LISUN GROUP

High Precision CCD Spectroradiometer & Integrating Sphere Test System LPCE-2(LMS-9000B)

Brochure

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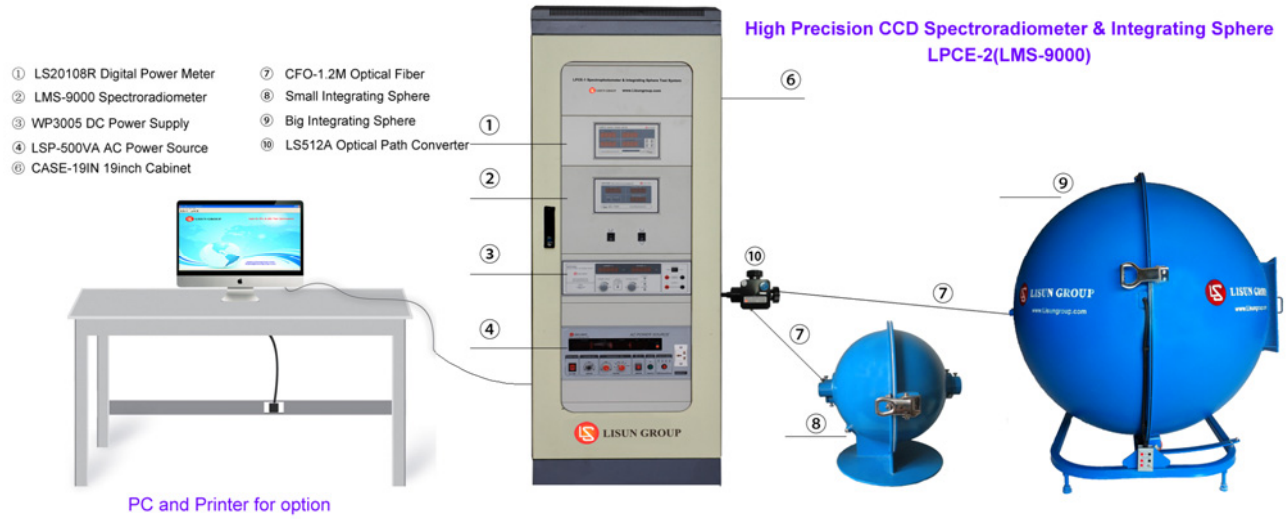
Lead in CFL & LED Test Instruments

Rev. 20161124



CONTENT TABLE

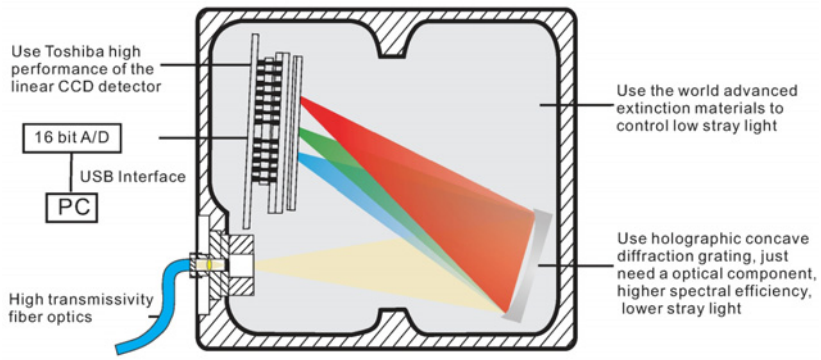
Note the following: If you need to test the single LED or LED Chip, you should choose the items which marked by Blue

1、 High Precision CCD Spectroradiometer

LMS-9000 is adopting the world advanced Holographic grating with flat-field correction, precision optical system and the electronic shutter control technology. The test speed can be in milliseconds and the test accuracy is in the laboratory level. It has the lowest value of stray light, LMS-9000B has high repeatability and stability testing. It is fully meet CIE127-1997, IES LM-79-08 and IES LM-80-08.

Specifications:

- Spectral Range Wavelength: 380nm~800nm
- Spectral Wavelength Accuracy: ±0.5nm(LMS-9000A), ±0.3nm(LMS-9000B),
- Wavelength Reproducibility: ±0.5nm(LMS-9000A), ±0.1nm(LMS-9000B)
- Accuracy of Chromaticity Coordinate (Δx, Δy): ±0.003 (LMS-9000A) and ±0.002 (LMS-9000B)
- Correlated Color Temperature CCT: 1,500K~25,000K(LMS-9000A), 1500K~100,000K(LMS-9000B), CCT Accuracy: ±0.5%(LMS-9000A), ±0.3%(LMS-9000B)
- Color Rendering Index Range: 0~100.0, Accuracy: ±(0.3%rd±0.3)
- Photometric linear: ±0.5% (LMS-9000A) and ±0.3% (LMS-9000B)
- Stray light: <0.015%(600nm) and <0.03%(435nm)
- Time of integration: 0.1ms-20s
- It can measure the temperature inside and outside of integrating sphere



LMS-9000 used the Band pass-filter Wheel Correcting Technique, Spectrometer & Broadband-radiometer & photometer Combined Technique, and modified NIST stray light correction technology, the LMS-9000 spectroradiometer can realize ultra low stray light and super photometry linearity in overall dynamic range.

2、 Optical Fiber

CFO-1.5M is 1.5m length optical fiber used to connect the spectroradiometer and integrating sphere. CFO-1.5MY is Y type optical fiber which work with LMS-9000A can connect with two integrating spheres at the same time.

3、 Digital CC and CV DC Power Supply

The DC Series Power Supplies are with high stability and high accuracy. The voltage and current can be adjustable and simple operation. They are suitable to supply DC Power for the standard lamps.

Specifications:

- Accuracy of Voltage and Current: +/-(0.02 Reading+0.01% Range+1 Digit)
- Stability of Output Voltage/Current: +/-0.01% Reading/3min
- Digital control for Constant Current output or Constant Voltage output
- Communicate with PC via software, the Voltage & Current set by the software and Power Output can be remote controlled.

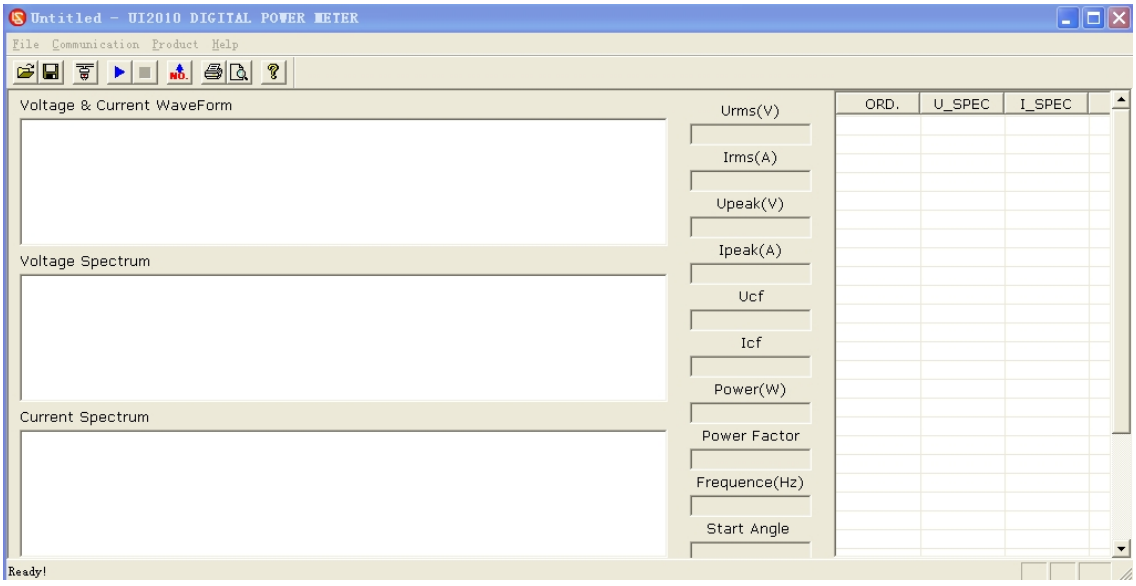
Model	DC3005	DC3010	DC6005	DC6010	DC12005
U Range	0.0005-30.000V	0.0005-30.000V	0.0005-60.000V	0.0005-60.000V	0.0001-120.00V
I Range	0.0005-5.0000A	0.0005-10.000A	0.0005-5.0000A	0.0005-10.000A	0.0005-5.0000A

4、 Digital Power Meter

- Measure Voltage, Current, Power and Power Factor.
- Voltage range:10~600V; Current range: 0.005~20A
- Accuracy: ±(0.4%reading + 0.1%range + 1digit)
- Communicate with PC by RS-232. It can communicate with LISUN spectroradiometer

Model	Measure	Remark
LS2008R	AC Parameters: U, I, P, PF	
LS2010	AC Parameters: U, I, P, PF and harmonic	Special Software can show harmonic in Win7 or Win8
LS2012	AC+DC Parameters: : U, I, P, PF	DC: 1~600v, DC Current Range: 0.005~20A, out of limit alarming
LS2050	AC+DC+Harmonic with high test accuracy	Special Software can show harmonic in Win8 or Win8

The LS2010 has a separately software can do harmonic analysis as below



5、 AC Power Source

- AC-DC-AC frequency conversion technology, Controlled & tested by 16 bits MCU
- Protection for over hot, thundering voltage and current
- Total voltage distortion: ≤0.6%; Voltage stability: ≤0.1%/30min
- Load adjust rate: ≤0.1%; Frequency stability: ≤0.05%/30min
- Output voltage range: AC 0.0~300.0V, Output Frequency Range: 45~70Hz, 100Hz, 200Hz and 400Hz
- Input Power: 220V and 50/60Hz
- Communicate with PC via software, the Voltage & Current set by the software and Power Output can be remote controlled.

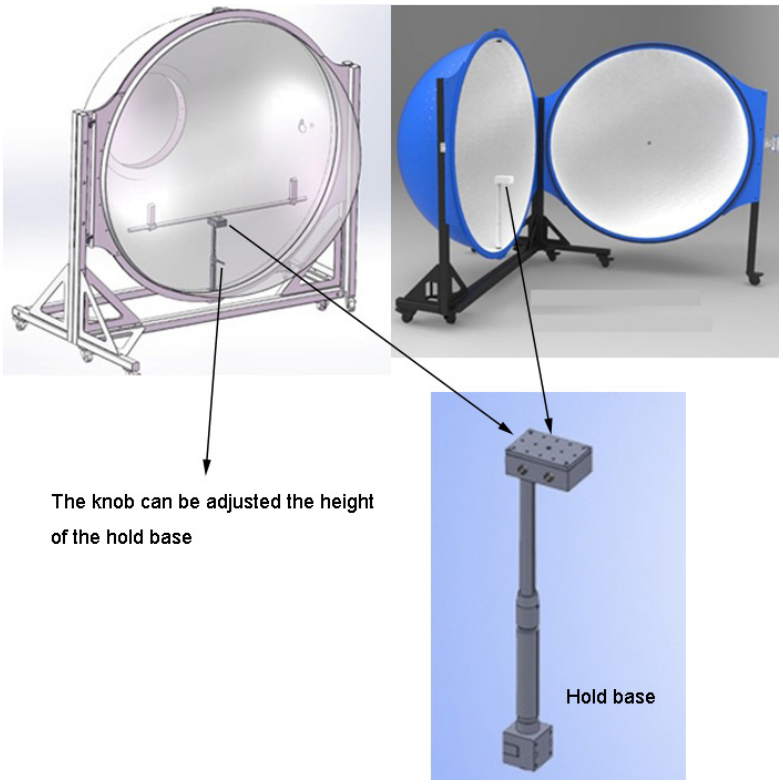
Lisun Model	Output Power	Remark
LSP-500VAS LSP-500VAR	500W	0~150V: 4.2A, 150~300V: 2.1A (LSP-500VAR is pure sine wave AC power source with low harmonic and high accuracy)
LSP-1KVAS LSP-1KVAR	1000W	0~150V: 8.4A, 150~300V: 4.2A (LSP-1KVAR is pure sine wave AC power source with low harmonic and high accuracy)

6、 New Design Integrating Sphere

Due to the LED luminaries such as LED street luminaries developed, to do 4π geometry testing, it is hard to be hold in the traditional integrating sphere design. To solve this problem, Lisun design a new kind of sphere.

The Lisun new Integrating sphere has the following advantages:

- The hold base can bear max 20kg, it can test all kinds of luminaires and light source such as E27/E40, all tubes such as T5/T8/T12 and all kinds of luminaries
- The hold base can be installed in the ceiling or down, it can be adjusted the height
- The test hold base has four power cables connect to the outside Power Supply and max is 5KW



Specification:

- Diameter: 0.3m, 0.5m, 1.0m, 1.5m, 1.75m, 2.0m, 2.5m and 3.0m
- The painting of integrating spheres is according to CIE Pub.No.84(1989)
- BaSO4 coating: ρ(λ)≥0.96(450nm~800nm) and ρ(λ)≥0.92(380nm~450nm)
- Fine diffuse reflection: Reflectanceρ≈0.8 and accuracy of ρ(λ)<1.5%

Order Number:

Lisun Model	**1.0m**	**1.5m**	**1.75m**	**2m**
	IS-1.0MA	IS-1.5MA	IS-1.75MA	IS-2.0MA
Square side opening	IS-1.0MA33C	IS-1.5MA55C	IS-1.75MA66C	IS-2.0MA77C

Remark:

The 55C in IS-1.5MA55C means the side opening is diameter=50cm cycle size

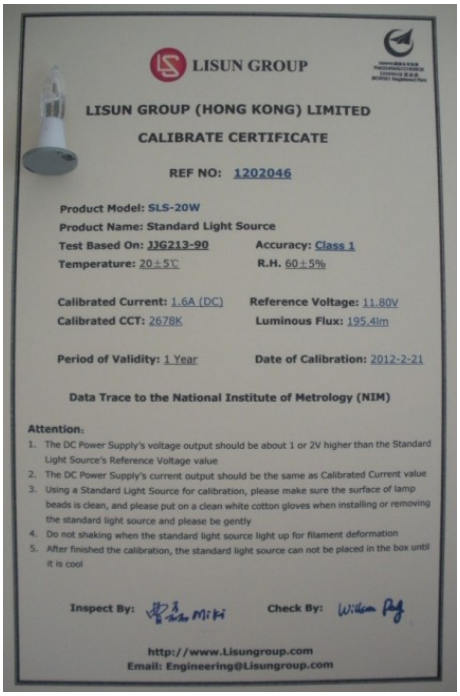
7、 Auxiliary Lamp (RLS-50W)

Due to the luminaires material has self-absorption, the test flux will be a bit difference than the original flux when test the luminaires in the integrating sphere, according to CIE request, it is necessary use an Auxiliary lamp to do flux self-absorption revise.

8、 Standard Lamp Source

OSRAM Standard Lamp to calibrate the spectrum and luminous flux with Lisun Lab certification. The data can be traced NIM. The Standard Lamp Source is used to calibrate the integrating sphere system. The different size of Integrating Sphere should choose the right power of standard lamp source

Integrating Sphere Size	Standard Lamp Source
0.3m/0.5m	SLS-10W
1m/1.5m/1.75m	SLS-50W
2m/2.5m/3m	SLS-100W



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CALIBRATE CERTIFICATE

REF NO: 1202046

Product Model: SLS-20W
Product Name: Standard Light Source
Test Based On: JJG213-90 Accuracy: Class 1
Temperature: 20±5℃ R.H. 60±5%

Calibrated Current: 1.6A (DC) Reference Voltage: 11.80V
Calibrated CCT: 2678K Luminous Flux: 195.4lm

Period of Validity: 1 Year Date of Calibration: 2012-2-21

Data Trace to the National Institute of Metrology (NIM)

Attention:
1. The DC Power Supply's voltage output should be about 1 or 2V higher than the Standard Light Source's Reference Voltage value
2. The DC Power Supply's current output should be the same as Calibrated Current value
3. Using a Standard Light Source for calibration, please make sure the surface of lamp beads is clean, and please put on a clean white cotton gloves when installing or removing the standard light source and please be gently
4. Do not shaking when the standard light source light up for filament deformation
5. After finished the calibration, the standard light source can not be placed in the box until it is cool

Inspect By: Check By:

http://www.Lisungroup.com
Email: Engineering@Lisungroup.com

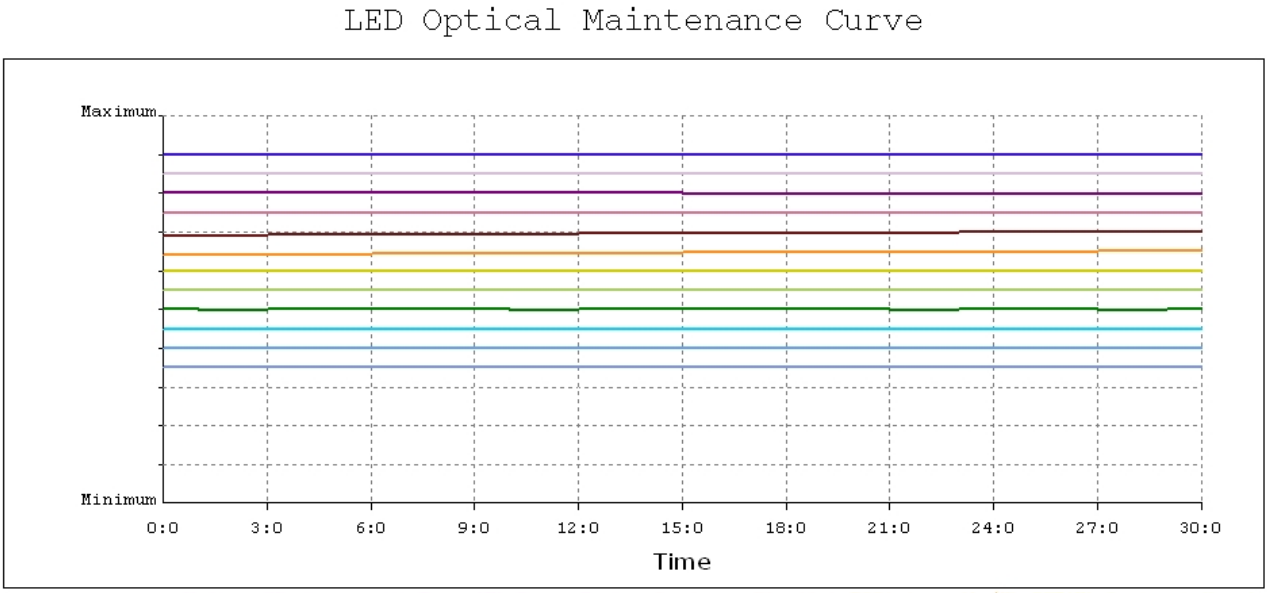
9、 Optical Path Converter (LS512A)

The LS512A work with LMS-9000B can be switch between the two spheres conveniently, but no need to take out the detector cable and optical fiber between the big sphere and small sphere

10、 Standard Instrument Cabinet 19Inch (CASE-19IN)

Combine all of the test instruments in a 19 inch standard Cabinet, makes the whole systems looks nice and is simple to use

Appendix 1: LM-80 LED Optical Maintenance Test Report



	Voltage(V)	Current(A)	Power(W)	Power Factor	Luminous Flux(lm)	Efficiency(lm/W)	CCT(K)	Dominant Wavelength(nm)
Maximum of Scale	27.16	2.491	64.69	1.333	1187.38	24.7	4807	1062.4
Minimum of Scale	0.00	0.000	0.00	0.000	0.00	0.0	0	0.0
Maximum	24.44	2.117	51.75	1.000	831.17	16.1	2884	584.3
Minimum	24.41	2.117	51.68	1.000	819.22	15.8	2881	584.3

Product Category: Hallogen Lamp
Product Number: SLS-50W

Product Spec: 24V/50W
Manufacturer: OSRAM

Condition: 20C/65%
Test Lab: Lisun Group
Operator: Jacky

Remark:
Test Time: 2013-02-18 16:38:24
Inspector:

The testing results can be exported Excel files to do detail analyse:

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Product Category	Hallogen Lamp											
2	Product Type												
3	Product Spec	24V/50W											
4	Product Number	SLS-50W											
5	Manufacturer	OSRAM											
6	Buyer												
7	Submitted Unit												
8	Test Lab	Lisun Group											
9	Operator	Jacky											
10	Test Time	2013-2-18 16:38											
11	Condition	20C/65%											
12	Remark												
13	Time	Voltage(V)	Current(A)	Power(W)	Power Factor	Luminous Flux(lm)	Efficiency (lm/W)	CCT(K)	Dominant Wavelength (nm)	Peak Wavelength (nm)	CRI: Ra	Chromaticity Coordinate: x	Chromaticity Coordinate: y
14	0:00:00	24.44	2.117	51.75	1	819.22	15.8	2884	584.3	799	99.9	0.4455	0.407
15	0:01:00	24.44	2.117	51.74	1	819.49	15.8	2883	584.3	799	99.9	0.4455	0.4069
16	0:02:00	24.43	2.117	51.72	1	820.08	15.9	2883	584.3	798	99.9	0.4456	0.4069
17	0:03:00	24.43	2.117	51.72	1	820.69	15.9	2883	584.3	800	99.9	0.4456	0.4069
18	0:04:00	24.43	2.117	51.72	1	821.41	15.9	2883	584.3	799	100	0.4455	0.4069
19	0:05:00	24.43	2.117	51.72	1	821.61	15.9	2883	584.3	800	99.9	0.4456	0.407
20	0:06:00	24.43	2.117	51.72	1	822.38	15.9	2882	584.3	800	100	0.4456	0.407
21	0:07:00	24.43	2.117	51.71	1	822.18	15.9	2883	584.3	799	99.9	0.4455	0.4069
22	0:08:00	24.43	2.117	51.71	1	823.08	15.9	2883	584.3	800	99.9	0.4456	0.407
23	0:09:00	24.42	2.117	51.71	1	823.63	15.9	2883	584.3	799	99.9	0.4456	0.407
24	0:10:00	24.42	2.117	51.71	1	824.06	15.9	2883	584.3	800	100	0.4455	0.4069
25	0:11:00	24.42	2.117	51.7	1	824.48	15.9	2883	584.3	798	100	0.4456	0.407
26	0:12:00	24.42	2.117	51.7	1	824.9	16	2882	584.3	799	99.9	0.4457	0.407
27	0:13:00	24.42	2.117	51.7	1	825.18	16	2881	584.3	799	99.9	0.4457	0.407
24	0:10:00	24.42	2.117	51.71	1	824.06	15.9	2883	584.3	800	100	0.4455	0.4069
25	0:11:00	24.42	2.117	51.7	1	824.48	15.9	2883	584.3	798	100	0.4456	0.407
26	0:12:00	24.42	2.117	51.7	1	824.9	16	2882	584.3	799	99.9	0.4457	0.407
27	0:13:00	24.42	2.117	51.7	1	825.18	16	2881	584.3	799	99.9	0.4457	0.407

Appendix 2: LM-79 LED Colorimetric, Photometric and Electrical Test Report

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Lightsource Test Report (1/2)

Product Infomation

Product Category: Standard Lamps
Product Type: CAL201711186
Product Spec: SLS-50W
Product Number: 100
Manufacturer: LISUN
Buyer: SHYLON

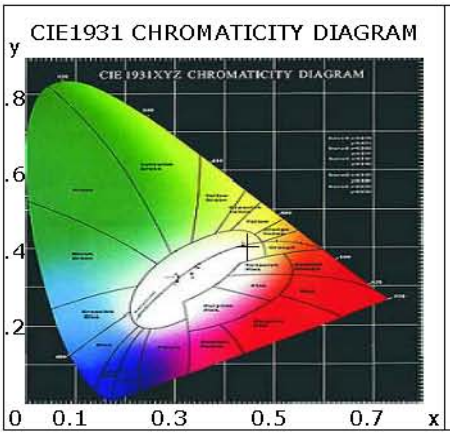
CIE Colorimetric Parameters

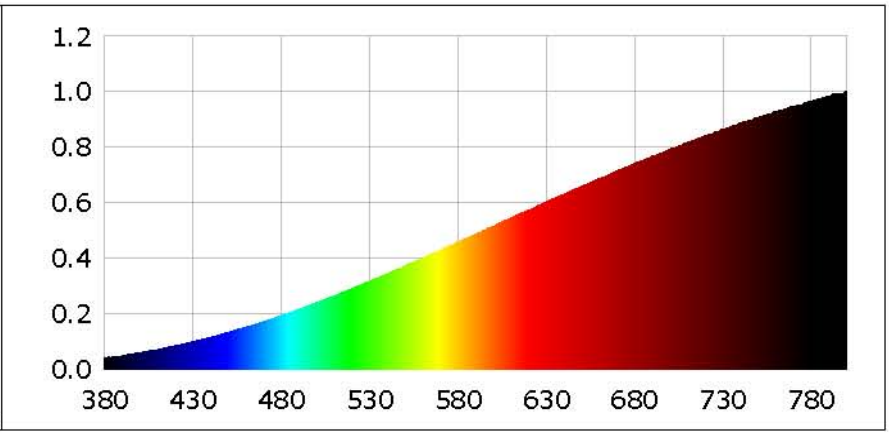
Chromaticity coordinates: x=0.4476 y=0.4076 u(u')=0.2559 v=0.3496 v'=0.5244
CCT: Tc=2856K (duv=0.00006)
Color Ratio: R=0.255 G=0.714 B=0.032
Peak Wavelength: 799.5nm
Half Bandwidth: 205.1nm
Dominant Wavelength: 583.4nm
Color Purity: 0.567
CRI: Ra=100.0
TM30: Rf= 100, Rg= 100

R1 =100	R2 =100	R3 =100	R4 =100	R5 =100	R6 =100	R7 =100	R8 =100
R9 =100	R10=100	R11=100	R12=100	R13=100	R14=100	R15=100	

Color Quality Scale: Qa= 98.1, Qf= 99.9, Qp= 99.9, Qg= 98.1

Q1 =98	Q2 =98	Q3 =98	Q4 =98	Q5 =98	Q6 =98	Q7 =98	Q8 =98
Q9 =98	Q10=98	Q11=98	Q12=98	Q13=98	Q14=98	Q15=98	





Photometric Parameters

Luminous Flux: 800.08 lm
Efficiency: 15.08 lm/W
Radiant Power: 5.137 W
EEI: 0.83
Energy Efficiency Class: D (EU 874-2012)
Pupil Flux: 1047.09 Plm
Pupil Lumens Per Watt: 19.73 Plm/W
Pupil Factor (Kp): 1.309
PAR: 3.186 W
PPF: 15.982 umol/s
R/B: 4.8

Electric Parameters

Voltage: 24.730V
Current: 2.1455A
Power: 53.06W
Power Factor: 1.0000
Frequency: 0.00Hz

Test Infomation
Scan Range: 380~800:1nm
Photometric Method: sphere-photometer (spec_rev)
Stabilization Time: 0 ms
Photometric Condition: Sphere diameter: 1.50m, 4PI
Max of Signal: 43912 (5765)
CCD Integration Time: 745.02 ms

Condition: Tx:22.2'C, Ti:20.8'C, R.H.:60%
Test Device: Lisun LMS-9000B
Test Lab: LISUN
Test Time: 2017-11-15 16:39:43
Operator: Joye
Inspector:

LISUN GROUP

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Lightsource Test Report (2/2)

WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)	WL(nm)	PL	PE(mW/nm)
380	0.0385	1.0492	525	0.3028	8.2425	670	0.7148	19.4572
385	0.0431	1.1737	530	0.3161	8.6041	675	0.7279	19.8147
390	0.0473	1.2871	535	0.3295	8.9685	680	0.7404	20.1546
395	0.0533	1.4498	540	0.3430	9.3359	685	0.7516	20.4598
400	0.0581	1.5805	545	0.3575	9.7309	690	0.7678	20.9013
405	0.0644	1.7526	550	0.3709	10.0954	695	0.7778	21.1729
410	0.0695	1.8921	555	0.3846	10.4681	700	0.7913	21.5388
415	0.0763	2.0773	560	0.3983	10.8430	705	0.8025	21.8444
420	0.0837	2.2776	565	0.4132	11.2471	710	0.8156	22.2027
425	0.0907	2.4690	570	0.4274	11.6336	715	0.8290	22.5673
430	0.0979	2.6651	575	0.4429	12.0569	720	0.8410	22.8933
435	0.1059	2.8826	580	0.4581	12.4713	725	0.8512	23.1710
440	0.1142	3.1091	585	0.4715	12.8358	730	0.8628	23.4871
445	0.1226	3.3364	590	0.4859	13.2267	735	0.8749	23.8145
450	0.1317	3.5851	595	0.5003	13.6191	740	0.8862	24.1244
455	0.1407	3.8310	600	0.5150	14.0182	745	0.8970	24.4179
460	0.1506	4.0983	605	0.5303	14.4353	750	0.9056	24.6519
465	0.1596	4.3441	610	0.5428	14.7759	755	0.9169	24.9586
470	0.1709	4.6524	615	0.5580	15.1885	760	0.9268	25.2280
475	0.1814	4.9390	620	0.5727	15.5897	765	0.9365	25.4937
480	0.1921	5.2280	625	0.5881	16.0090	770	0.9461	25.7526
485	0.2037	5.5462	630	0.6016	16.3776	775	0.9527	25.9347
490	0.2155	5.8656	635	0.6141	16.7163	780	0.9670	26.3241
495	0.2262	6.1563	640	0.6292	17.1278	785	0.9742	26.5198
500	0.2384	6.4904	645	0.6431	17.5059	790	0.9855	26.8257
505	0.2508	6.8279	650	0.6579	17.9075	795	0.9941	27.0603
510	0.2633	7.1672	655	0.6734	18.3301	800	1.0000	27.2211
515	0.2757	7.5040	660	0.6869	18.6984			
520	0.2883	7.8477	665	0.6991	19.0293			

Condition: Tx:22.2'C, Ti:20.8'C, R.H.:60%
Test Lab: LISUN
Operator: Joye

Test Device: Lisun LMS-9000B
Test Time: 2017-11-15 16:39:43
Inspector: