

HOW TO CONTACT

Do you have any questions?
We have the answers!

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Lighting Laboratory

Photometric Measurements to CIE Standards

Our light laboratory provides comprehensive photometric measurement and analysis services in accordance with CIE standards, using state-of-the-art measurement technology. Our expertise focuses on the precise characterization of LEDs, UV LEDs, LED modules, and LED systems across an extended spectral range from ultraviolet to infrared.

Our measurement systems are specifically designed for LED technologies and deliver reproducible, standards-compliant results for verifying datasheet specifications as well as for comparative measurements of products from different manufacturers.

In addition, we support our customers in the development and optimization of LED modules and LED systems. By combining engineering expertise with advanced photometric measurement capabilities, we accompany projects from the initial concept and prototype stage through to standards-compliant validation.

For advanced testing of LED modules and complete luminaires — including extended photometric, spectroradiometric, and standards-based evaluations—we collaborate with an experienced external partner. This enables us to provide a seamless range of services from product development to final performance assessment

We support you with:

- Verification of datasheet specifications (including pulsed-mode operation)
- Comparative measurements of LEDs from different manufacturers
- Measurements across the spectral range from UV (200 nm) to IR (1,100 nm)

MEASUREMENT EQUIPMENT

SPECTRORADIOMETER

- CCD array detector, 1024 × 128 pixels
- Spectral range: 395–1,100 nm (UV | VIS | IR)
- Integration time: 9 ms–60 s
- Measured parameters:
 - Chromaticity coordinates ($x, y / u', v'$)
 - Correlated Color Temperature (CCT)
 - Color Rendering Index (CRI: Ra, Ri 1–14) and TM-30
 - Relative Spectral Power Distribution (SPD)
 - Luminous flux and radiant power

UV, SPECTRAL & OPTICAL MEASUREMENTS

- Spectral range: UVA to IRA (200–1,100 nm)
- Spectral analysis software for colorimetric, radiometric, and application-specific measurements
- Transmission and reflection measurements
- Radiance and irradiance measurements

INTEGRATING SPHERES Ø 30 cm | Ø 100 cm

- Total luminous flux
- CCT, spectral distribution, chromaticity coordinates
- CRI / TM-30
- Dominant wavelength
- Electrical parameters (V, A), power consumption, and efficiency
- Luminous intensity (cd) or radiant intensity (mW/sr)

GONIOPHOTOMETER

- Angular radiation characteristics of LEDs, LED modules, and optical components
- Angular resolution: 0.1°
- Luminous intensity range: 10 mcd–200 cd
- Luminous intensity distribution, beam angle (FWHM), total luminous flux

Advanced Testing Services for LED-Modules and Luminaires

For LED modules and luminaires, we complement our in-house capabilities with additional photometric testing performed in collaboration with selected external partners. This allows us to offer a comprehensive service portfolio, delivering precise results, exceptional quality, and full compliance with applicable industry standards.

PHOTOMETRY

- Photometric measurements of LED modules and luminaires
- Luminous flux measurements
- Generation of 3D luminous intensity distribution (LID) files (LDT / IES formats)
- Conversion of photometric data (LDT / IES formats)
- Determination of gross and net luminous flux of LED luminaires
- Determination of key photometric parameters, including:
 - Luminous efficacy
 - Efficiency
 - Unified Glare Rating (UGR)
 - Luminance
 - Luminous intensity
 - Beam angle
 - Zonal luminous flux
 - Correlated Color Temperature (CCT)
 - Chromaticity coordinates
 - Color Rendering Index (CRI)
- Temperature-dependent measurement of photometric and colorimetric parameters of LED modules
- Measurement of spatial light distribution in accordance with EN 13032 and LM-79-08
- Absolute luminous flux measurements in accordance with EN 13032

SPECTRORADIOMETRY

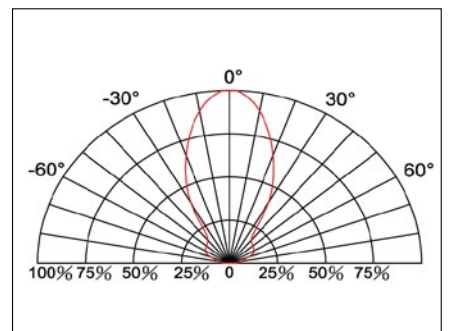
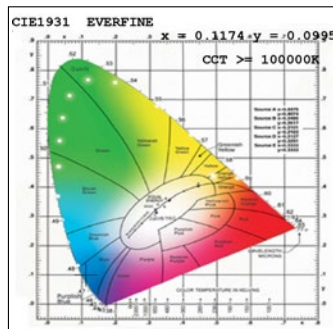
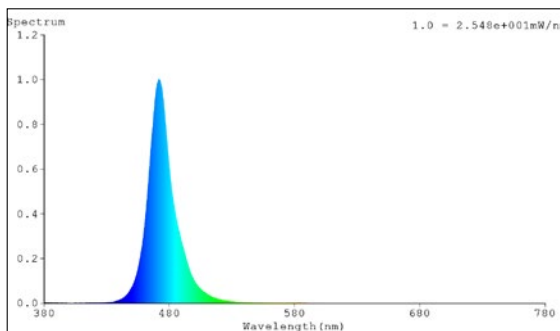
- Measurement of spectral power distribution (380–800 nm)
- Photobiological safety testing in accordance with DIN EN 62471
- Spectral measurements from 200–3,000 nm
- Radiance measurements
- Measurement of Photosynthetically Active Radiation (PAR), Photosynthetic Photon Flux (PPF), and Photosynthetic Photon Flux Density (PPFD) for horticultural lighting (400–700 nm)
- Irradiance measurements

EMC TESTING

- Conducted and radiated emissions (EMI)
- Immunity testing (EMS)

FLICKER MEASUREMENTS

- Flicker frequency
- Percent flicker
- Flicker index



Various **Analysis Charts**

Light Measurement Parameter

We offer comprehensive LED photometric measurement services, covering all relevant performance parameters. For UV LEDs, additional application-specific measurement parameters can be analyzed.

LUMINOUS FLUX (lm)

Measured in lumens (lm), luminous flux represents the total visible light output of a source, integrated over the entire three-dimensional emission space.

LUMINOUS INTENSITY (cd) *

Measured in candela (cd), luminous intensity is the luminous flux emitted per unit solid angle and describes the directional light output of a source.

PHOTOSYNTHETIC PHOTON FLUX (PPF)

Describes the total amount of photosynthetically active photons emitted by a light source per second, measured in $\mu\text{mol/s}$.

ILLUMINANCE (lx)

Luminous flux per unit area, measured in lux (lx), describes the amount of light incident on a surface.

SPECTRUM *

Describes the spectral distribution of optical radiation across different wavelengths within the electromagnetic spectrum.

TRANSMISSION-REFLECTION *

Measures the amount of light transmitted through a material and the amount of light reflected from its surface.

CORRELATED COLOR TEMPERATURE (CCT)

Measured in kelvin (K), CCT describes the chromatic appearance of a white light source by relating it to the color of a black body radiator at a corresponding temperature. Values range from cool white to neutral white and warm white.

WAVELENGTH (nm) *

Visible light covers a wavelength range of approximately 380–780 nm. Our measurement capabilities extend beyond the visible spectrum, covering the UV range from 350 nm and the infrared range up to 1,100 nm.

BEAM ANGLE (°)

Measured in degrees, describes the angle at which light is emitted from a light source, typically defined as the Full Width at Half Maximum (FWHM).

CRI | TM30

The Color Rendering Index (CRI) describes the color rendering quality of light sources with the same correlated color temperature (CCT).

CHROMATICITY COORDINATES

The x and y chromaticity coordinates define the color position of a light source within the CIE 1931 XYZ color space.

ANGULAR RADIATION CHARACTERISTICS

Describe the directional distribution of emitted light from a luminaire or light source.

Colorimetric Parameters

Chromaticity Coordinate: $x = 0.1174$ $y = 0.0995$ / $u' = 0.1187$ $v' = 0.2261$ ($duv = -1.31e-01$)
CCT $\geq 100000K$ Prcp WL: $L_d = 475.4nm$ Purity = 96.0%
Peak WL: $L_p = 472nm$ FWHM: $= 19.3nm$ Ratio: R=0.1% G=19.1% B=80.7%
Render Index: $R_a = 0.2$
R1 = 0 R2 = 0 R3 = 0 R4 = 0 R5 = 2 R6 = 0 R7 = 0
R8 = 0 R9 = 0 R10 = 0 R11 = 0 R12 = 0 R13 = 0 R14 = 0 R15 = 0
LEVEL: OUT WHITE: OUT

Photometric & Radiometric Parameters

Flux = 63.103 lm Eff. : 43.10 lm/W Fe = 681.74 mW

A: 3.8324e-001mW

B: 6.1976e+002mW

Excerpt from a **Measurement Report**

* UV-LEDs