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Measurement Services

Optics Laboratory

Valid from: 01.02.2018

In our laboratory we perform high accuracy calibrations of your standards and measuring instruments in the field of radiometry and photometry. Our measurement results are traceable to national standards and thus to internationally supported realizations of the SI units.

The services listed in this catalogue correspond to our standard measurement capabilities. Other services, with e.g. reduced measurement uncertainty or an extended measurement range, are possible and may be discussed directly with the responsible expert. In addition, our lab team with its considerable specialist knowledge is available for consultation and assisting in finding solutions to demanding metrological tasks in the field of electrical measurements.

Measurement uncertainty

The measurement uncertainties are supplied for information only and can be evaluated only after the measurements being completed. They contain contributions originating from the measurement standard, from the calibration method, from the environmental conditions and from the device under test. The indicated uncertainty of measurement is stated as the combined standard uncertainty multiplied by a coverage factor $k = 2$. The measured value (y) and the associated uncertainty (U) represent the interval ($y \pm U$) which contains the value of the measured quantity with a probability of approximately 95 %. The uncertainty is estimated following the guidelines of the ISO (GUM - JCGM 100:2008).

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1 Radiometric Detectors

1.1 radiometer, optical detector, power meter

Quantity	spectral sensibility 250nm - 1000nm
Uncertainty	U > 0.6% (depends on wavelength)
Procedure	calibration through direct comparison with reference detectors
Extend of service	for one wavelength
Quantity	relative responsivity
Procedure	according CIE53:1982
Quantity	linearity

1.2 Laser Power Meter

Quantity	calibration factor, laser power meter Kr+,TiSa-Laser
Uncertainty	U > 1%
Procedure	direct comparison with reference detectors
Quantity	calibration factor, laser power meter
Quantity	calibration factor, laser power meter HeNe,LaserDiode-Laser
Uncertainty	U > 1%
Procedure	direct comparison with reference detectors
Quantity	Linearity 1nW-100mW
Parameters	Kr+,HeNe-Laser

1.3 UV radiometer

Quantity	irradiance wavelength: 365 nm (Hg)
Uncertainty	U > 4 % (depends on DUT)
Procedure	calibration by direct comparison with reference detectors
Quantity	irradiance in respect to a specific spectral distribution
Procedure	direct comparison with reference detectors
Extend of service	Measurement of the spectral distribution of the light source. Determination of the calibration factor of the reference detector.

2 Radiometric Sources

2.1 reference lamp (irradiance)

Quantity	spectral irradiance 250 nm - 1100 nm
Uncertainty	U > 2.4% (depends on wavelength)
Procedure	calibration by comparison with reference lamps using a double monochromator
Quantity	additional wavelengths

2.2 reference lamp (flux)

Quantity	spectral radiant flux 380 nm - 780 nm
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2.3 light source, spectral distribution

Quantity	spectral distribution 250 nm - 1100nm
Procedure	measured using a double-monochromator
Quantity	spectral distribution 380 nm - 780nm
Procedure	mobil spectroradiometer

2.4 luminous source

Quantity	total power
Procedure	measured using an integrating sphere

2.5 UV sources (p.e. : solarium lamps)

Quantity	UVA, erythemal UV 250nm-400nm
Procedure	spectral Measurement by a double monochromator
Extend of service	in situ or in lab

3 Optical Properties of Materials

3.1 reference filtre

Quantity	spectral transmittance 250 nm - 1000 nm
Quantity	additional wavelengths
Quantity	additional filter

3.2 filter

Quantity	spectral transmittance 380 nm - 780 nm
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4 Photometrical detectors

4.1 luxmeter

Quantity	illuminance high quality instrument
Procedure	comparison with reference luxmeter
Parameters	CIE standard illuminants, ~40 lx

Quantity	cos adaption
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Quantity	illuminance low cost luxmeter
Procedure	comparison with reference luxmeter
Parameters	CIE standard illuminants

4.2 luminancemeter

Quantity	luminance low cost luminancemeter
Procedure	comparison with reference luminance source
Parameters	CIE standard illuminants

Quantity	relative responsivity
Procedure	according CIE69:1987
Parameters	according to another light source

Quantity	luminance high quality instrument
Procedure	comparison with reference luminance source
Parameters	CIE standard illuminants

5 Photometric Sources, Lamps

5.1 reference lamp (luminous intensity)

Quantity	luminous intensity (1 direction)
Procedure	Calibration of the illuminance by a reference luxmètre at a defined distance

Quantity	luminous intensity (1 direction)
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5.2 reference lamp (luminous flux)

Quantity	luminous flux Incandescent lamp
Procedure	Calibration by a photogoniometer

Quantity	luminous flux
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Quantity	luminous flux Electric discharge lamp, fluorescent lamp
Procedure	Calibration by a photogoniometer

Quantity	luminous flux
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5.3 External luminaire

Quantity	luminous intensity distribution 52 C planes
Procedure	measurement according CIE 121, by a mirror-photogoniometer
Extend of service	including lumious flux and efficiency
Quantity	mounting effort

5.4 Internal luminaire

Quantity	Luminous intensity distribution 12 C planes, 19 gamma until 90°
Procedure	according CIE 121
Extend of service	including lumious flux and efficiency
Quantity	Luminous intensity distribution 12 C planes, 39 gamma until 180°
Procedure	according CIE 121
Extend of service	including lumious flux and efficiency
Quantity	Luminous intensity distribution 24 C planes, 19 gamma until 90°
Procedure	according CIE 121
Extend of service	including lumious flux and efficiency
Quantity	Luminous intensity distribution 24 C planes, 39 gamma until 180°
Procedure	according CIE 121
Extend of service	including lumious flux and efficiency
Quantity	additional spectral measurements

5.5 LED lamp (simple)

Quantity	luminous flux
Procedure	by a photogoniometer, according CIE S025
Quantity	luminous flux
Quantity	additional spectral measurements

5.6 LED lamp (simple)

Quantity	luminous intensity distribution
Procedure	by a photogoniometer
Extend of service	lumious flux calculated through the intensity distribution
Quantity	luminous intensity distribution
Quantity	additional spectral measurements

5.7 LED luminaire (interior)

Quantity	luminous intensity distribution
Procedure	according CIE S025, by a mirror-photogoniometer
Extend of service	lumious flux calculated through the intensity distribution
Quantity	luminous intensity distribution
Quantity	additional spectral measurements

5.8 simple lamp

Quantity	Luminous flux
Procedure	Electric discharge lamp, fluorescent lamp CIE 121

Quantity	luminous flux
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5.9 reference luminance light source

Quantity	luminance
Procedure	measured by a reference luminancemeter

Quantity	additionally: correlated colour temperature
Uncertainty	50K
Procedure	measurment by a mobile spectrometer
