

## LM-79-08 TEST REPORT

for

### GREEN CREATIVE LTD

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

### LED Lamp

Model: 11A19DIM/940

### Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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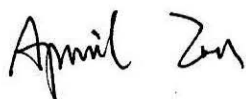
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Report No.: HZ19050037i

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

Review by:



Engineer: April Zou  
May 31, 2019

Approved by:



Manager: Jim Zhang  
May 31, 2019

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: 11A19DIM/940

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
110.2	1242.0	11.27	0.9790
CCT (K)	CRI	Stabilization Time (Light & Power)	
3999	93.0	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>	: May 23, 2019
<b>Date of Test</b>	: May 28, 2019
<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 ANSI/IES TM-30-18 IES Method for Evaluating Light Source Color Rendition

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## SAMPLE PHOTO



Figure 1- Overview of the sample

### Equipment Under Test(EUT)

<b>Name</b>	: LED Lamp
<b>Model</b>	: 11A19DIM/940
<b>Electrical Ratings</b>	: 120V, 60Hz, 11W
<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 25.0 °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 65 minutes.

### Sphere-Spectroradiometer Method

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.096
Power Factor	0.9790
Test Power (W)	11.27
THD A%	11.07
Luminous Efficacy (lm/W)	110.2
Total Luminous Flux (lm)	1242.0
Color Rendering Index (CRI)	93.0
R9	64.4
Correlated Color Temperature (CCT)(K)	3999
Chromaticity Chroma x	0.3793
Chromaticity Chroma y	0.3727
Chromaticity Chroma u	0.2260
Chromaticity Chroma v	0.3331
Duv	0.0016
Chromaticity Chroma u'	0.2260
Chromaticity Chroma v'	0.4996

Special Color Rendering Indices	
R1	94.6
R2	99.3
R3	96.9
R4	90.6
R5	93.1
R6	95.2
R7	90.6
R8	83.6
R9	64.4
R10	96.9
R11	91.6
R12	74.3
R13	96.8
R14	99.2

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 24.8 °C.

The photometric distance is 2.47 m.

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)	0.096
Power Factor	0.9802
Power (W)	11.34
Luminous Efficacy (lm/W)	111.5
Total Luminous Flux (lm)	1264.6
Beam Angle ( ° )	222.5 (0°-180°) / 221.8 (90°-270°)
Center Beam Candle Power (cd)	156
Maximum Beam Candle Power (cd)	157.8 (At: C=100.0, Gamma=26.5)
Spacing Criteria	1.52 (0°-180°) / 1.47 (90°-270°)
Zonal Lumens in the 0 °-60 °Zone	37.19%
Zonal Lumens in the 60 °-90 °Zone	30.76%
Zonal Lumens in the 90 °-120 °Zone	21.65%
Zonal Lumens in the 120 °-180 °Zone	10.39%

Table 3: Test data per Goniophotometer Method

## Spectral Power Distribution - Sphere Spectroradiometer Method

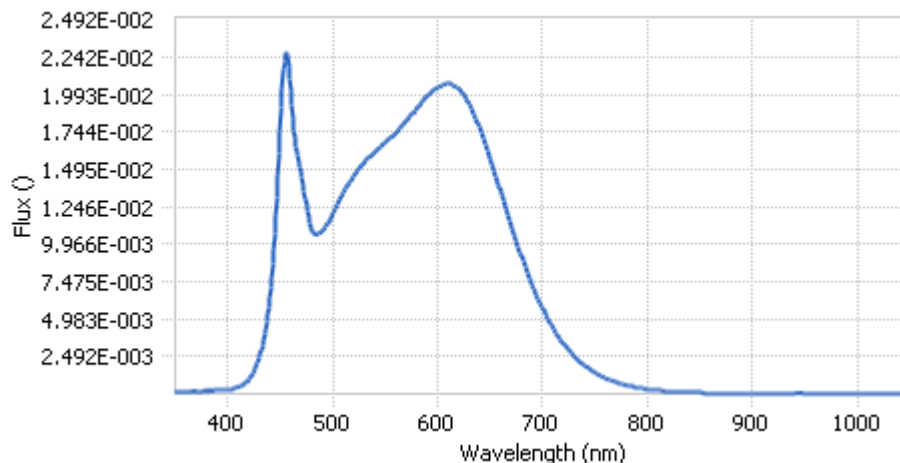


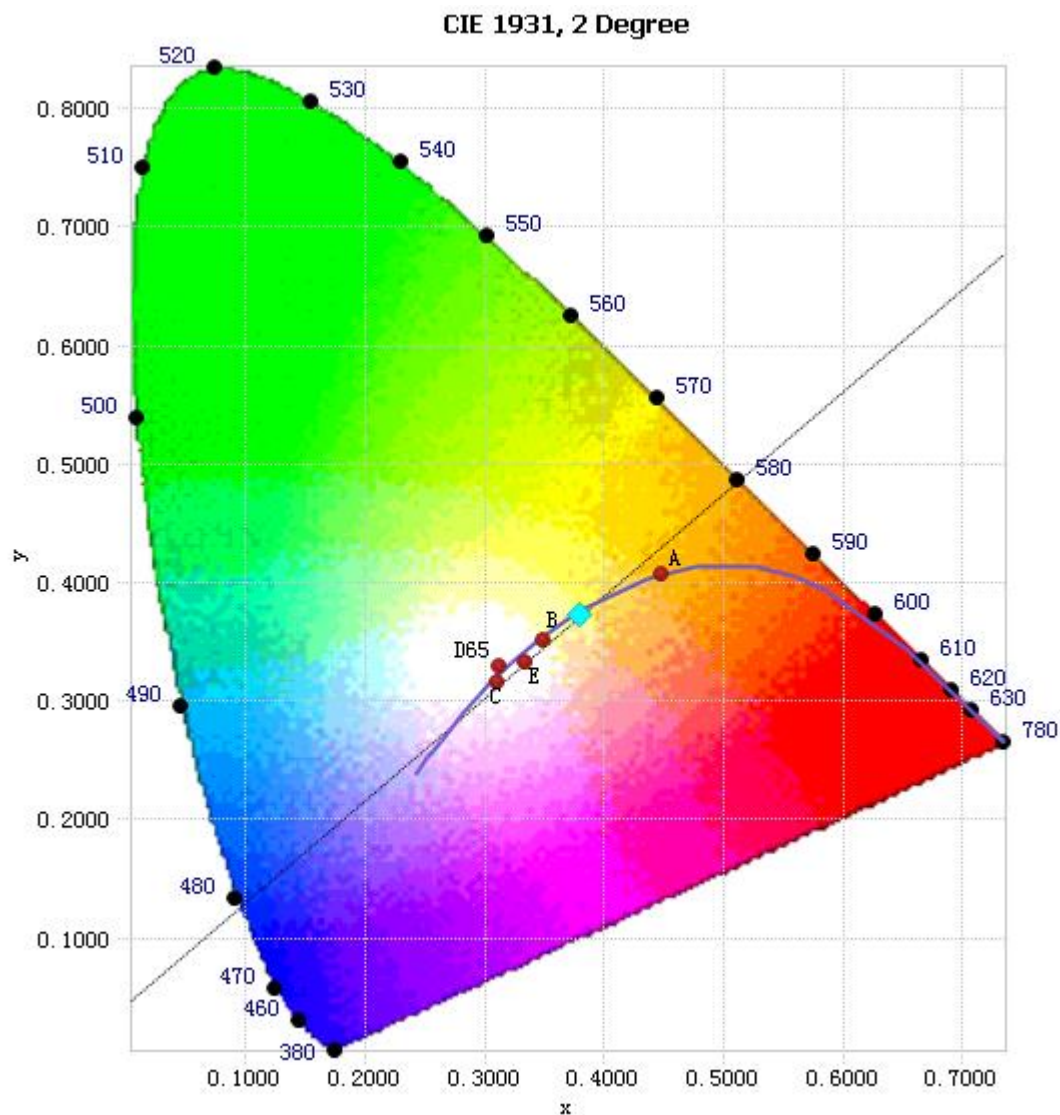
Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	2.18E-04	485	1.06E-02	590	1.98E-02	695	6.43E-03
385	2.09E-04	490	1.08E-02	595	2.01E-02	700	5.70E-03
390	2.40E-04	495	1.13E-02	600	2.04E-02	705	4.99E-03
395	2.54E-04	500	1.20E-02	605	2.06E-02	710	4.38E-03
400	2.89E-04	505	1.27E-02	610	2.06E-02	715	3.84E-03
405	3.44E-04	510	1.34E-02	615	2.05E-02	720	3.35E-03
410	4.50E-04	515	1.41E-02	620	2.03E-02	725	2.92E-03
415	6.43E-04	520	1.45E-02	625	1.99E-02	730	2.53E-03
420	9.61E-04	525	1.50E-02	630	1.93E-02	735	2.20E-03
425	1.51E-03	530	1.54E-02	635	1.86E-02	740	1.89E-03
430	2.43E-03	535	1.57E-02	640	1.77E-02	745	1.63E-03
435	3.96E-03	540	1.61E-02	645	1.67E-02	750	1.41E-03
440	6.42E-03	545	1.64E-02	650	1.57E-02	755	1.22E-03
445	1.06E-02	550	1.67E-02	655	1.46E-02	760	1.06E-03
450	1.74E-02	555	1.70E-02	660	1.35E-02	765	9.05E-04
455	2.27E-02	560	1.73E-02	665	1.23E-02	770	7.79E-04
460	2.01E-02	565	1.77E-02	670	1.12E-02	775	6.70E-04
465	1.64E-02	570	1.81E-02	675	1.02E-02	780	5.76E-04
470	1.47E-02	575	1.86E-02	680	9.15E-03		
475	1.25E-02	580	1.90E-02	685	8.17E-03		
480	1.09E-02	585	1.94E-02	690	7.26E-03		

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



# Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.3793, 0.3727)

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

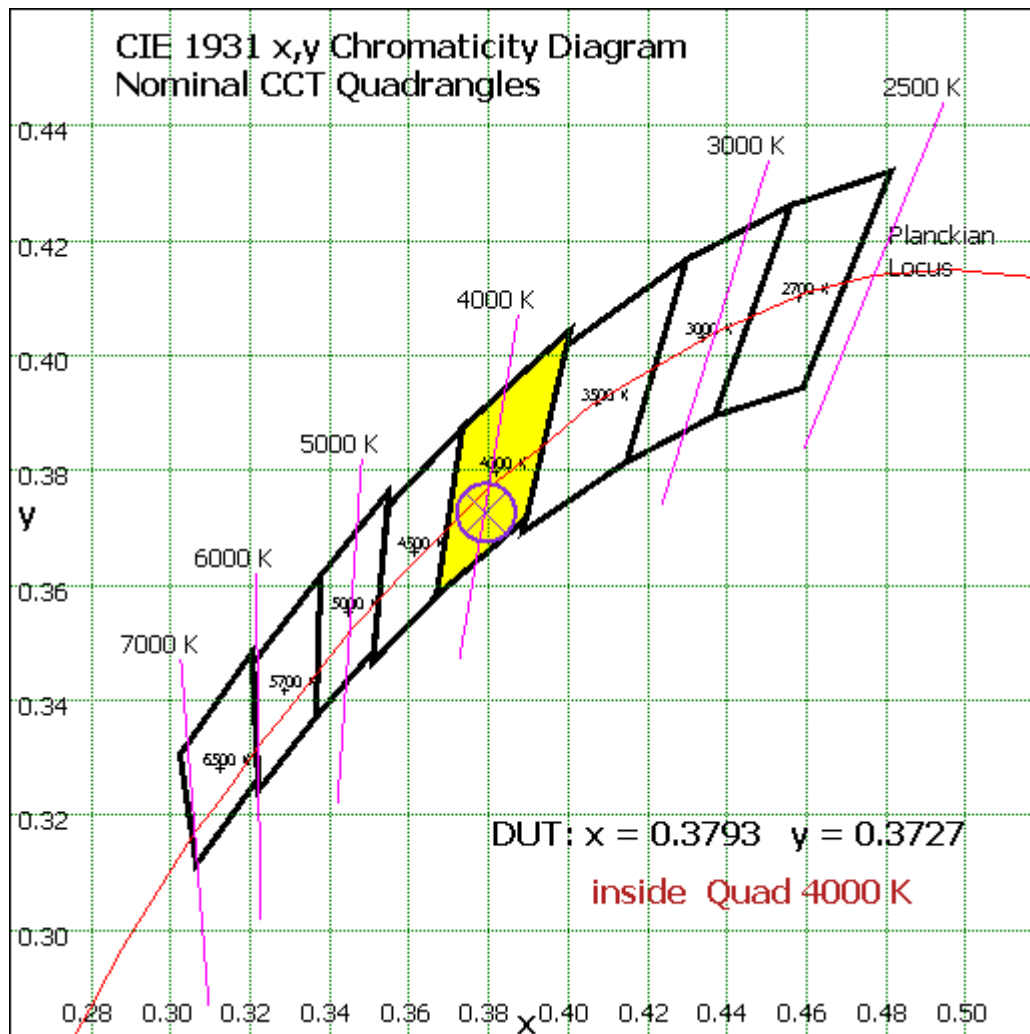
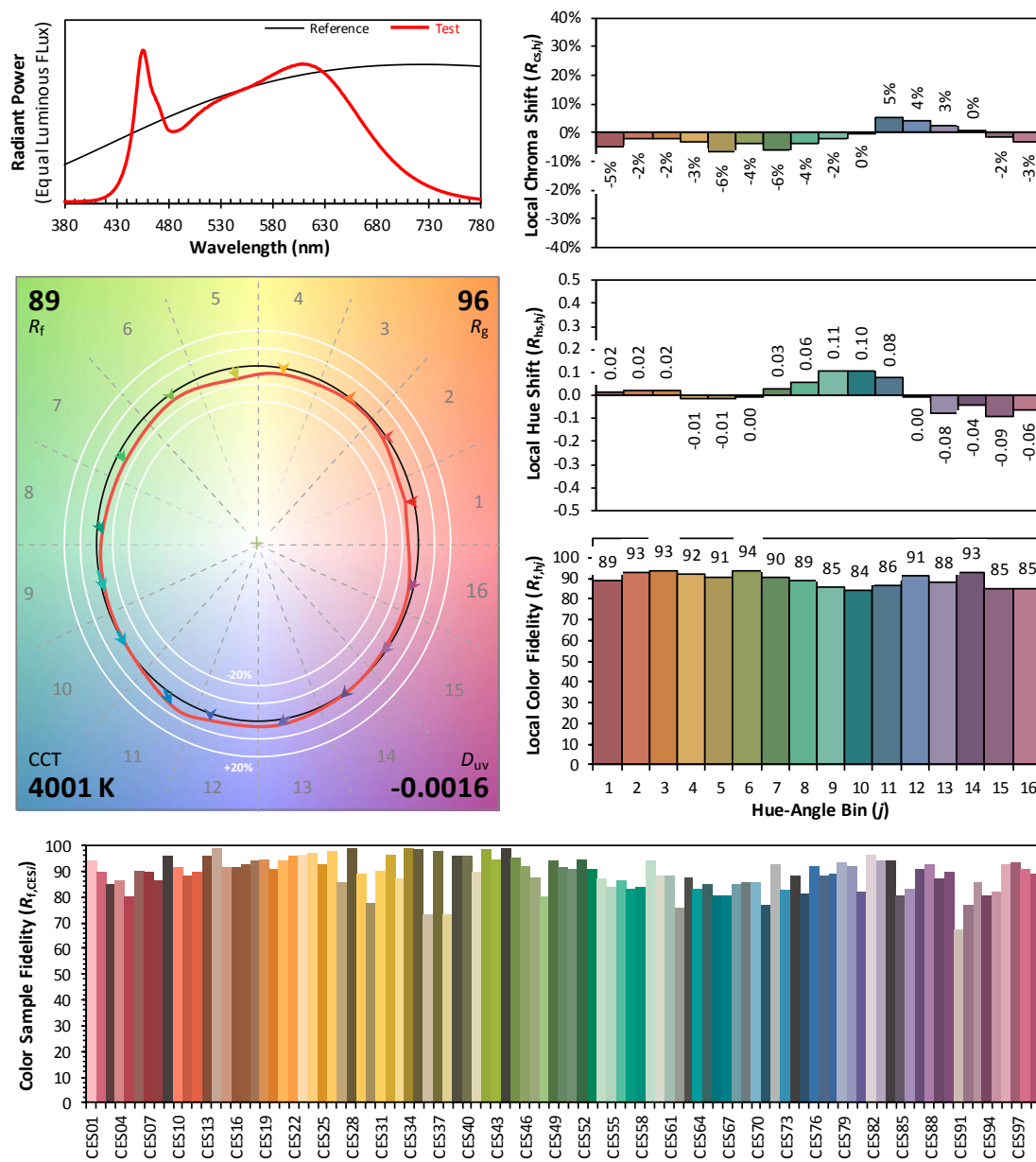


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

## Color Rendition Report – Sphere Spectroradiometer Method



**Notes:** This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$	0.3793
$y$	0.3727
$u'$	0.2260
$v'$	0.4996

#### Chart 4: Full Report Created with the IES TM-30 Calculator

Note: The values in this diagram might be a little different from the values in Table 2 due to rounding.

### Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	14.872	1.18%
10- 20	44.072	3.49%
20- 30	71.582	5.66%
30- 40	95.991	7.59%
40- 50	115.458	9.13%
50- 60	128.37	10.15%
60- 70	133.854	10.58%
70- 80	131.891	10.43%
80- 90	123.228	9.74%
90-100	109.251	8.64%
100-110	91.776	7.26%
110-120	72.795	5.76%
120-130	54.142	4.28%
130-140	37.325	2.95%
140-150	22.925	1.81%
150-160	11.921	0.94%
160-170	4.764	0.38%
170-180	0.347	0.03%
Total	1264.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0-130	1187.282	93.89%
130-180	77.282	6.11%
0-180	1264.6	100%

Table 5: Zonal Lumen

## Illuminance Plots- Goniophotometer Method

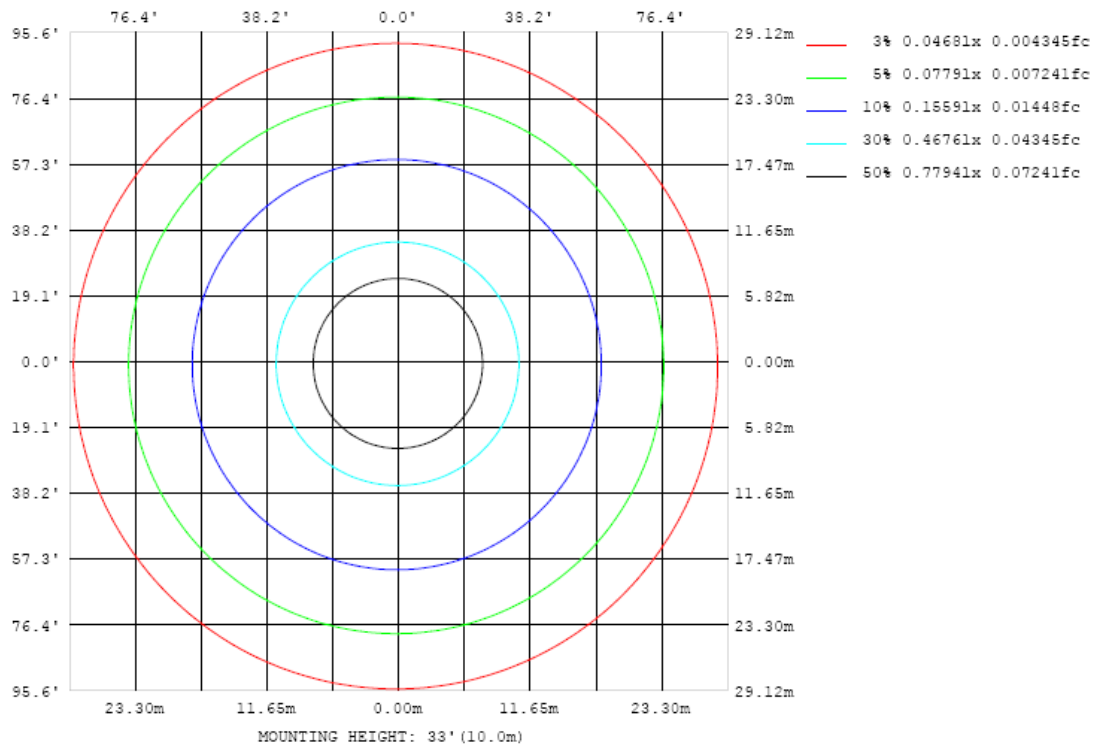


Chart 5: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots- Goniophotometer Method

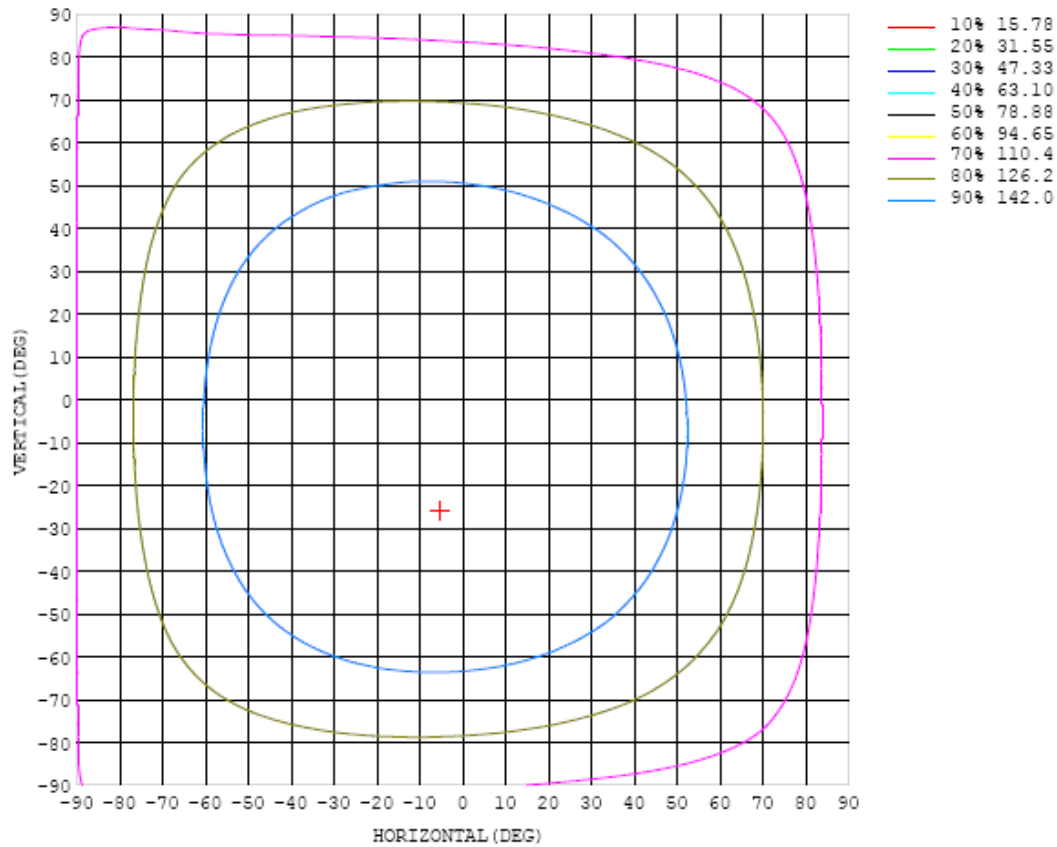


Chart 6: Isocandela Plot

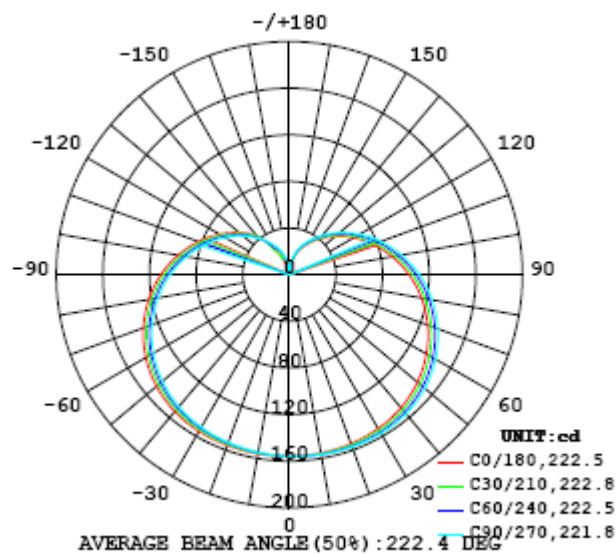


Chart 7: Polar Candela Distribution

## 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	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
5	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
10	155	155	156	156	156	156	156	157	157	157	157	157	157	157	157	157	156	156	156
15	155	155	155	156	156	156	157	157	157	157	157	157	157	157	157	157	157	156	156
20	154	155	155	155	156	156	157	157	157	157	158	158	158	158	157	157	157	156	156
25	153	154	154	155	155	156	157	157	157	158	158	158	158	158	157	157	157	156	156
30	152	153	154	154	155	156	156	157	157	157	158	158	158	157	157	157	156	156	155
35	151	152	152	153	154	155	155	156	156	157	157	157	157	157	157	156	156	155	154
40	149	150	150	151	152	153	154	155	155	156	156	156	156	156	155	155	155	154	153
45	146	147	148	149	150	151	152	153	154	154	154	155	155	155	154	154	153	152	151
50	143	144	145	146	147	148	149	150	151	152	152	152	152	152	152	151	151	150	149
55	140	141	142	143	144	145	146	147	148	149	149	149	149	149	149	148	148	147	146
60	136	137	138	139	140	141	142	143	144	145	145	146	146	146	145	145	144	143	142
65	131	132	133	134	136	137	138	139	140	141	141	141	141	141	141	140	140	139	138
70	126	127	128	129	131	132	133	134	135	136	136	137	137	136	136	136	135	134	133
75	121	122	123	124	125	126	127	129	130	130	131	131	131	131	131	130	130	129	128
80	115	116	117	118	119	120	122	123	124	124	125	125	125	125	125	125	124	123	123
85	109	110	111	112	113	114	115	116	117	118	119	119	119	119	119	118	118	117	117
90	103	104	105	106	107	108	109	110	111	112	112	113	113	113	112	112	112	111	110
95	96.2	97.1	98.2	99.1	100	101	102	103	104	105	105	106	106	106	106	105	105	104	104
100	89.6	90.5	91.5	92.3	93.3	94.3	95.3	96.3	97.2	97.8	98.4	98.7	98.9	98.9	98.7	98.4	98.0	97.5	97.0
105	83.0	83.8	84.7	85.6	86.5	87.5	88.4	89.3	90.1	90.7	91.3	91.6	91.8	91.8	91.7	91.4	91.1	90.6	90.1
110	76.5	77.2	78.0	78.8	79.7	80.6	81.4	82.3	83.1	83.6	84.2	84.5	84.7	84.7	84.6	84.4	84.1	83.7	83.2
115	70.0	70.6	71.4	72.1	72.9	73.8	74.6	75.4	76.1	76.6	77.2	77.4	77.7	77.7	77.6	77.4	77.2	76.7	76.3
120	63.6	64.2	64.9	65.5	66.3	67.0	67.8	68.5	69.2	69.7	70.2	70.5	70.7	70.7	70.7	70.5	70.3	69.9	69.5
125	57.4	57.9	58.5	59.1	59.8	60.5	61.1	61.8	62.4	62.9	63.4	63.7	63.9	63.9	63.9	63.8	63.6	63.2	62.9
130	51.3	51.8	52.4	52.9	53.6	54.2	54.8	55.4	55.9	56.4	56.8	57.1	57.3	57.3	57.3	57.3	57.1	56.8	56.5
135	45.6	46.0	46.5	47.0	47.6	48.1	48.7	49.2	49.7	50.1	50.5	50.8	51.0	50.9	51.0	51.0	50.9	50.6	50.3
140	40.1	40.5	40.9	41.4	41.9	42.4	42.9	43.4	43.8	44.2	44.6	44.8	45.0	44.9	45.0	45.0	44.9	44.7	43.4
145	35.0	35.3	35.7	36.2	36.6	37.0	37.5	37.9	38.3	38.6	38.9	39.2	39.3	39.3	39.3	39.4	39.2	39.0	35.0
150	30.3	30.6	30.9	31.3	31.7	32.1	32.4	32.8	33.2	33.5	33.8	34.0	34.1	34.2	34.0	34.1	32.9	32.3	24.4
155	25.9	26.1	26.4	26.7	27.0	27.4	27.7	28.1	28.3	28.6	28.9	29.1	29.3	29.3	29.2	29.2	27.1	23.0	21.1
160	21.2	21.4	21.7	22.0	22.1	22.5	22.9	23.2	23.3	23.7	24.1	24.3	24.4	24.5	24.5	24.4	24.1	18.4	10.7
165	15.8	16.1	16.3	16.6	16.4	16.9	17.5	17.8	17.7	18.4	18.7	18.8	19.0	19.1	19.3	19.3	18.5	16.7	14.7
170	8.18	8.43	8.49	8.57	9.38	10.1	10.5	10.9	11.0	11.7	12.1	12.3	12.4	12.5	12.4	11.5	10.6	9.27	
175	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.22	0.23	0.25	0.26	0.27	0.27	0.27	0.28	0.30	0.33	0.27	0.25
180	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

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	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156		
5	156	156	156	156	156	155	155	155	155	155	155	155	155	155	155	155	156		
10	156	156	156	155	155	155	155	155	155	155	155	155	155	155	155	155	155		
15	156	156	155	155	155	155	154	154	154	154	154	154	154	154	154	154	155		
20	156	155	155	154	154	154	154	153	153	153	153	153	153	153	153	153	154		
25	155	155	154	154	154	153	153	153	152	152	152	152	152	152	152	152	153		
30	155	154	154	153	153	152	152	151	151	151	151	151	151	151	151	151	152		
35	154	153	153	152	151	151	150	150	150	149	149	149	149	149	149	149	150		
40	153	152	151	150	150	149	149	148	148	147	147	147	147	147	147	147	148		
45	151	150	149	148	148	147	146	146	145	145	145	144	144	144	144	145	146		
50	148	147	146	146	145	144	143	143	142	142	141	141	141	141	141	141	142		
55	145	144	143	142	142	141	140	139	139	138	138	138	137	138	138	138	139		
60	142	141	140	139	138	137	136	135	135	134	134	133	133	133	133	134	135		
65	137	136	135	134	133	133	132	131	130	130	129	129	129	129	129	129	130		
70	133	132	130	129	129	128	127	126	125	125	124	124	124	124	124	124	125		
75	127	126	125	124	123	122	122	121	120	120	119	118	118	118	118	119	120		
80	122	121	120	119	118	117	116	115	114	114	113	113	113	113	113	113	114		
85	116	115	114	113	112	111	110	109	109	108	107	107	107	107	107	107	108		
90	110	109	108	106	106	105	104	103	102	102	101	101	101	101	101	101	102		
95	103	102	101	100	99.2	98.3	97.5	96.8	96.1	95.5	94.9	94.5	94.2	94.2	94.4	94.9	95.4		
100	96.4	95.5	94.4	93.4	92.6	91.8	91.0	90.3	89.6	89.1	88.5	88.1	87.8	87.8	88.0	88.4	89.0		
105	89.5	88.7	87.6	86.7	86.0	85.2	84.5	83.8	83.1	82.6	82.0	81.6	81.4	81.4	81.6	81.9	82.4		
110	82.6	81.8	80.9	80.1	79.4	78.6	77.9	77.2	76.6	76.1	75.6	75.2	74.9	75.0	75.1	75.5	75.9		
115	75.8	75.1	74.2	73.4	72.8	72.0	71.4	70.7	70.1	69.6	69.2	68.8	68.6	68.7	68.8	69.1	69.5		
120	69.1	68.4	67.6	66.9	66.3	65.6	65.0	64.4	63.8	63.3	62.9	62.6	62.4	62.4	62.5	62.7	63.1		
125	62.5	61.9	61.2	60.5	60.0	59.3	58.7	58.2	57.6	57.2	56.8	56.5	56.3	56.3	56.4	56.6	57.0		
130	56.1	55.6	55.0	54.4	53.9	53.2	52.7	52.2	51.7	51.3	50.9	50.6	50.4	50.4	50.5	50.7	51.0		
135	49.8	49.6	49.0	48.5	48.0	47.4	46.9	46.4	46.0	45.6	45.3	45.0	44.8	44.8	44.8	45.0	45.4		
140	43.4	42.8	42.2	41.7	41.5	41.2	41.4	41.0	40.6	40.2	39.9	39.7	39.5	39.5	39.5	39.7	40.0		
145	35.5	33.0	33.7	35.4	34.7	34.5	36.3	35.9	35.5	35.2	34.9	34.7	34.5	34.4	34.5	34.6	34.9		
150	15.3	15.0	23.2	26.7	27.5	27.9	31.5	31.2	30.8	30.6	30.3	30.1	29.9	29.8	29.8	30.0	30.2		
155	21.6	16.3	17.1	19.6	20.7	24.1	26.7	26.8	26.5	26.2	26.0	25.8	25.6	25.5	25.4	25.6	25.8		
160	9.21	11.6	15.7	17.3	19.2	21.0	21.3	21.9	22.0	21.8	21.3	21.3	21.2	20.9	20.7	21.0	21.2		
165	13.9	14.5	15.3	15.7	15.8	15.9	15.9	16.2	16.8	16.6	15.9	15.9	15.8	15.5	15.0	15.6	15.7		
170	9.20	8.93	9.71	9.20	9.09	9.07	9.07	9.63	9.58	8.89	8.61	8.69	8.48	8.35	8.16	7.60	7.80		
175	0.28	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.22	0.22	0.22	0.23	0.22		
180	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20		

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.

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 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 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 \*\*\*

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