UV Calibration

Catalog

sglux
The UV Experts

WHAT IS CALIBRATION?

Calibration is the determination and documentation of a mismatch between the measurement values of a measuring device and those of a calibration standard. In order to transform the measurement signal (usually electric current) in a signal based on SI units, the calibration factor is determined. After the calibration the calibration factor will be directly applied to the measurement device or the regulator (e.g. a potentiometer) will be adjusted if possible. It is called a traceable calibration if a standard device of known accuracy is used for the calibration and the measurement error is determined (according to GUM= Guide to the Expression of Uncertainty in Measurement (http://www.bipm.org/en/publications/guides/gum.html)). The standard device is related to a national primary standard which is characterized by the PTB or another accredited laboratory. The definition of the SI-unit is contained therein.

HOW DOES A CALIBRATION LABORATORY WORK?

A calibration is done under controlled conditions in a calibration laboratory. Trained personnel as well as an efficient infrastructure and the appropriate measurement technology should guarantee good professional practice. The calibration of a wavelength-integrating UV radiometer is only valid for a combination of UV probe and UV radiation source, since the signal from the radiometer is proportional to the convolution of the spectral sensitivity of the probe with the spectral emission of the source. Consequently the irradiance of the UV source is always measured with a traceable-calibrated spectroradiometer ($W/m^2/nm$) or a UV radiometer (W/m^2) before calibration. In order to reduce the measurement error caused by different field of views, the input optics of the sensor and the reference system should be nearly equal. In case of a calibration with a UV radiometer, the spectral response of the radiometer has to be equal to the spectral response of the sensor. Optical filters realize weighting functions like the erythemal action spectrum (UV-Index sensors) or the microbicidal action spectrum (DVGW/ÖNORM sensors). When using a spectroradiometer, the irradiance will be determined by integration over the selected wavelength range. A weighting function (erythemal action spectrum, microbicidal action spectrum, ICNIRP) can be applied.

sglux uses reference radiometers, calibrated spectroradiometers and calibration standards for calibration. In order to ensure the quality of the calibration process, the calibration standards are traceable to the national calibration

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OUR SERVICES

Our calibration service includes the following measurement values:

- sensitivity regarding the spectral irradiance (s_E in [W/m²])
- spectral response of UV detectors ($s_E(\lambda)$ in [A/W/nm])
- spectral irradiance of UV sources (E(λ) in [W/m²/nm])
- determination of the angle dependent sensitivity $s_E(\theta)$ of UV sensors

The following measurement devices are used for calibration:

- calibrated spectroradiometer Gigahertz BTS2048-UV-S-F, calibrated measurement range: 200 - 430 nm
- calibrated reference radiometer (DVGW, ÖNORM)
- calibrated current sensors (e.g. sglux UV-Surface), the current is measured by a calibrated Keithley 6514 Electrometer

The following UV sources are available:

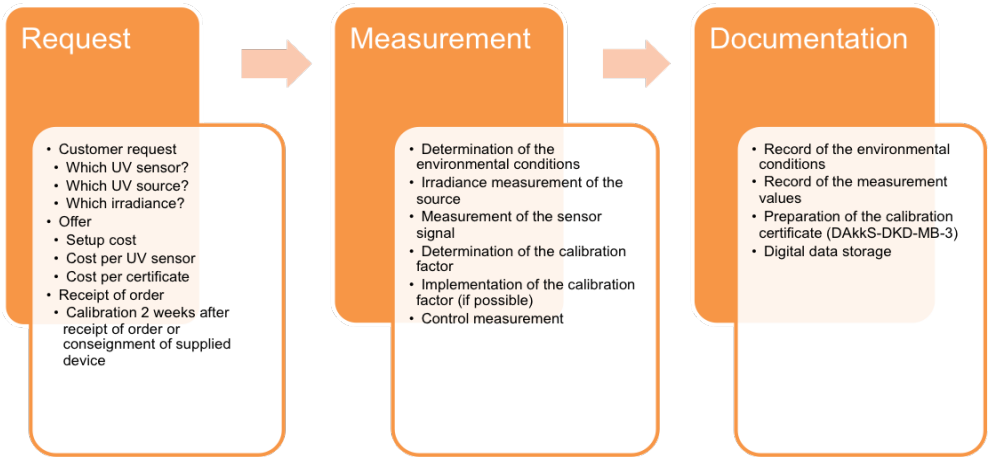
- mercury low pressure lamp
  - UVA: PL-L 36W-09 (Emission Peak 350nm), PL-S 9W BLB (Emission Peak 365nm)
  - UVB: PL-L 36W-01 (Narrowband, Emission Peak 311nm), PL-S-9W-12 (Broadband)
  - UVC: PL-L 36W (Emission Peak 254nm)
- mercury medium pressure lamp: 1 kW undoped (irradiance approx. 1000 mW/cm²)
- mercury medium pressure lamp: calibration standard developed in cooperation with the PTB (calibration of DVGW/ÖNORM sensors)
- microwave powered mercury medium pressure lamp: UV Fusion I300 with an undoped Ga or a Fe doped source
- UV LED:
  - 405nm, 780mW, Nichia SMD LED UV NCSU276A
  - 395nm, 1000mW
  - 365nm, 1000mW, Nichia SMD LED UV NVSU233A
  - 369nm, SETi UVTOP355-TO39-BL
  - 310nm, SETi UVTOP310-TO39-BL
  - 304nm, SETi UVTOP300-TO39-BL
  - 285nm, 1.5mW, SETi UVTOP280-EW-SMD
  - 275nm, 1.5mW, SETi UVTOP275-EW-SMD
  - 260nm, SETi UVTOP255-TO39-BL
- sun: Berlin, Adlershof 52° 26' 16" N, 13° 32' 51" O: Clear sky May – September (UVI > 4), calibration in winter is possible with additional cost at a measurement station in Malaga (Spain)

sglux is ISO 9001 certified. Actually, we prepare a certification according to ISO 17025. The project “Creation of new calibration services for radiometric measurement values in the range of high irradiances” (BMWi: MNPQ 04/13) is supported by the PTB (section spectroradiometry, working group 4.11).

Our calibrations are performed according to DAkkS-DKD-MB-3.

OUR CALIBRATION PROCESS

Calibrations are performed after determination of the customer's requirements, the field of application and the specific environmental conditions. Please see diagram below.



YOUR REQUEST

The requirements for a proper calibration by sglux are listed below:

- Appropriate measurement devices for the calibration have to be available or supplied by the customer, which is always the case for sglux products
- The UV source with the necessary irradiance should be available or supplied by the customer. Therefore UV LEDs can be acquired by sglux. In case of very high irradiance, a calibration on site could be useful.
- The calibration of UV Index sensors depends on the weather and the season. A calibration in Berlin is possible from May – September.

To ensure a fast order processing, we recommend to use our request for calibration form for your calibration demand. For specific requests we invite you to call our experts via telephone to talk about your calibration.

THE MEASUREMENT

Once we have received your order or devices, the measurement takes place under the defined conditions. The calibration object acclimates in our laboratory and the UV source will be stabilized. In order to determine the measurement values of the sensor, the irradiance will be measured with a calibration standard and with the sensor. The values will be compared to adjust the sensor. The measurement uncertainty is improved by averaging various measurements.

THE DOCUMENTATION

The documentation is done according to DAkkS-DKD-MB-3. The description of the calibration object (serial number, manufacturer), a description of the measurement method and the environmental conditions as well as the measurement values and the measurement uncertainty are included in the certificate.