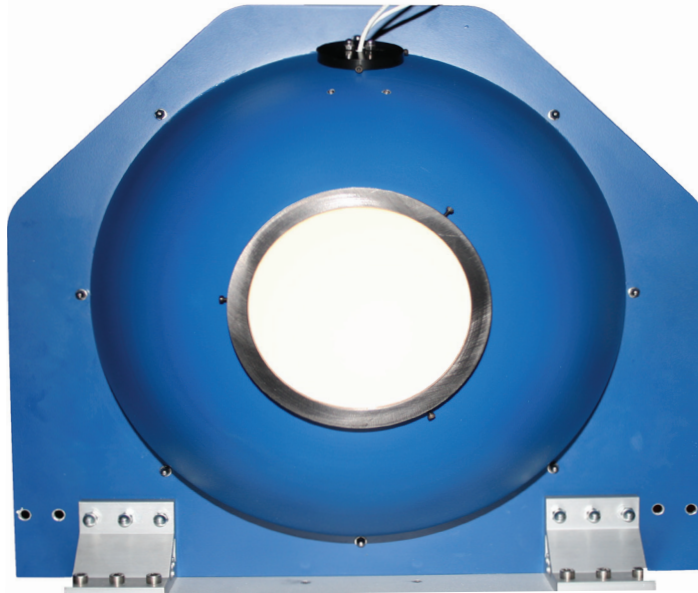


Luminance & radiance standards



Integrating sphere (d = 300 mm)

Luminance standards and radiance standards are used in photometry and radiometry, in particular for the calibration and characterization of cameras and optical measuring devices. Another application is the determination of reflection, transmission and absorption properties of materials.

Luminance and radiance standards are homogeneous light sources that have a uniform brightness over their entire emitting surface and emit almost perfectly lambent and uniformly in all directions. The mode of operation is based on the principle of the integrating sphere. The integrating sphere consists of a hollow, spherical structure with a highly reflective inner surface. This surface is coated with a diffuse reflective coating of barium sulphate, which scatters almost 100% of the incident light. This property enables the sphere to distribute the light evenly in all directions and eliminate directional effects. For luminance standards and radiance standards, the light sources are positioned outside and shine into the sphere.

Each Opsytec integrating sphere is manufactured to the customer's individual requirements to ensure optimum performance for specific applications.

Another feature of the luminance and radiance standards from Opsytec Dr. Gröbel GmbH is their ability to integrate multiple light sources simultaneously. These can optionally be operated individually or in groups and can be dimmed or fitted with a manual or motorized mechanical diaphragm. Shades are used if the luminance and radiance levels need to be adjusted but the lamps cannot be dimmed or change spectrally.



Halogenlampen in der 2500 mm Ulbrichtkugel

LUMINANCE & RADIANCE STANDARDS

The following lamps can be used as a homogeneous light source for luminance or radiance standards:

Halogen lamps are commonly used as they provide a continuous spectrum in the visible range. They are ideal for applications that require high color fidelity and continuous spectrum. Halogen lamps are also available in different wattages, allowing flexibility of choice.

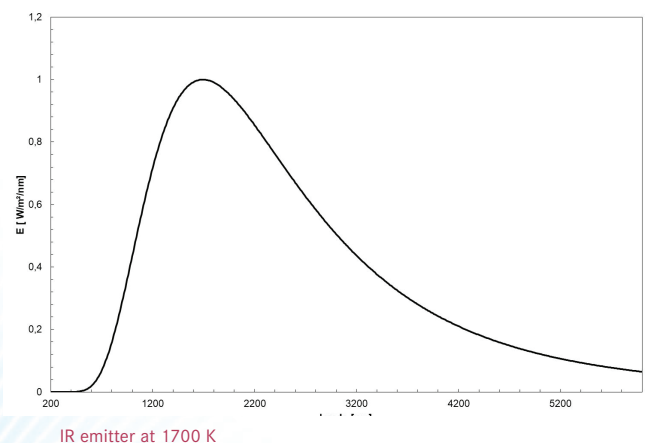
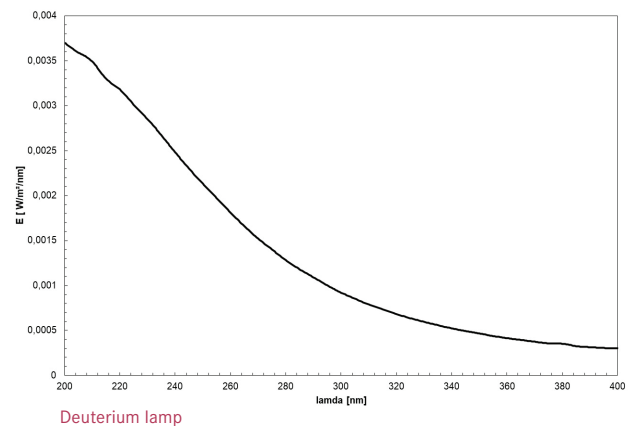
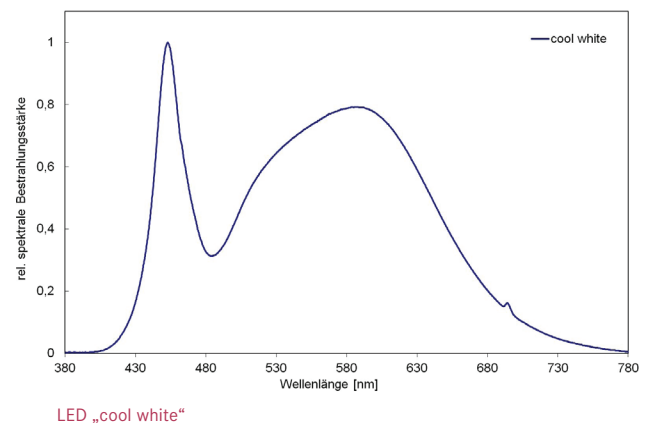
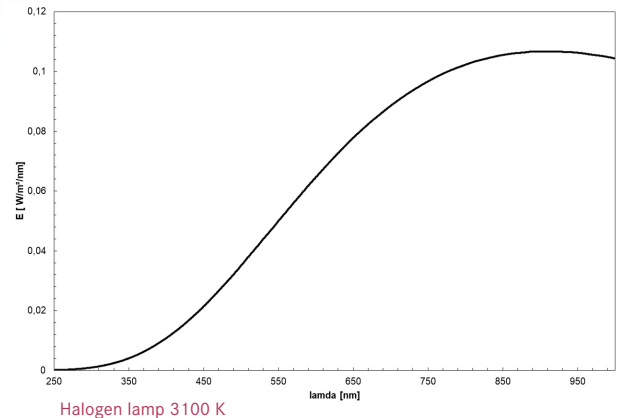
Light emitting diodes (LEDs) are increasingly being used for luminance standards and radiance standards. LEDs offer several advantages, including long life, energy efficiency and the ability to select specific wavelengths. LEDs enable precise control of light intensity and a fast response time, which makes them particularly attractive for modern applications. The luminance achieved is higher than that of conventional integrating spheres with halogen lamps.

Deuterium lamps produce a continuous spectrum from around 200 to 400 nm, which makes them ideal for applications requiring UV radiation.

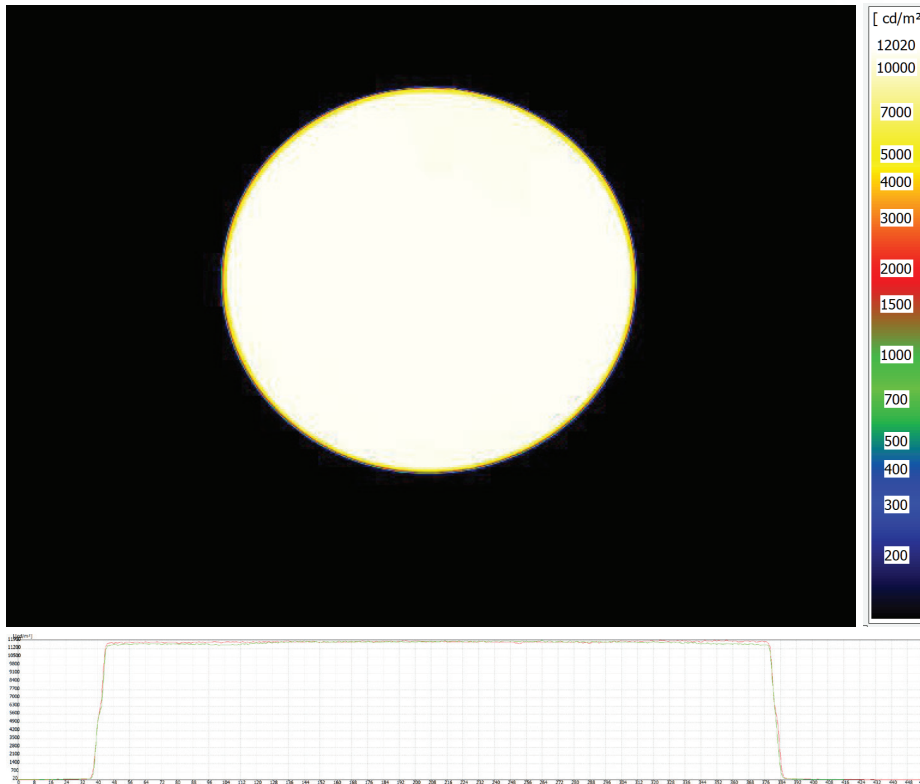
IR emitters, such as tungsten emitters, produce a continuous spectrum with a maximum in the near to mid infrared range and are often used in IR spectroscopy and thermography. IR emitters are also available for vacuum applications.

These lamps serve as luminance and radiance standards and are used in various applications:

- Calibration of luminance and radiance measuring devices
- Generation of defined luminances for the characterization of camera systems
- Provision of reference values for quality control in the lighting industry
- Supporting research and development in the field of optics and photometry
- Characterization of reflection, transmission and absorption, where uniform illumination ensures the results.



EXAMPLES



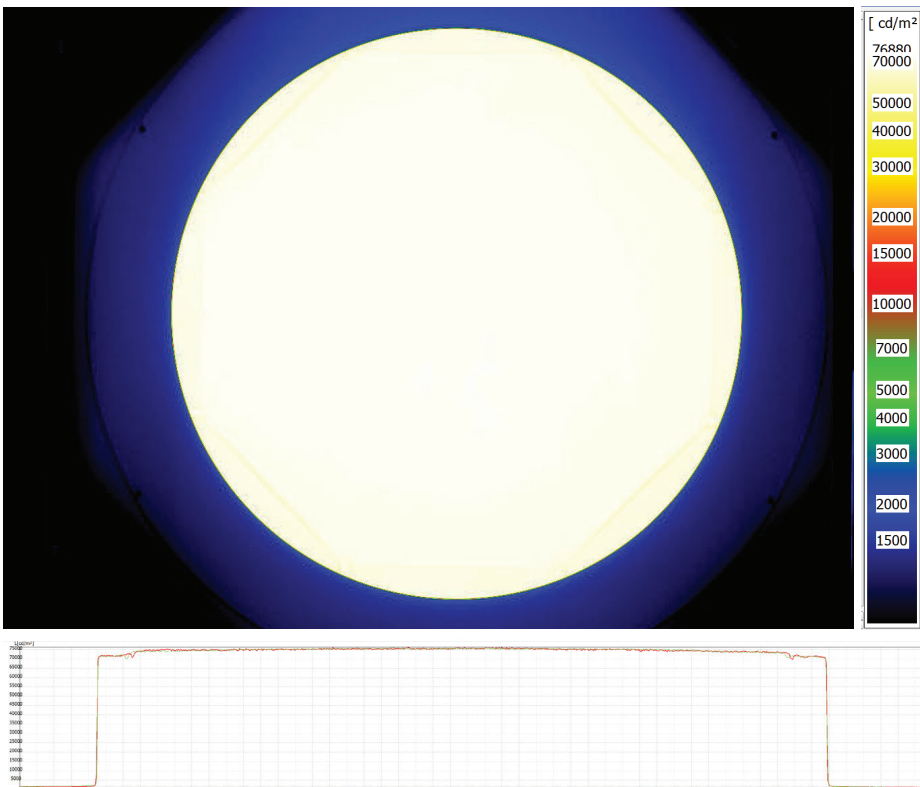
Luminance standard with 300 mm diameter and 50 mm output port



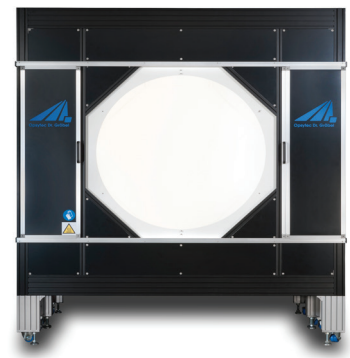
The example shows a luminance standard with 50 mm output port and 300 mm diameter.

Four halogen lamps were used (8 max). The luminance is 12,000 cd/m². The homogeneity is over 99.5% over the entire surface.

Material: Barium sulphate



Luminance standard with 2500 mm diameter and 1200 mm output port



The example shows a radiance standard with an output port of 1200 mm and a diameter of 2500 mm. Twenty-five halogen lamps (1000 W each) were used, one of them with a motorized iris diaphragm.

The luminance of the large integrating sphere is 76,000 cd/m². The homogeneity is over 98% on the surface to be realized.

Material: PTFE

TECHNISCHE DATEN

Diameter	see: part numbers
	customer-specific on request
Coating	Barium sulfat (BaSO_4)
	PTFE
	Gold
Wavelengths	BaSO_4 300-2400 nm
	PTFE 200-2500 nm
	Gold 0,7 - 20 μm
Ports	1 (Standard)
Lamp ports	1 - 25
Accessories	UControl control unit
	RMD sensors
	Spectrometer
	Port apertures

PART NUMBERS BARIUMSULFAT

300 mm	850112
500 mm	850130
600 mm	850135
800 mm	850138
1000 mm	850140
1650 mm	850165
2500 mm	on request

PART NUMBERS PTFE

75 mm	850303
100 mm	850304
150 mm	850306
customized	on request

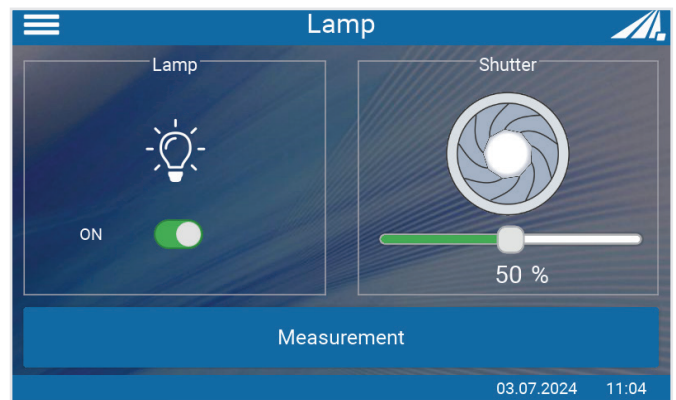
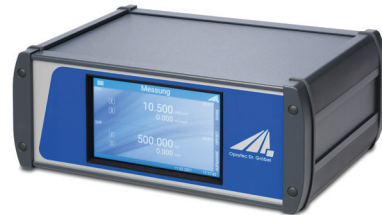
PART NUMBERS GOLD

100 mm	850504
150 mm	850506
200 mm	850508
300 mm	850512
500 mm	850513
600 mm	850514
1000 mm	850516

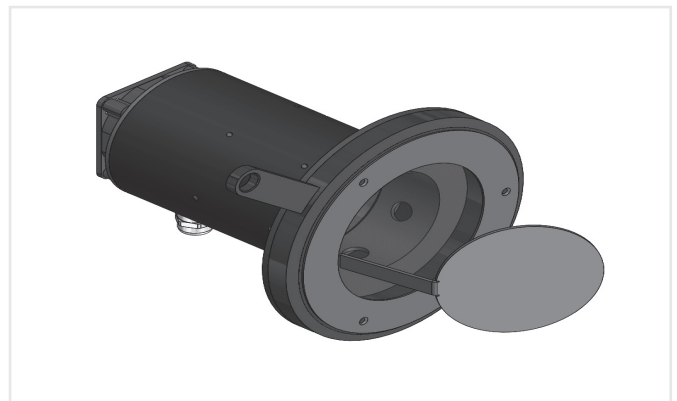
The team of experts at Opsytec Dr. Gröbel GmbH assists customers in selecting the optimum sphere design for their specific applications. This ensures that each integrating sphere is perfectly matched to the individual measurement requirements.

ACCESSORIES

Ucontrol controls the lamps and blinds and can record measurement data from the sensors.



UControl - Intuitive control for integrating spheres, suitable for our RMD sensors



Lamp system with iris diaphragm and baffle



Port reducer, RMD sensor adapter