Light sources for calibration
Calibrated irradiance sources, UV - NIR

- Standards of irradiance
- For calibrating spectrometers and radiometers
- PTB or NPL traceable

These are calibrated sources of known spectral irradiance (unit: $Wm^{-2}nm^{-1}$). That should not be confused with spectral calibration lamps that check the wavelength calibration of spectrometers. Lamps suitable for calibration are specially chosen for measuring spectral responsivity.

Irradiance standards

Irradiance is defined as the incident power per unit area. Detection systems measure the power incident on the detector's active area. The irradiance values for these lamps obey the inverse square law for distances of more than 20 times the radiating element size. This allows you to calculate irradiance at distances other than the calibration distance.

Irradiance produced by any lamp depends upon the distance between the lamp and target, the orientation of the lamp, and the directional nature of the lamp's output. For this reason lamps which are suitable for irradiance measurements have to be carefully worked out. The irradiance changes very little when the lamp is rotated through small angles or moved several centimeters out of the calibration plane, so these lamps can be used to generate a known irradiance even over large apertures.

PTB or NPL standards

Our lamps are measured against a PTB or NPL standard (Physikalisch-Technische Bundesanstalt; National Physical Laboratory Ltd.).

Each lamp is carefully tested to specifications recommended by the PTB. The selected, suitable lamps are burnt-in and then measured in open air (secondary standard) in reference to the PTB standard. PTB or NPL provide uncertainties for their lamp standards (first standard). The uncertainty mainly depends on the wavelength range, the lamp structure and fluctuations in (repeated) measurements of data from which the results are calculated. The uncertainty for the secondary standard adds up and is always some factors larger than that of the first standard.

Halogen lamps

The lamps that are suitable for calibration show a low directionality in output and a relatively large lifetime of approx. 500 h. Spectral irradiance data in $mWm^{-2}nm^{-1}$@0.7 m are provided at 5 nm intervals for 250 - 1100 or 1700 nm. The PTB or NPL standards are certified at fewer points. Our additional points are based on interpolation following a procedure of a corresponding DIN norm.

General characteristics of halogen lamps can be found on page Halogen light sources

Deuterium lamps

Deuterium lamps emit useful radiation from 200 - 400 nm. They are recommended if you need an irradiance standard below ~330 nm. The lamps that are suitable for calibration are specially chosen for long-term stability and directioned output uniformity within their lifetime (typ. 500 h).

Spectral irradiance data in $mWm^{-2}nm^{-1}$@ 0.5m is provided at 5 nm intervals for 200 - 400 nm.

For typical lamp spectra chapter Basics.

A word on safety

Deuterium lamps produce very intense UV radiation. In all cases UV glasses must be worn.

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Power supplies
The irradiance data provided is measured at a particular lamp current. To maintain calibration it is necessary that these lamps are run by a qualified constant current power supply.

The set-up
The lamps are run in open air, preferably at the same distance as stated in the calibration report. Choose the lamp which provides irradiance levels close to the linearity and dynamic of the detection system in the wavelength range of interest. For convenient working distances other than the calibration distance you can calculate other irradiance levels according to the inverse square law for distances more than 20 times the radiating element size.

All the lamps come with an appropriate lamp mount with electrical interface and M6 threading for an optical rod. The measurement set-up should preclude any reflections from the lamp to the measurement plane.

Ordering information		
Lamps		
	Lamp type	**Calibrated range [nm]**
LSK113	100 W quartz halogen	250 - 1100
LSK114	200 W quartz halogen	250 - 1100
LSK115	100 W quartz halogen	250 - 1700
LSK116	200 W quartz halogen	250 - 1700
LSK211	30 W deuterium	200 - 400

Power supplies	
LSN111	Constant current power supply for halogen lamps up to 150 W
LSN6016	Constant current power supply for halogen lamps up to 400 W
LSN122	Power supply for 30 W deuterium lamps

UV-safety spectacles	
LSZ025	UV safety spectacles
LSZ026	UV safety spectacles “over the glass“
LSZ027	UV welding goggles

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