Components

Lens
Sigma 17-50mm F2.8 EX DC OS HSM
(incl. lens hood and dust cover)

Transport
Mobility case Samsonite + carrying strap
Transport case **Techno**Team
Wide strap [EW-100DBIII]

Power supply
2 Lithium-Ion Akku [SLP-E8]
Battery charger LC-E8 oder E5E + power plug
AC adapter kit [ACK E8]
Compact mains adapter [CA-PS700]
+ power cord DC coupler [DR-E8]

Cable/Interface
Stereo-AV-Kabel [AV-DC40St]
USB Interface cable

Memory card
SDHC card 4GB

Software
EOS Digital Solution (CD ROM)
LMK Labsoft measuring software
(CD ROM)

Manual / Certification
Manual Canon EOS 550D
Manual **LMK** mobile advanced
Manual **LMK** Labsoft
luminance analysis software
Calibration certification

Optional
additional SDHC card 4GB
Remote control RC6
Tripod
Sucking tripod "Cullmann"
Neutral density filter - single or set
(opt. density: 1.0; 2.0; 3.0)
Fisheye lens SIGMA
[4.5mm/2.8 EX DC Circular Fisheye]

LMK mobile advanced

Canon 550D (digital / reflex)
Sigma 17-50mm F2.8 EX DC OS HSM

Electronics	Sensor / Resolution	CMOS Canon APS-C mit 5184(H) x 3456(V)
	File format	14 Bit RAW - data as uncompressed Bayer structure
	PC-Interface	CR2 image file transfer via USB 2.0 to the PC
Measurement results	Luminance image resolution	2592(H) x 1728(V)
	Dynamic resolution	Single measurement: 1:4000 High-Dyn measurement: 1:32000 (1/1250 s < t_f < 8 s)
Configuration	Selection of measuring range	selecting aperture value, exposure time and ISO speed
	Measuring distance	> ca. 280mm
	Focus	automatic focus / manual focus
	Aperture values	F4 - F11 (calibrated for luminance measurements) in 1/3 steps
	Focal length	17mm - 50mm stepless
	Viewing angle	focal length 17mm: 65°(H) x 45°(V) focal length 50mm: 28°(H) x 19°(V)
	Exposure time	30 s - 1/4000 s
Measurement parameter	Light sensitivity (typical full scale)	Blende: 4 / 4 / 11 ISO: 100 / 1600 / 100 t_f= 0.001 s: 20 kcd/m² / 1200 cd/m² / 140 kcd/m² t_f= 3.0 s: 6 cd/m² / 0.36 cd/m² / 50 cd/m²
	V(λ)-matching	numerical transformation from R,G,B – sensor data
	Integral spectral mismatch in % for several lamp types / spectra	Halogen metal discharge lamps: 2-9% High pressure sodium discharge lamp: 7-13% Fluorescent lamp: 8-10% LED white: 5-12%
	Calibration uncertainty ΔL in %	ΔL = 2.5% (standard illuminant A)
	Repeatability ΔL in %	ΔL = 1.3 ... 4.3%
	Uniformity ΔL in %	ΔL ± 2% (t_{f2} ≤4%)
	Measuring uncertainty ΔL in % (standard illuminant A)	TRAv: 4 / 5.6 / 8 / 11 0.25 ms: 7.6 / 9.0 / 8.2 / 8.8 2.5 ms: 6.0 / 6.3 / 6.5 / 7.2 25 ms: 5.8 / 6.2 / 6.4 / 7.0 0.25 s: 5.8 / 6.2 / 6.4 / 7.0 2.5 s: 5.8 / 6.2 / 6.4 / 7.0
Operating data	Memory	SDHC card memory chip (ca. 15 MB per image)
	Operating system	Windows XP/Vista/7
	Software	**LMK** LabSoft (monochrome luminance analysis software)

TechnoTeam Bildverarbeitung GmbH reserves the right to change products and specifications without prior notice.

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CAMERA

TechnoTeam
Bildverarbeitung GmbH

PHOTOMETER

based on the Canon EOS 550D
digital reflex camera

LMK
mobile advanced

Glare evaluation

The LMK imaging photometer allows measurements for verifying existing standards and design projects to be made in a simple and fast way with regard to full illumination, glare, ergonomics and well-being.

- Analysis of luminance ranges in illuminated rooms
- Determination of illuminance ranges with regard to ergonomy and economy on workspaces
- Evaluation of the circadian action potential of artificial lighting related to healthiness
- Indoor rating for contrasts and glare values at workspaces and in offices (i.e. CRF, UGR, DGP)
- Assessment of glare values for artificial outdoor lighting. For example the maximum tolerable luminance, the equivalent veil luminance and TI-value for street lighting fixtures or road & traffic signs

Measuring the threshold increment (TI-value) for tunnel entrance area


real scene of a tunnel entrance to be measured

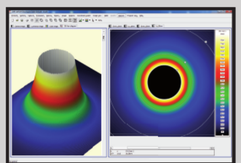
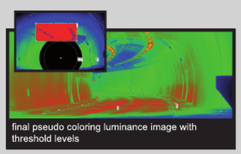


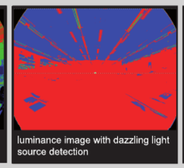
Image processing via the calcualtion of the veiling luminance in the scene

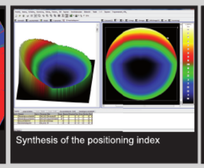

final pseudo coloring luminance image with threshold levels

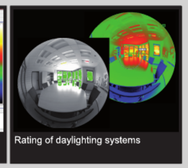
Indoor UGR & DGP assessment


box office with lighting fixtures

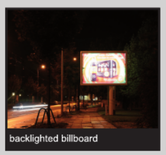

(left) real scene to be measured (right) pseudo coloring luminance


luminance image with dazzling light source detection


Synthesis of the positioning index


Rating of daylighting systems

Determination of the maximum tolerable luminance level


backlighted billboard


pseudo coloring lumiance image

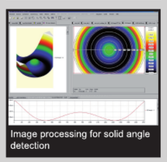
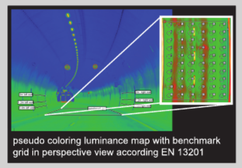


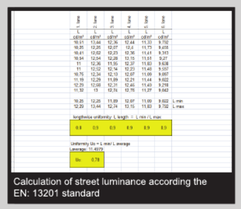
Image processing for solid angle detection

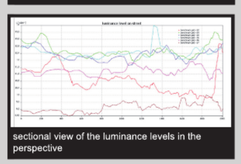

pseudo coloring image with maximum tolerable luminance level

Canon 550D
(digital still image reflecting camera)
SIGMA 4.5mm/2.8 EX DC
Circular Fisheye

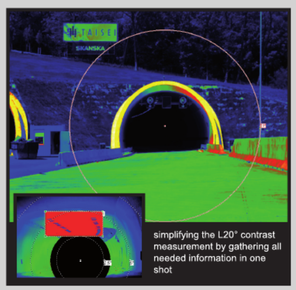
Ease of use in the evaluation by using LMK LabSoft tools


pseudo coloring luminance map with benchmark grid in perspective view according EN 13201


Calculation of street luminance according the EN: 13201 standard


sectional view of the luminance levels in the perspective

Benchmark of tunnel entrance portal for L20° measurement and threshold increment TI


simplifying the L20° contrast measurement by gathering all needed information in one shot

Measuring Street and Tunnels

The LMK imaging photometer system is very well suited to make measurements in an urban environment on public places and streets in order to make data for the lighting designs in cities available. Thus, for example the system allows the efficiency of lighting installations or the luminance range on claddings to be evaluated.

- Assessment of the luminance range according EN: 13201 standard for roads and tunnel
- Glare rating with TI-calculation, L20° measurement for lighting fixtures
- Checking the visibility of road markers and street illumination under various weather conditions

Further Applications

- Indoor measurements, in example for offices and desktop areas
- Fast and easy assessment for luminances in outdoor areas. As example the artificial illumination of public places in urban environment
- Review the highlighting of facades and gladdings or street lighting fixtures and the illumination of other public traffic ways

Restrictions

- Can not be used for measuring coloured light sources (i.e. LED)
- Limited use for measuring modulated light source with a high depth of modulation

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