



- standards of irradiance
- for calibrating spectrometers and radiometers
- PTB or NPL traceable

These are calibrated sources of known spectral irradiance (unit:  $\text{Wm}^{-2}\text{nm}^{-1}$ ). Don't confuse them with spectral calibration lamps, which check the wavelength calibration (of spectrometers). The 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 power incident on the detector active area. The irradiance values for these lamps obey the inverse square law for distances more than 20 times the radiating element size. This allows you to calculate irradiance at distances other than the calibration distance.

The 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 carefully have to be worked out. The irradiance changes very little as the lamp is rotated through small angles or as you move several cm 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 burned 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 is mainly depending 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 always is some factors larger than the one of the first standard.



## Halogen Lamps

The lamps being suitable for calibration show a low directionality in output and a relatively large lifetime of approx. 500 h. Spectral irradiance data in  $\text{mWm}^{-2}\text{nm}^{-1}@0,7 \text{ m}$  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 [www.lot-oriel.com/lightsources](http://www.lot-oriel.com/lightsources) („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 suitable for calibration are specially chosen for long term stability and directioned output uniformity within their lifetime (typ. 500 h). Spectral irradiance data in  $\text{mWm}^{-2}\text{nm}^{-1}@0,5 \text{ m}$  is provided at 5 nm intervals for 200 – 400 nm.

For typical lamp spectra see [www.lot-oriel.com/lightsources](http://www.lot-oriel.com/lightsources) („Basics“).

### Warning:

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



## Power Supplies

The irradiance data provided is measured at a particular lamp current. In order to maintain calibration it is necessary that these lamps be run by a qualified constant current power supply.

## The Set-Up

The lamps are run in open air, preferably at the same distance as said in the report of calibration. Choose the lamp which provides irradiance levels matched 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 reading the measurement plane.

## Ordering Information

Lamps		
	Lamp Type	Calibrated range [nm]
<b>LSK113</b>	100 W Quartz Halogen	250 – 1100
<b>LSK114</b>	200 W Quartz Halogen	250 – 1100
<b>LSK115</b>	100 W Quartz Halogen	250 – 1700
<b>LSK116</b>	200 W Quartz Halogen	250 – 1700
<b>LSK211</b>	30 W Deuterium	200 – 400
Power Supplies		
<b>LSN111</b>	Constant Current Power Supply for Halogen Lamps up to 150 W	
<b>LSN4012</b>	Constant Current Power Supply for Halogen Lamps up to 200 W	
<b>LSN121</b>	Power Supply for 30 W Deuterium Lamps	
UV-Safety Spectacles		
<b>LSZ025</b>	UV Safety Spectacles	
<b>LSZ026</b>	UV Safety Spectacles „Over the Glass“	
<b>LSZ027</b>	UV Welding Goggles	