

## LM-79-08 Test Report

for

### GREEN CREATIVE LTD

756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

### LED Lamp

**Model: 25HID/840/277V/EX39/R**

### Laboratory: Leading Testing Laboratories

**NVLAP CODE: 200960-0**

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, Yuhang Dist,  
Hangzhou, Zhejiang Province, China 311100

Tel: +86 571 86376106

[www.ledtestlab.com](http://www.ledtestlab.com)

Report No.: HZ18120009b

The laboratory that conducted the testing detailed in this report has been accredited for SSL by NVLAP.

Review by:



Engineer: April Zou  
Dec. 13, 2018

Approved by:



Manager: Jim Zhang  
Dec. 13, 2018

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

## Test Summary

Sample Tested: **25HID/840/277V/EX39/R**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
143.7	3485.0	24.26	0.9958
CCT (K)	CRI	Stabilization Time (Light & Power)	
4021	83.6	60	

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

### Test specifications:

<b>Date of Receipt</b>	: Dec. 10, 2018
<b>Date of Test</b>	: Dec. 12, 2018
<b>Test item</b>	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
<b>Reference Standard</b>	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

## TABLE OF CONTENT

LM-79-08 Test Report.....	1
Test Summary.....	2
Sample Photos .....	4
TEST RESULTS .....	5
Goniophotometer Method .....	6
Spectral Power Distribution - Sphere Spectroradiometer Method .....	7
Chromaticity Diagram - Sphere Spectroradiometer Method.....	8
Nominal CCT Quadrangles – Sphere Spectroradiometer Method .....	9
Zonal Lumen Tabulation- Goniophotometer Method .....	10
Luminous Intensity Distribution Plots- Goniophotometer Method.....	12
Luminous Intensity Data- Goniophotometer Method.....	13
EQUIPMENT LIST .....	15
TEST METHODS .....	15
Seasoning of SSL Product.....	15
Sphere-Spectroradiometer Method- Photometric and Electrical Measurements.....	15
Goniophotometer Method .....	16
Photometric and Electrical Measurements .....	16
Color Characteristics Measurements.....	16
Color Spatial Uniformity .....	16

## Sample Photos



Figure 1- Overview of the sample

### Equipment Under Test (EUT)

<b>Name</b>	: LED Lamp
<b>Model</b>	: 25HID/840/277V/EX39/R
<b>Electrical Ratings</b>	: 120-277V, 50/60Hz, 25W
<b>Product Description</b>	: 4000K
<b>Manufacturer</b>	: GREEN CREATIVE LTD
<b>Address</b>	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

## TEST RESULTS

Test ambient temperature was 26.0°C.

Base orientation was Base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 70 minutes.

### Sphere-Spectroradiometer Method

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.203	0.092
Power Factor	0.9958	0.9353
Test Power (W)	24.26	23.74
THD A%	6.69	12.14
Luminous Efficacy (lm/W)	143.7	146.2
Total Luminous Flux (lm)	3485.0	3470.0
Color Rendering Index (CRI)	83.6	
R9	10.9	
Correlated Color Temperature (CCT)(K)	4021	
Chromaticity Chroma x	0.3788	
Chromaticity Chroma y	0.3740	
Chromaticity Chroma u	0.2252	
Chromaticity Chroma v	0.3334	
Duv	0.0015	
Chromaticity Chroma u'	0.2252	
Chromaticity Chroma v'	0.5001	

Special Color Rendering Indices	
R1	82.3
R2	91.6
R3	95.7
R4	80.7
R5	82.2
R6	87.3
R7	85
R8	64.3
R9	10.9
R10	79.1
R11	79.4
R12	63.5
R13	84.9
R14	98.2
Rf	82
Rg	94

Table 2: Test data per Sphere-Spectroradiometer Method

Note: According to CIE 1976 (u',v') diagram,  $u' = u = 4x/(-2x+12y+3)$ ,  $v' = 3v/2 = 9y/(-2x+12y+3)$ .

## Goniophotometer Method

Test ambient temperature was 25.0°C.

The photometric distance is 2.47m.

Luminous data was taken at 0.5 °vertical intervals and 10 °horizontal intervals.

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.206
Power Factor	0.9952
Test Power (W)	24.58
Luminous Efficacy (lm/W)	143.5
Total Luminous Flux (lm)	3528.3
Beam Angle ( °)	288.4
Center Beam Candle Power (cd)	310
Spacing Criteria	1.62 (0 °-180 °)/ 1.66 (90 °-270 °)
Zonal Lumens in the 0 °-60 °Zone	30.04%
Zonal Lumens in the 60 °-90 °Zone	30.07%
Zonal Lumens in the 90 °-120 °Zone	25.10%
Zonal Lumens in the 120 °-180 °Zone	14.78%

Table 3: Test data per Goniophotometer Method

## Spectral Power Distribution - Sphere Spectroradiometer Method

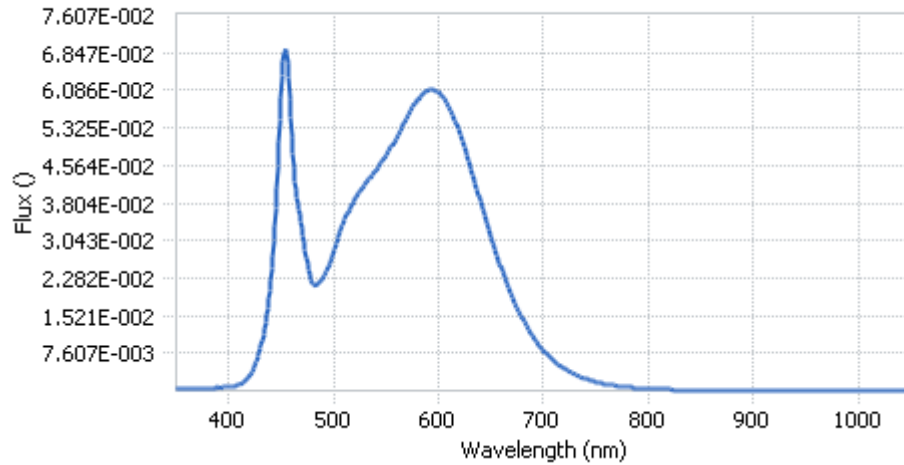


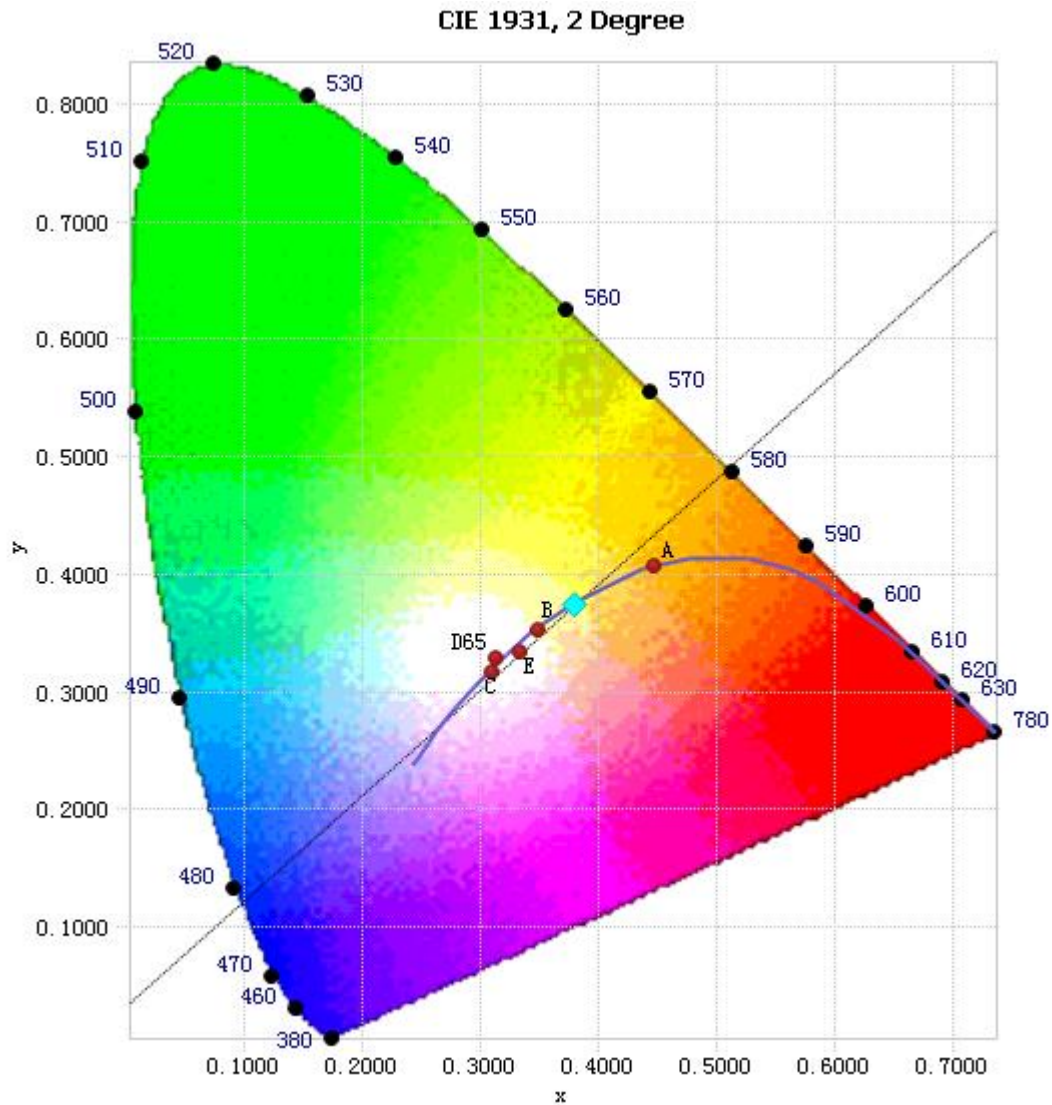
Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	6.11E-04	485	2.16E-02	590	6.09E-02	695	9.47E-03
385	5.81E-04	490	2.29E-02	595	6.10E-02	700	8.16E-03
390	6.60E-04	495	2.51E-02	600	6.05E-02	705	7.00E-03
395	7.03E-04	500	2.83E-02	605	5.93E-02	710	6.01E-03
400	7.66E-04	505	3.17E-02	610	5.75E-02	715	5.19E-03
405	9.42E-04	510	3.45E-02	615	5.51E-02	720	4.49E-03
410	1.29E-03	515	3.68E-02	620	5.22E-02	725	3.86E-03
415	1.91E-03	520	3.89E-02	625	4.91E-02	730	3.30E-03
420	3.10E-03	525	4.04E-02	630	4.56E-02	735	2.84E-03
425	5.13E-03	530	4.21E-02	635	4.20E-02	740	2.41E-03
430	8.51E-03	535	4.33E-02	640	3.83E-02	745	2.08E-03
435	1.40E-02	540	4.46E-02	645	3.46E-02	750	1.81E-03
440	2.26E-02	545	4.63E-02	650	3.11E-02	755	1.54E-03
445	3.71E-02	550	4.77E-02	655	2.79E-02	760	1.34E-03
450	5.94E-02	555	4.96E-02	660	2.47E-02	765	1.15E-03
455	6.84E-02	560	5.12E-02	665	2.18E-02	770	9.90E-04
460	5.15E-02	565	5.34E-02	670	1.91E-02	775	8.58E-04
465	3.90E-02	570	5.54E-02	675	1.66E-02	780	7.42E-04
470	3.29E-02	575	5.72E-02	680	1.46E-02		
475	2.57E-02	580	5.89E-02	685	1.26E-02		
480	2.17E-02	585	6.03E-02	690	1.09E-02		

Table 4: Spectral Power Distribution Numerical Data per Sphere - Spectroradiometer Method



## Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3788, 0.3740)

Chart 2: Chromaticity Diagram per Sphere - Spectroradiometer Method

Note: The location on the diagram of the tristimulus coordinates are indicated by the blue diamond.



### Nominal CCT Quadrangles – Sphere Spectroradiometer Method

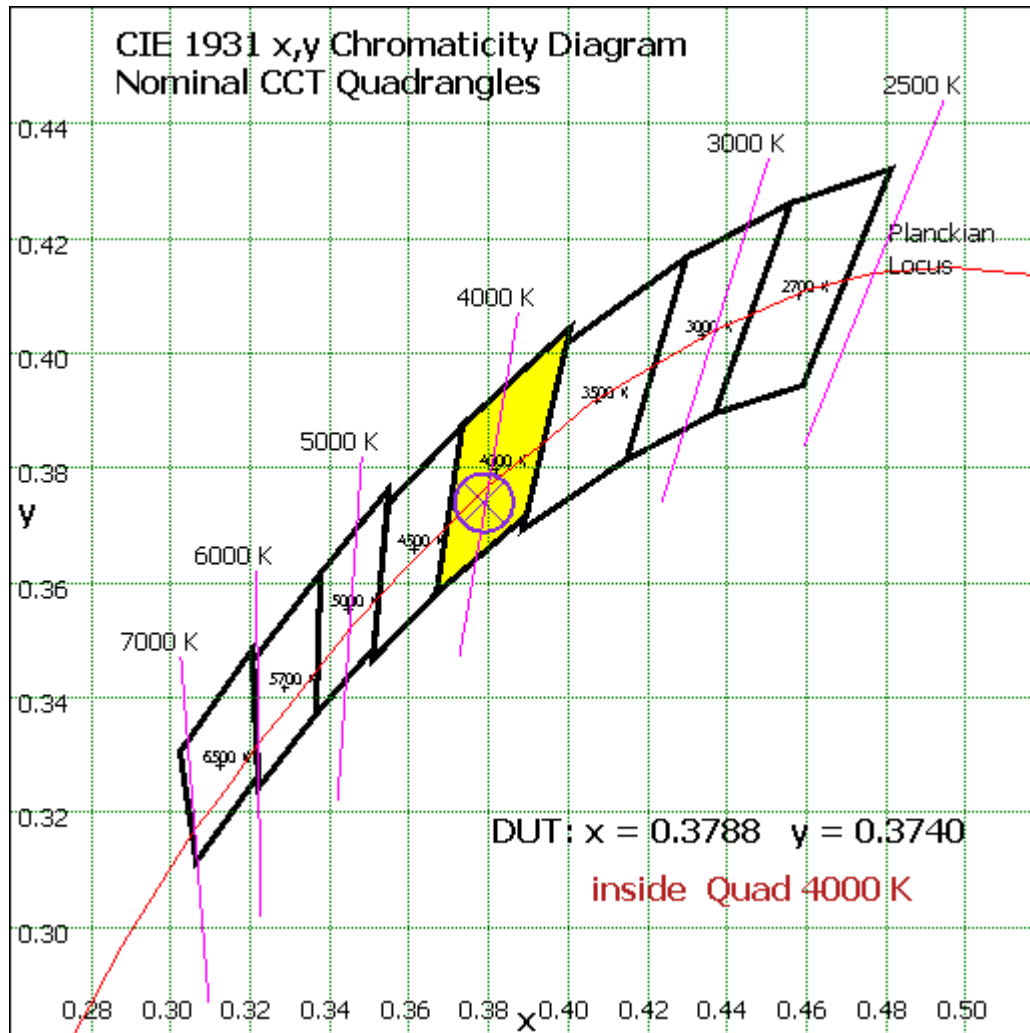


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

### Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	29.74	0.84%
10- 20	89.625	2.54%
20- 30	150.25	4.26%
30- 40	210.452	5.96%
40- 50	266.606	7.56%
50- 60	313.216	8.88%
60- 70	345.348	9.79%
70- 80	359.898	10.20%
80- 90	355.902	10.09%
90-100	334.469	9.48%
100-110	298.619	8.46%
110-120	252.621	7.16%
120-130	200.509	5.68%
130-140	146.673	4.16%
140-150	96.107	2.72%
150-160	53.162	1.51%
160-170	21.848	0.62%
170-180	3.299	0.09%
Total	3528.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1059.889	30.04%
60- 90	1061.148	30.07%
0-90	2121.037	60.11%
90- 180	1407.307	39.89%
0- 180	3528.3	100%

Table 5: Zonal Lumen Data

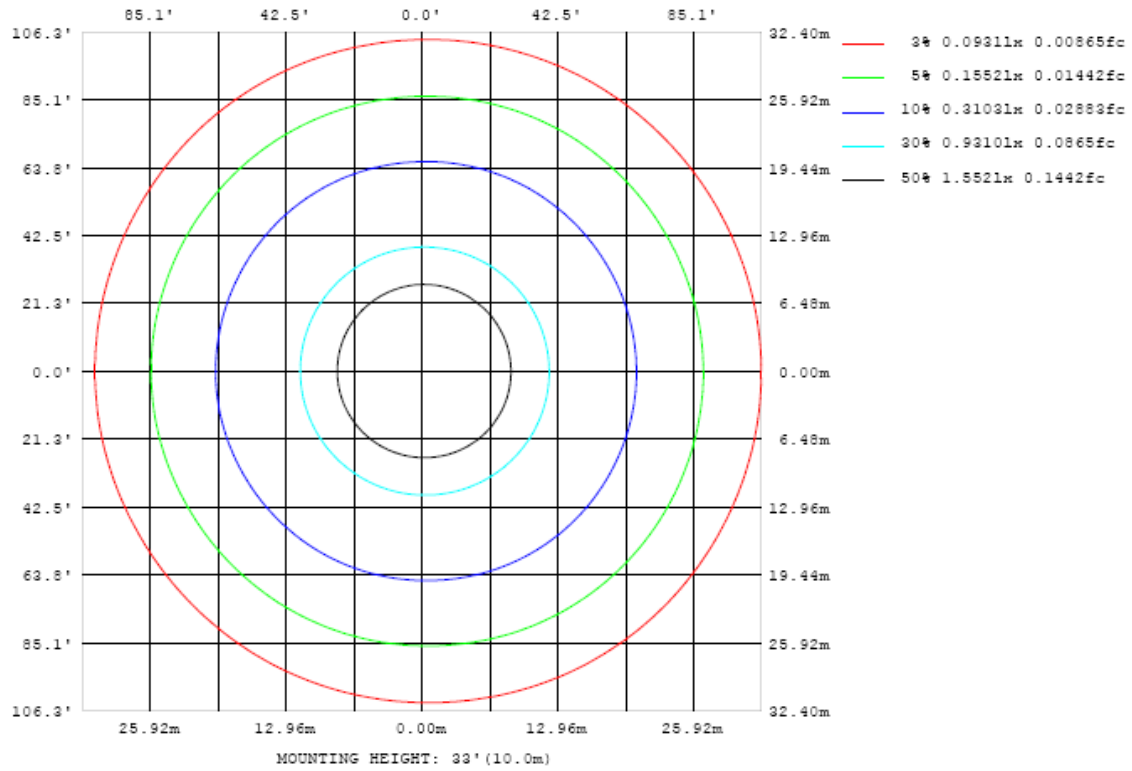


Chart 4: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots- Goniophotometer Method

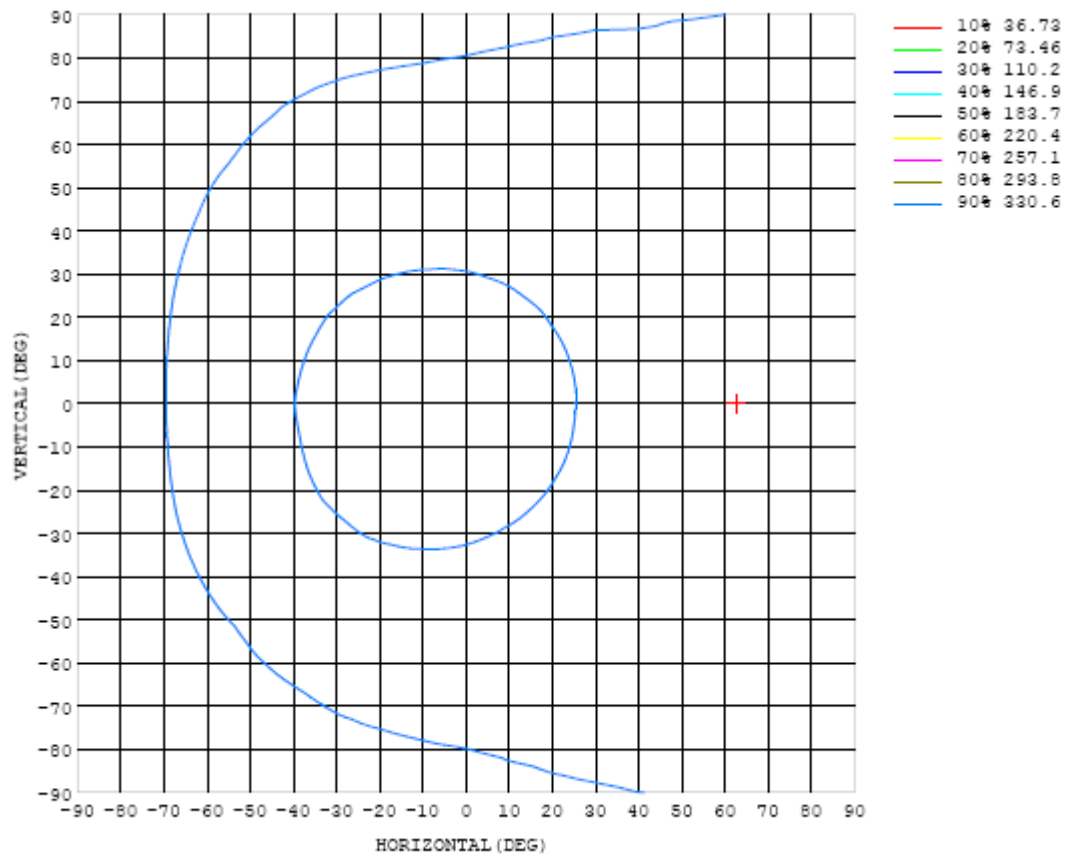


Chart 5: Isocandela Plot

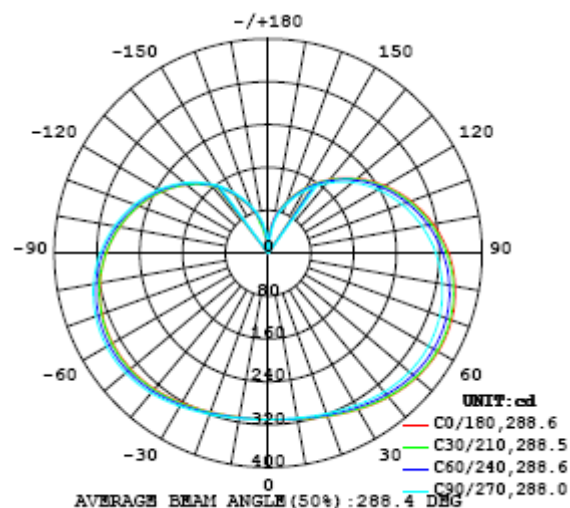


Chart 6: Polar Candela Distribution

## Luminous Intensity Data- Goniophotometer Method

Table--1

UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310
5	312	312	312	312	312	311	311	311	311	311	311	310	310	310	310	310	310	310	310
10	315	315	315	315	314	314	313	313	313	312	312	312	311	311	311	311	311	311	311
15	319	319	319	318	318	317	317	316	316	315	314	314	313	313	313	313	313	313	312
20	324	324	324	323	323	322	321	320	319	319	318	317	317	316	316	315	315	315	315
25	330	330	330	329	328	327	326	325	324	323	322	321	320	320	319	319	319	319	319
30	337	337	336	335	335	334	332	331	329	328	327	326	325	324	324	323	323	323	323
35	344	343	343	342	341	340	338	337	335	333	332	330	329	328	328	327	327	327	327
40	350	350	350	349	348	346	344	342	340	338	336	335	333	332	332	331	331	331	331
45	357	357	356	355	353	352	349	347	344	342	340	338	337	335	335	334	334	334	334
50	361	361	361	360	358	356	354	351	348	345	343	341	339	337	337	336	336	336	336
55	365	365	364	363	361	359	356	353	350	346	344	342	340	338	337	336	336	337	337
60	367	367	366	365	363	361	357	354	350	346	344	342	340	338	337	335	335	336	336
65	367	367	366	364	362	360	357	353	348	345	342	340	338	336	334	333	333	334	334
70	365	365	363	362	360	358	354	350	345	341	339	337	335	332	331	329	330	330	330
75	361	361	359	358	356	354	350	346	341	337	334	332	330	327	326	324	324	325	325
80	355	354	353	351	350	347	344	339	334	330	328	326	324	321	319	318	318	319	319
85	347	347	345	344	342	340	337	332	327	323	320	319	316	313	312	310	310	311	312
90	338	337	335	334	332	330	327	322	317	314	311	310	308	305	302	301	302	303	303
95	326	326	324	322	322	319	316	312	307	303	302	300	297	295	293	291	291	293	293
100	314	313	311	310	308	307	303	300	296	292	290	288	286	284	282	280	281	282	282
105	299	299	297	296	295	293	291	287	283	280	278	276	275	272	270	269	269	270	270
110	284	284	282	282	280	278	276	273	269	266	266	263	262	260	258	257	257	257	258
115	268	268	267	266	265	264	261	259	255	253	251	249	248	246	244	243	243	244	244
120	252	252	250	249	248	247	246	243	240	238	236	235	234	232	230	229	229	229	230
125	235	235	233	233	232	231	229	227	224	222	221	220	218	216	215	214	214	214	215
130	217	217	216	215	214	214	212	210	207	205	204	203	202	200	199	197	197	198	198
135	199	198	197	197	196	195	194	192	190	188	187	186	184	183	181	180	180	181	181
140	180	179	179	178	177	177	176	174	172	170	169	168	166	165	163	162	162	162	163
145	161	160	160	159	158	158	157	155	153	152	151	149	148	146	145	144	144	144	145
150	141	141	140	140	139	138	137	136	135	133	132	130	129	127	126	125	124	125	126
155	122	121	120	120	120	119	118	117	115	114	113	111	110	108	106	105	105	105	106
160	102	102	101	101	100	99.7	98.9	97.9	96.5	95.2	93.9	92.7	91.1	89.4	88.2	87.3	86.8	86.8	87.5
165	83.6	82.9	82.3	81.1	81.8	81.9	81.0	80.2	79.2	77.8	72.1	74.5	73.3	72.2	69.8	66.6	66.7	66.6	67.4
170	65.3	64.1	64.1	60.3	58.1	61.4	62.5	59.3	57.4	52.7	43.2	40.6	45.1	43.1	37.5	36.7	40.6	41.4	41.9
175	43.4	40.3	38.6	35.3	32.7	31.3	30.9	28.7	26.1	20.8	14.3	12.4	14.3	16.2	15.1	13.7	13.4	13.8	13.3
180	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35

Table 6: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) y (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310	310		
5	310	310	310	310	310	311	311	311	311	311	312	312	312	312	312	312	312		
10	311	311	311	311	312	312	312	313	313	313	314	314	314	315	315	315	315		
15	313	313	313	313	314	314	315	315	316	317	317	317	318	319	318	319	319		
20	316	316	316	317	318	318	319	319	320	321	321	322	323	323	323	324	324		
25	319	320	320	321	322	322	323	324	325	326	326	327	328	329	329	329	330		
30	323	324	324	325	326	327	328	329	330	331	332	333	334	335	335	336	336		
35	327	328	329	330	331	332	333	334	335	337	338	339	340	342	342	343	343		
40	331	332	333	334	335	336	338	339	341	342	343	345	346	348	348	349	350		
45	335	335	336	337	339	340	341	343	345	346	348	350	351	353	354	355	356		
50	336	337	338	339	341	342	344	346	348	349	352	353	355	357	358	360	361		
55	337	338	339	340	342	344	345	347	349	351	354	356	358	360	361	363	364		
60	336	337	338	340	342	343	345	346	349	351	354	357	358	361	362	364	366		
65	334	334	335	337	340	341	343	344	347	350	353	356	357	360	361	364	366		
70	331	331	332	334	336	338	339	341	343	346	350	353	355	357	359	362	364		
75	326	325	327	329	331	333	334	336	338	341	345	348	350	352	355	357	360		
80	319	320	321	322	325	327	328	329	331	335	338	342	344	346	349	352	354		
85	312	311	313	315	317	319	320	321	323	327	331	333	336	338	341	344	346		
90	303	303	304	306	309	310	311	312	314	317	321	324	326	328	331	335	337		
95	293	293	293	296	298	299	300	301	303	307	310	313	315	317	320	323	326		
100	282	282	282	285	287	288	289	290	292	295	298	301	303	305	308	310	313		
105	270	270	271	272	274	276	276	277	279	282	285	289	290	292	294	296	299		
110	257	258	258	260	262	263	263	264	266	269	271	274	275	277	279	282	284		
115	244	244	245	246	248	249	249	250	252	254	257	260	261	262	265	267	269		
120	230	230	230	232	233	234	235	236	237	239	242	244	245	247	248	250	252		
125	215	215	215	216	218	219	219	220	221	223	226	228	229	230	232	234	235		
130	198	198	199	200	201	202	203	203	205	207	209	211	212	213	215	216	217		
135	181	181	182	183	184	185	185	186	187	189	191	193	194	195	197	198	199		
140	163	164	164	165	166	167	167	168	169	171	173	175	176	177	178	180	181		
145	146	146	146	147	148	149	149	150	152	153	155	157	157	158	159	161	162		
150	126	126	127	128	128	129	130	131	132	134	136	138	139	140	141	142	143		
155	106	107	107	108	109	109	110	111	113	115	116	118	119	120	121	122	123		
160	87.3	87.4	88.4	88.7	89.2	90.3	91.1	92.1	93.4	94.9	96.8	98.5	99.7	101	102	102	103		
165	67.9	64.3	56.5	64.0	70.2	70.8	73.6	74.5	75.5	76.5	78.0	79.8	81.3	82.3	83.2	83.8	84.3		
170	40.8	31.3	31.2	43.6	50.1	49.7	51.9	57.0	58.0	54.5	59.0	62.0	63.7	65.0	65.5	65.8	66.1		
175	12.3	17.8	22.5	19.3	20.1	24.1	28.3	31.9	36.4	38.7	40.6	42.8	44.4	44.6	44.2	44.4	44.3		
180	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35		

Table 7: Luminous Intensity Data

## EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 14, 2018	Aug. 13, 2019
Digital Power Meter	PF2010A	HZTE028-01	Sep. 12, 2018	Sep. 11, 2019
AC Power Supply	DPS1060	HZTE001-06	Aug. 09, 2018	Aug. 08, 2019
DC Power Supply	WY12010	HZTE004-03	Aug. 09, 2018	Aug. 08, 2019
Temperature recorder	JM624U	HZTE018-08	Aug. 09, 2018	Aug. 08, 2019
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 09, 2018	Aug. 08, 2019
Standard source	D908	HZTE012-01	Aug. 14, 2018	Aug. 13, 2019
Integrate Sphere system	3M	HZTE015-04	Aug. 16, 2018	Aug. 15, 2019
Digital Power Meter	WT210	HZTE008-01	Aug. 02, 2018	Aug. 01, 2019
AC Power Supply	PCR 500L	HZTE001-07	Aug. 09, 2018	Aug. 08, 2019
DC Power Supply	IT6154	HZTE004-04	Aug. 09, 2018	Aug. 08, 2019
Standard source	SCL-1400	HZTE012-02	Aug. 16, 2018	Aug. 15, 2019
Temperature and humidity recorder	JR900	HZTE018-02	Aug. 09, 2018	Aug. 08, 2019
Temperature Meter	TES1310	HZTE017-01	Aug. 09, 2018	Aug. 08, 2019

Table 8: Test Equipment List

## TEST METHODS

### Seasoning of SSL Product

For the purpose of rating new SSL products, SSL products shall be tested with no seasoning. Therefore, no seasoning was performed.

### Sphere-Spectroradiometer Method- Photometric and Electrical Measurements

A Labsphere Model CDS 2100 Spectroradiometer and Two Meter Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit. The coating reflectance of each sphere is 98%. The measure geometry is  $4\pi$ . Self-absorption correction is conducted in testing. Bandwidth of spectroradiometer is 350nm-1050nm.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED lamps) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Yokogawa Power Analyzer.

The standard reference of the integrated sphere system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Standards and Technology.

Prepared by: Leading Testing Laboratories

Page 15 of 17

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, Yuhang Dist,  
Hangzhou, Zhejiang Province, China 311100

Tel: +86 571 86376106 [www.ledtestlab.com](http://www.ledtestlab.com)



The uncertainty of integrating sphere system reported in this document is expanded uncertainty is 2.1% with a coverage factor  $k=2$ .

## **Goniophotometer Method**

### **Photometric and Electrical Measurements**

An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.

Ambient temperature was measured at the same height of the sample mounted on the Goniophotometer equipment. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation.

The stabilization time typically ranges from 30 min (small integrated LED Tubes) to 2 or more hours for large SSL luminaires). It can be judged that stability is reached when the variation (maximum – minimum) of at least 3 readings of the light output and electrical power over a period of 30 min, taken 15 minutes apart, is less than 0.5 %.

Electrical measurements including voltage, current, and power were measured using the Everfine Digital Power Meter.

Some graphics were created with Photometric Plus software.

The standard reference of the Goniophotometer system is halogen incandescent lamp, the intensity distribution type is omni-directional, and is traceable to the National Institute of Metrology P.R. China.

The uncertainty of goniophotometer system reported in this document is expanded uncertainty is 2.3% with a coverage factor  $k=2$ .

### **Color Characteristics Measurements**

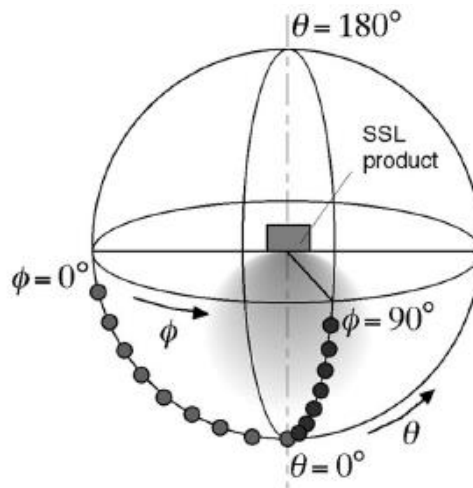
The color characteristics of SSL products include chromaticity coordinates, correlated color temperature, and color rendering index. These characteristics of SSL products may be spatially non-uniform, and thus, in order that they can be specified accurately, the color quantities shall be measured as values that are spatially average, weighted to intensity, over the angular range where light is intentionally emitted from the SSL product. The color characteristics measurements are using gonio-spectroradiometer.

### **Color Spatial Uniformity**

The characteristics of SSL products may be spatially non-uniform, the chromaticity coordinate shall be measured at two vertical planes ( $C=0^\circ/180^\circ$  and  $C=90^\circ/270^\circ$ ) and at  $10^\circ$  or less intervals for vertical angle until the light output dropped to below 10% of the peak intensity. The averaged weighted chromaticity coordinate

was calculated from these points. The data was then analyzed to check for delta color differences of the  $u'$ ,  $v'$  chromaticity coordinates. The spatial non-uniformity of chromaticity,  $\Delta u'v'$ , is determined as the maximum deviation (distance on the CIE ( $u'$ ,  $v'$ ) diagram) among all measured points from the spatially averaged chromaticity coordinate.

The geometry for the chromaticity measurement using gonio-spectroradiometer is shown as following.



\*\*\* End of Report \*\*\*

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.