Instrument Systems
KONICA MINOLTA Group

ACS 150 / 150B

LED Light Source for 2D / CAS Audit

Key features at a glance

- Specification of 2D uniformity in luminance and chromaticity
- Reference values for luminance and derived color quantities
- Supports testing of (spectrally enhanced) imaging colorimeters (e.g. LumiTop 2700)

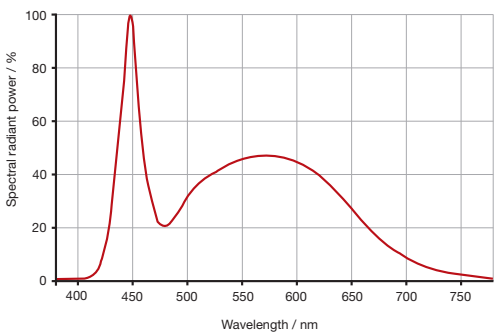
The ACS 150 from Instrument Systems GmbH is a highly stable light source based on LED technology whose light is homogenized by an integrating sphere. The ACS 150 is used to test the image sensor calibration of luminance and color measurement cameras (e.g. LumiTop 2700), and to test the measurement accuracy of photometric measuring devices. Instrument Systems provides an accredited testing service for luminance and derived color quantities.

\\ MODE OF OPERATION

The high-power LED inside the ACS 150 is actively temperature-stabilized by a TEC element. The generated heat is dissipated to the ambient air by an integrated electrical fan. The ACS 150 LED light source is usually operated at 250 mA / 35 °C. Specially developed software is used for controlling.

The radiation of the high-power LED at a stable temperature is directly emitted into an integrating sphere with an inner diameter of 150 mm. The inner layer of the integrating sphere homogenizes the radiation and emits it through a transmission screen at the aperture of 50 mm in diameter.

The reference values and relevant operating parameters are stored in the ACS 150. In addition, the operating time is tracked and logged in the device.



The spectrum of the ACS 150.

Due to the homogeneous distribution of the luminance and chromaticity coordinates the ACS 150 can be used as a 2D audit light source for testing the image sensor calibration of luminance and color measurement cameras.

Two different coatings are available for integrating spheres, determining the total homogeneity. The 2D audit light source ACS 150B provides the best spatial non-uniformity and maximum luminance. The 2-in-1 model ACS 150 compromises a little on the uniformity but can be used as reference standard for luminance and chromaticity measurements.

The image sensor calibration of luminance and color measurement cameras (2D audit) and the measurement accuracy of photometric measuring devices (CAS audit, ACS 150 only) are tested in the same measurement setup: at a distance of 2 mm from the camera objective lens housing.

Measurement setup for both 2D and CAS audit.

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\\ TECHNICAL SPECIFICATIONS

ACS 150 LED light source for 2D/CAS audit	84% $BaSO_4$ coating (ACS 150)	97% $BaSO_4$ coating (ACS 150B)
Mechanical Data		
Diameter of the light-emitting aperture	50 mm	
External dimensions (L x W x H)	262 mm x 181 mm x 167 mm	
Weight	1.1 kg	
Photometric / Colorimetric Data		
Luminance [1]	Typically 300 – 500 cd/m²	Typically 400 – 600 cd/m²
Correlated color temperature (CCT) [1]	Typically 5000 – 6000 K	Typically 5000 – 6000 K
Spatial non-uniformity (RNU) [2] in luminance [3]	< 1.0%	< 0.6%
Spatial non-uniformity (RNU) [2] in chromaticity coordinates	< 0.0004 in x and y	< 0.0004 in x and y
Recommended recalibration interval	100 h / 1 year	
Long-term stability		
Long-term stability of luminance [1]	Within 0.3 % / 12 h and 0.5 % / 100 h	n/a
Long-term stability of chromaticity coordinates [1]	Within 0.0002 / 12 h and 0.0005 / 100 h	n/a
Long-term stability of spatial non-uniformity in L_v	Within 0.01 % / 100 h	Within 0.01 % / 100 h
Long-term stability of spatial non-uniformity in x, y	Within 0.00002 / 100 h in x and y	Within 0.00004 / 100 h in x and y
Turn-on stabilization time	< 200 s	
Sensitivity to ambient conditions (variation of temperature and relative humidity)		
Sensitivity of luminance [1]	< 1.0 % / 10 K and < 0.2 % / 35 % RH	n/a
Sensitivity of chromaticity coordinates [1]	< 0.0002 / 10 K and < 0.0001 / 35 % RH	n/a
Sensitivity of spatial non-uniformity in L_v	< 0.02 % / 10 K and < 0.02 % / 35 % RH	< 0.02 % / 10 K and < 0.01 % / 35 % RH
Sensitivity of spatial non-uniformity in x, y	< 0.0001 / 10 K and < 0.0001 / 35 % RH	< 0.0001 / 10 K and < 0.0001 / 35 % RH
Operating temperature range	15 - 35°C	

[1] Exact value determined with DTS 140 with following uncertainties: luminance: ±3.5%; chromaticity coordinates: ±0.0015; CCT: ±10 K
[2] The response non uniformity (RNU) is calculated for an image with 16 pixels cropped at each edge and 10 by 10 pixel binning (34 averages). The RNU is defined as the 95% percentile of the deviation of all bins from the mean image value.
[3] Within central 63% of the light emitting aperture, i.e. 32 mm in diameter (lateral positioning accuracy: ±2 mm from center; tilt tolerance: ±0.5° from perpendicular).

Please note: Audit limits for usage of ACS in production lines depend on device tested, ACS model, environmental conditions and process maturity.
For support please contact your Instrument Systems sales engineer.

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