LISUN GROUP

Integrating Sphere & Goniophotometric System

Specification

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Lead in CFL & LED Test Instruments

Integrating Sphere & Goniophotometric System

According to LM-79 & CIE Request, the traditional luminaries and LED lighting needs to do the photometric and color test. Lisun Group Integrating Sphere & Goniophotometric System includes a CCD Spectrophotometer (LMS-8000), two integrating spheres (The big sphere is for the chip or single LED test. The small sphere is for the LED lamp test), Rotation Goniophotometer (LSG-1800), Calibrating Standard Lamps and necessary accessories.

The integrating sphere & goniophotometric system can test the following parameters:

- **Photometric:** total luminous flux, luminous efficiency, Radiant. Iv. spatial intensity distribution curve, spatial iso-intensity curve, iso-illuminance distribution curve, luminance limitation curve, luminaire efficiency, glare grade, effective beam angle, upward luminous flux ratio, downward luminous flux ratio, total luminous flux, effective luminous flux, utilization factor.
- **Colorimetric:** total radiant intensity, dominant wavelength, peak wavelength, color coordinates, half-bandwidth, spectral purity, correlated color temperature (CCT), color rendering index (CRI).
- **Electrical:** forward voltage, reverse voltage, forward current, reverse current, power, power factor
- **Distribution Intensity:** Electronic parameters, spatial intensity distribution curve, spatial iso-intensity curve, iso-illuminance distribution curve, luminance limitation curve, luminaire efficiency, glare grade, effective beam angle, upward luminous flux ratio, downward luminous flux ratio, total luminous flux, effective luminous flux, utilization factor.

The Measured data match with international standard form (IES) and can be applied for lighting design by other lighting design software such as Dialux

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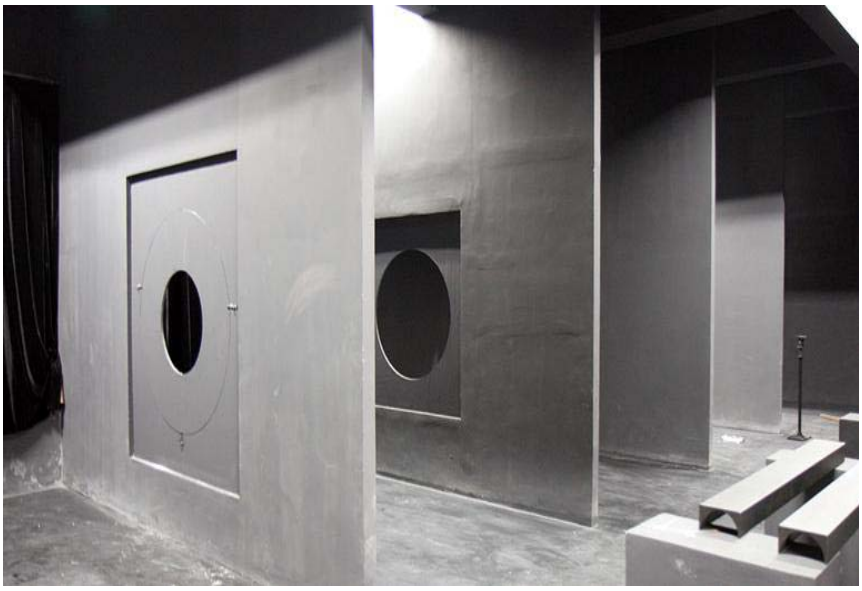
Installation Requirements for the Laboratory Room:

- Prepare a computer with WinXP, the PC request at least two RS-232 and one USB ports
- Dark Room for Goniometric Console Dimension: W3.0m*H2.5m*L(8-30)m
- Operator Room for controlling cabinet, computer and printer Dimension: No less than W3.0m*H3.0m*L5.0m
- The wall, ceiling and floor should be all coated with dull black paint or be covered by black cloth and black carpet.
- Air-conditioner should be set in the dark room to control the temperature around lamps to the standard value upon the CIE requirements
- LISUN engineer dept will submit the Lab Design support documents according to the customer's lab size after the formal purchase order was confirmed



1. CCD Spectroradiometer (LMS-8000)

LMS-8000 LED Measurement System is an automated measurement system for identifying the performance of individual LED and LED lamps. It is designed to have a capability of producing any visible spectral distribution, mimicking various light sources in the visible region by feedback control of the radiant power emitted by individual LED. This LED test system will be used as a transfer standard for photometric, colorimetric and radiometric applications.

LED's photoelectricity performance indicates its quality being a light source, and play an important role when developing and manufacturing LED and lamps. Our system gives best solution for accurate measurement of photometry, colorimeter & electricity, with following advantages:

- achieve the purpose of testing LED and led lamps' photometry, colorimetry and electricity parameter by only one single instrument;
- system designed to meet CIE standard for test comparison and international communication;
- fine corrected detector, class 1 according to GB/T7403 standard;
- set all parameters by key, no mechanical slider;
- USB interface with computer, versatile software.
- The LMS-8000 has two ports for detectors which can connect with two integrating spheres. It allows the customers to select the sphere to test directly without calibrating

Working Principle

■ Principal of forward voltage test

Principal diagram see fig 1(a), provide a forward current to LED, and test the voltage between two poles of LED, which is just named forward voltage.

■ Principal of reversed current test

Principal diagram see fig. 1(b), provide a reverse voltage between two poles of LED and test the reversed leakage current.

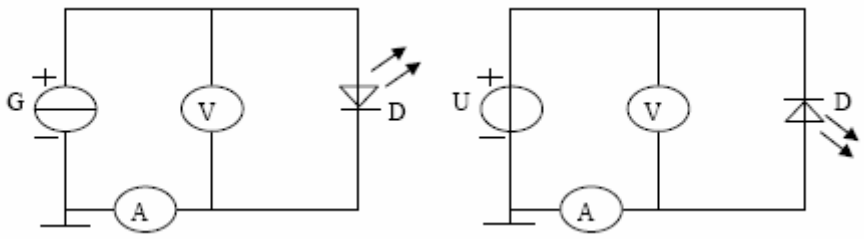


Fig 1(a) Forward voltage test Fig 1(b) reversed current test

D LED being tested G Constant current supply U Constant voltage supply

A Amperometer V Voltage meter

■ Principle of luminous intensity test

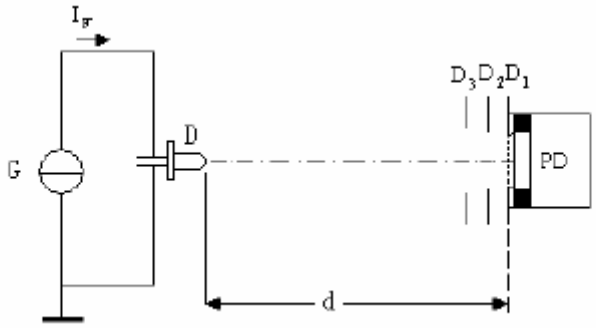


Fig 2 Principal of luminous intensity test

D: LED being tested G: contact current supply PD: photometry detector

D1, D2, and D3: Diaphragm to dispose other lights d: distance between LED and D1

Distance d and receiving area of detector should be according CIE recommended standard. CIE requires the detector be with a 100 mm2 (diameter 11.3mm accordingly) circle input hole. And test conditions as below table:

CIE recommend	Distance between LED tip and detector : d	Solid angle	Plane angle(SBC case
Condition A	316mm	0.001sr	2°
Condition B	100mm	0.01sr	6.5°

■ **Principal of luminous flux test**

See as fig 3, it needs an integrating sphere to participate in testing luminous flux. It adopts comparison method to testing luminous flux. When system installed, using a standard light source for system calibration first, and then test the tube. (After calibration, no calibration is need when next measurement, unless that relative position of detector and sphere inside is changed.)

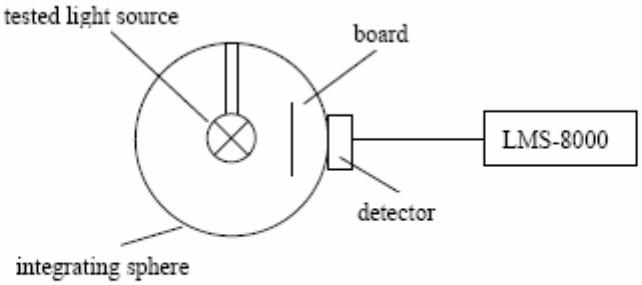


Fig 3 Diagram for luminous flux test

■ **Principal of colorimetry test**

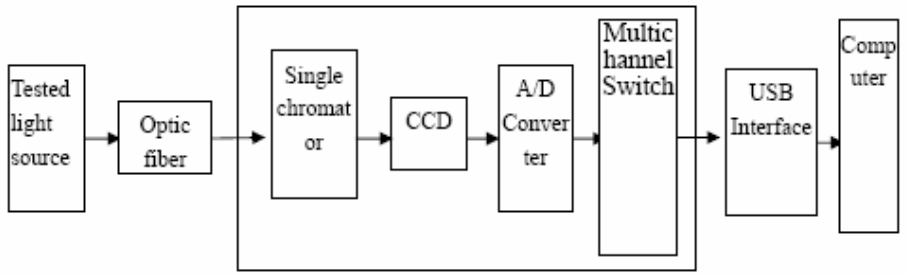


Fig 4 Principal diagram of spectrum analysis

The light come from the inside of integrating sphere, will be coupled by an optical fiber at the entrance slit of the monochromatic. The spectrum separated by the monochromatic came out from the exit slit of the monochromatic and then was converted into electronic signal by CCD. The signal was amplified and converted into digital signal by A/D convector. Finally the digital signal was sent into computer so that the software will make out all colorimetry parameters.

Measures:

Electrical: Forward Voltage, Reverse Current

Colorimetric: Total Radiant Intensity, Dominant Wavelength, Peak Wavelength, Color Coordinates, Half-bandwidth, Spectral Purity, Correlated Color Temperature, Color Rendering Index, Color Difference, Chromaticity, Spatial Radiation Pattern

Photometric: Total Luminous Flux, Luminous Efficiency

Technical Specifications:

- Chromaticity coordinate, correlated color temperature, rending index
- Different models for the UV-VIS and VIS-NIR spectral range wavelength: 380nm ~ 780nm (Special: 200nm-1050nm)
- Spectral Resolution: ±0.2nm, Reproducibility: ±0.5nm
- λ Spectral radiation bandwidth
- Spectral power distribution P(λ), Peak-emission Λp
- Luminous flux, Luminous flux efficiency
- Accuracy of Chromaticity Coordinate (Δx, Δy): ±0.003
- Correlated Color Temperature Meter CCT: 1500K ~ 25000K (±3%)
- SMA905 Optical Fiber coupling rises to unattenuated light transmission
- Complete measurement results in less than 5 seconds.
- With a built-in 2500.0mA constant current and up to 30V power supply to drive LED
- Compliance with the CIE Technical Report for Measurement of LEDs (CIE 127-1997) and IES LM 79 -08 standards

2. Integrating Sphere (IS-0.3M IS-1.5M55P)

It is equipped with LMS-8000 for colorimeter and electrical measurement on light source by comparison with a standard lamp.

Specification:

- Diameter is 0.3 meter and 1.5meter with 500x500mm opening side for LED luminaries.
- Applications: 1. Luminous flux measurements on lamps for production and quality control, research, and development 2. Calibration of luminous flux working standards 3. Color measurement on light sources with colorimeters
- Building position: pendant, horizontal;
- Interior sphere paint: inside painting according. to CIE Pub l. No. 84 (1989);
- The reflectivity curve ρ(λ) and transparency curve ′l(λ) of Sphin™ coating is more smooth, longer life and more accurate than normal ones.

3. Standard Light Source (SLS-10W SLS-50W)

- An NIM traceable calibrated tungsten lamp is employed to calibrate the spectrum and luminous flux with manufacturer certification;

4. Rotation Luminaire Goniophotometer (LSG-1800)

LSG-1800 Goniophotometric system is an automatic goniophotometric measurement system for measuring photometric parameters of luminaires, such as LED road lighting fixture, room lighting fixture and projecting lighting fixture. The measured data meets IES standard format and can be applied for lighting design by lighting design software such as DIALUX.

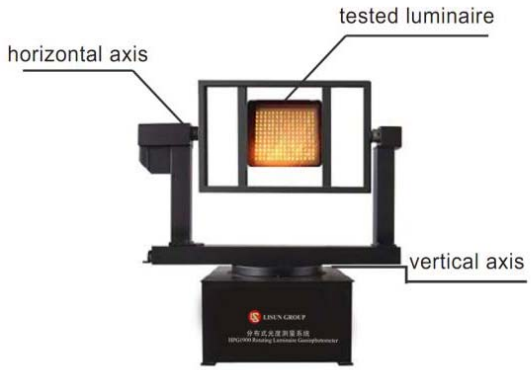
Be utilized to measure photometric parameters of luminaries for LED road lighting fixture, room lighting fixture and projecting lighting fixture, such as spatial intensity distribution curve, spatial iso-intensity curve, intensity distribution curve on each section (represent by right-angled coordinates or polar coordinates, luminance limitation curve, luminaire efficiency, glare grade, effective beam angle, upward luminous flux ratio, downward luminous flux ratio, total luminous flux, effective luminous flux, utilization factor and electric parameters voltage, current, wattage, power factor and etc. The measured data meets IES standard format and can be applied for lighting design by lighting design software. The measurement system fully satisfies the requirement of lighting design work.

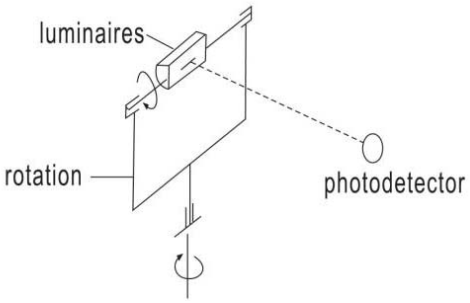
Working Principle

LSG 1800 Goniophotometric System carries out measuring methods of fixed location and rotating luminaires. The measured luminaire is installed on the rotating supporte, the center of which is in line with the rotating supporter center with the help of Laser sight. The fixed photometery detector is testing the luminous intensity in various horizontal directions, while the light source rotating. The mechanical equipment allows turning the tested luminaires around a vertical axis and a horizontal axis. When tested luminaires turn around horizontal axis, the detector which is at the same level with rotating table will measure the intensity of each direction at this surface. When rotating with vertical axis, the detector will measure the intensity at the vertical surface. The vertical and horizontal axis can be rotated continuously at -180° ～ +180° . According to the measurement requirements, the system can be operated in B-β, A-α and C-γ coordinates. When getting intensity distribution data, computer will calculate other photometric parameters automatically.

Double pillars structure (B-β,A-αcoordinate system)

This type is applied to fixed grille lamp. The symmetry axis of lamp and the horizontal of rotating supporter is coaxial, in the B-β coordinate system, and the two is vertical Cross, in the A-α coordinate system.

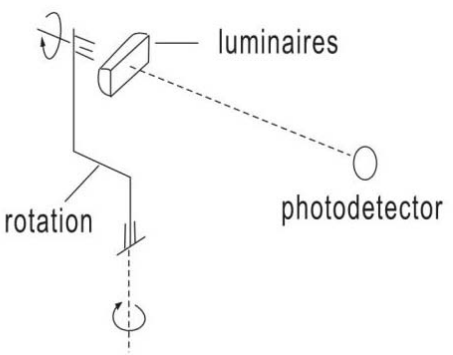




Double pillars structure

Single pillar structure (C-γ coordinate and Conic coordinate)

The single column structure will be gotten when the assistant column is taken down from double columns structure. This type is applied to fixed tube lamp, spot lamp etc. The axis radiation of lamp and the horizontal of rotating supporter is coaxial.



Features:

- Meets the requirements of IEC & GB standards
- Reaching many measurement ways such as B-β, A-α and C-γ
- Can be drived by both double pillars and single pillar
- Special laser cross aim device makes the installation of luminaire
- The special rotating electric devices for lighting the tested luminaire
- Provided with the precious metal fiber for signal transmission
- Measured data match with international standard form (IES) and can be applied for lighting design by other lighting design software such as Dialux
- Emergency stop function
- RS-232C interface, compatible with all kinds of computers

Technical Specifications:

- Photometric accuracy: class 1
- Test range of illuminance: 0.01Lx to 1×100,000Lx;
- Angle accuracy: 0.01 degree
- Rotating scope: H: -180° ~+ 270° ; V: -180° ~+ 180°
- Electric meter accuracy: class 0.5
- Principal axis goniometer resolution: 0.0016 degree
- Luminaire can be rotated by -180 ~ 180° or 0 ~ 360° along with vertical axis
- Luminaire can be rotated by -180 ~ 180° or 0 ~ 360° along with horizontal axis
- Maximum capacity of luminaires: 2KW/50kg (double pillar)
- Measuring distance: Between 5m ~ 30m

*****The Next Pages are Test Report

- LMS- 8000 Integrating Sphere Report includes
  - ✓ Single LED Test Report in 0.3m integrating sphere
  - ✓ LED Lamp Test Report. In 1.5m integrating sphere
- LSG-1800 Goniophotometric System Report
  - ✓ IES standard format file
  - ✓ Luminaire Photometric Test Report