directly irradiated by the high intensity ultraviolet and heat radiation which can reduce life time and cause damage and temperature drift. Gigahertz-Optik's RCH series UV detectors are built with a low profile housing and UV and temperature stable Radiation Integrator. The photodiode and UV bandpass filters are located outside the critical hot zone coupled to the RADIN diffuser by a flexible or rigid light guide.

## ■ RCH-Series detectors

The RCH-Series comprises a range of detectors with spectral responsivities tuned to the various lamp technologies and photoinitiators used in UV and blue light curing processes.



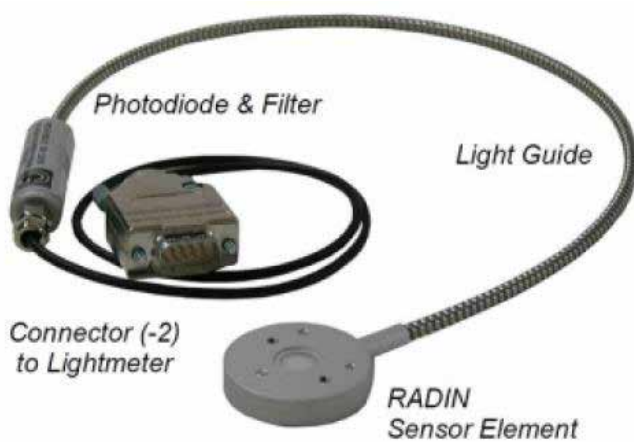
Available Detectors - Relative spectral responsivity

Detector Name	wavelength
RCH-x02	320-460nm
RCH-x05	320-460nm
RCH-x06	200-400nm
RCH-x08	365nm UVA
RCH-x09	BLUE
RCH-x10	240-320nm
RCH-x11	350-400nm
RCH-x12	400-450nm
RCH-x13	305-485nm
RCH-x14	400 & 436nm
RCH-x15	436nm

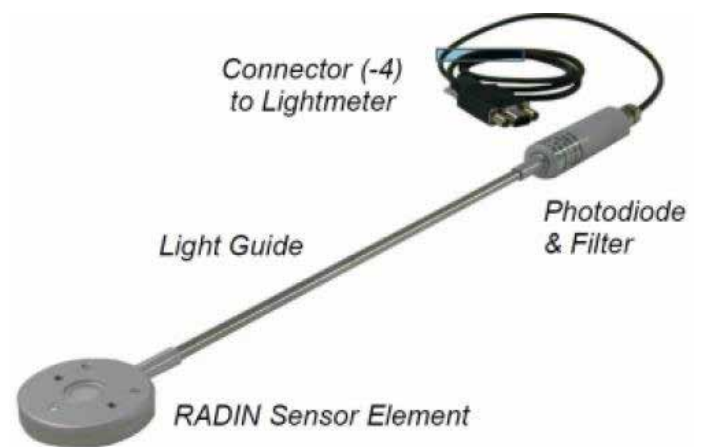
RCH-Series detectors are available in two formats:

**RCH-0xx** detectors have a **50cm flexible** light guide;

**RCH-1xx** detectors have a **22cm length rigid** light guide.



RCH-0 Head with Flexible Light Guide



RCH-1 Head with Rigid Light Guide

## ■ Specifications X1 and X1-1-RCH-116-4

<b>Specifications X1-1-RCH-116-4</b>	
Short description	Handheld radiometer with a separate detector measurement of high-power LED lamps in UV-A and blue light radiation curing
Main features	Detector with passive radiation absorber that has a coupled UV sensor
Measurement range	1 mW/cm <sup>2</sup> to 40,000 mW/cm <sup>2</sup> .
Typical applications	Monitoring and regulation of LED emitters in UV-A and blue light radiation curing
Calibration	Irradiance W/cm <sup>2</sup> . Factory calibration. Traceable to international calibration standards
Input optics	9 mm diameter, diffuser
Dimensions	Measurement head: Height: 8 mm / Diameter: 37 mm
Detector element	Length: 65 mm / Diameter: 15 mm
Light Guide	Rigid, Length 22 cm / 8.7 inch
Calibration LED wave-lengths	365 nm, 375 nm, 385 nm, 395 nm, 405 nm and 430 nm
Max. Irradiance	40 W/cm <sup>2</sup>
Max. signal current	100 µA
Temperature range	up to + 100 °C

### Calibration of the X1-1 RCH-116-4

One essential quality feature of photometric devices is their precise and traceable calibration. The RCH-116-4 detector is calibrated for standard LED wavelengths: 365 nm, 375 nm, 385 nm, 395 nm, 405 nm, and 430 nm. The calibration is performed by Gigahertz-Optik's calibration laboratory that is accredited by DAkkS (D-K-15047-01-00) for the spectral responsivity and spectral irradiance according to ISO/IEC 17025. The calibration and calibration values are confirmed by a calibration certificate for every detector.



With its innovative and high-quality products as well as application solutions, Gigahertz-Optik enjoys a high regard from its international customers within the field of optical radiation measurement technology. As a manufacturer, Gigahertz-Optik offers standard and custom-made solutions. Regular investments in new technologies ensure that Gigahertz-Optik is able to offer modern measuring solutions to its customers in industry and science.

#### Broadband light measurement devices

- UV Radiometer
- Photometer
- Hazard

#### Spectral light meter

- Handheld devices
- High-end devices
- UV Spectroradiometer
- Weather-proof devices
- Light transmission

#### Complementary products

- Integrating spheres
- Integrating sphere light sources
- Calibration standards
- Electronics, optomechanics
- Optically diffuse materials

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