



## LM-79-08 Test Report

for

### GREEN CREATIVE LTD

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

### Downlight

**Model: 97991 12DL6DIM/927**

### Laboratory: Leading Testing Laboratories

**NVLAP CODE: 200960-0**

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Report No.: HZ17080054d

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

Review by:

Engineer: April Zou  
Sep. 01, 2017

Approved by:



Manager: Jim Zhang  
Sep. 01, 2017

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: 97991 12DL6DIM/927

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
85.0	1008.0	11.86	0.9758
CCT (K)	CRI	Stabilization Time (Light & Power)	
2713	92.8	60	

Table 1: Executive Data Summary

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

### Test specifications:

**Date of Receipt** : Aug. 29, 2017

**Date of Test** : Aug. 30, 2017

**Test item** : Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters

**Reference Standard** : IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

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## Sample Photos



Figure 1- Overview of the sample

### Equipment Under Test (EUT)

<b>Name</b>	: Downlight
<b>Model</b>	: 97991 12DL6DIM/927
<b>Electrical Ratings</b>	: 120V, 60Hz, 12W
<b>Product Description</b>	: 2700K
<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 light down. 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
Voltage frequency (Hz)	60
Test Current (A)	0.101
Power Factor	0.9758
Test Power (W)	11.86
THD A%	17.6
Luminous Efficacy (lm/W)	85.0
Total Luminous Flux (lm)	1008.0
Color Rendering Index (CRI)	92.8
R9	56.4
Correlated Color Temperature (CCT)(K)	2713
Chromaticity Chroma x	0.4590
Chromaticity Chroma y	0.4109
Chromaticity Chroma u	0.2618
Chromaticity Chroma v	0.3516
Duv	0.0001
Chromaticity Chroma u'	0.2618
Chromaticity Chroma v'	0.5273

Special Color Rendering Indices	
R1	93.1
R2	97.7
R3	98.2
R4	92.6
R5	93.3
R6	97.5
R7	90.3
R8	79.4
R9	56.4
R10	94
R11	94.3
R12	86.4
R13	94.5
R14	99.9
Rf	91
Rg	98

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 24.6°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)	0.103
Power Factor	0.9752
Test Power (W)	12.04
Luminous Efficacy (lm/W)	85.1
Total Luminous Flux (lm)	1024.4
Beam Angle (°)	99.3
Center Beam Candle Power (cd)	433
Spacing Criteria	1.20 (0°-180°)/ 1.21 (90°-270°)
Zonal Lumens in the 0°-60°Zone	85.74%
Zonal Lumens in the 60°-90°Zone	14.16%
Zonal Lumens in the 90°-120°Zone	0.02%
Zonal Lumens in the 120°-180°Zone	0.08%

Table 3: Test data per Goniophotometer Method

## Spectral Power Distribution - Sphere Spectroradiometer Method

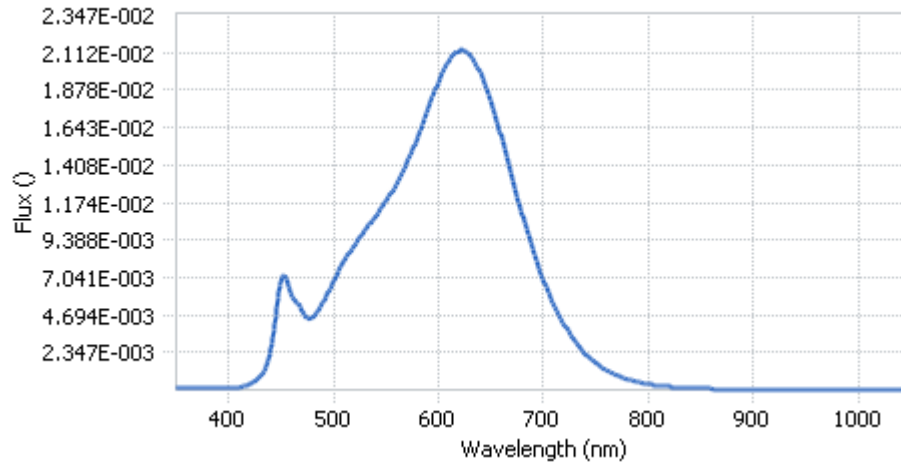
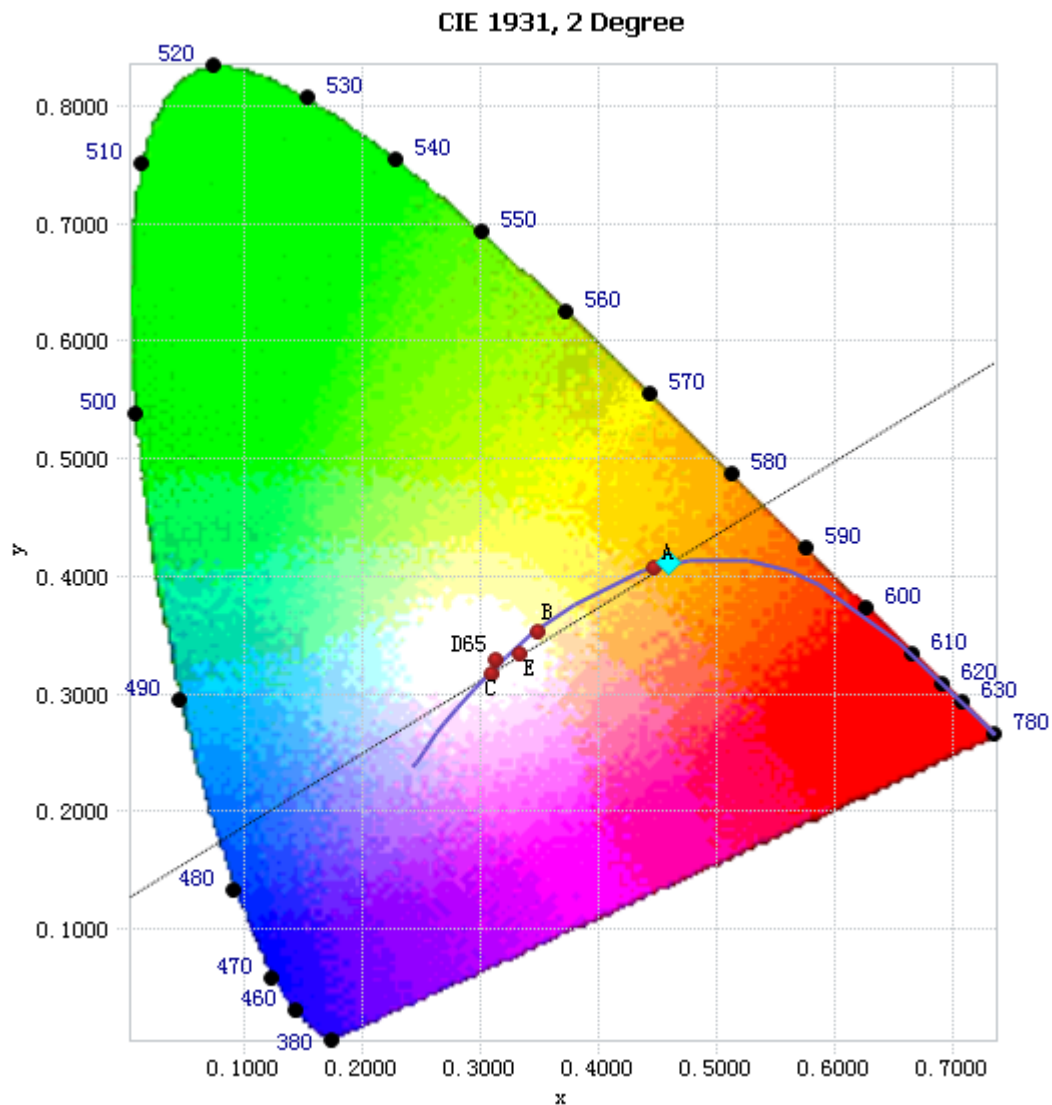


Chart 1: Spectral Power Distribution

Spectral Distribution over Visible Wavelength							
WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)	WL(nm)	Radiant(Watts)
380	1.30E-04	485	4.94E-03	590	1.76E-02	695	7.76E-03
385	1.17E-04	490	5.46E-03	595	1.85E-02	700	6.89E-03
390	1.23E-04	495	6.13E-03	600	1.93E-02	705	6.03E-03
395	1.27E-04	500	6.82E-03	605	2.00E-02	710	5.26E-03
400	1.24E-04	505	7.48E-03	610	2.06E-02	715	4.62E-03
405	1.51E-04	510	8.05E-03	615	2.11E-02	720	4.04E-03
410	1.81E-04	515	8.61E-03	620	2.12E-02	725	3.50E-03
415	2.45E-04	520	9.10E-03	625	2.12E-02	730	3.04E-03
420	3.50E-04	525	9.55E-03	630	2.10E-02	735	2.62E-03
425	5.41E-04	530	1.00E-02	635	2.05E-02	740	2.25E-03
430	8.55E-04	535	1.05E-02	640	1.99E-02	745	1.93E-03
435	1.42E-03	540	1.09E-02	645	1.90E-02	750	1.67E-03
440	2.58E-03	545	1.14E-02	650	1.80E-02	755	1.44E-03
445	4.67E-03	550	1.18E-02	655	1.69E-02	760	1.23E-03
450	6.83E-03	555	1.23E-02	660	1.58E-02	765	1.05E-03
455	6.87E-03	560	1.29E-02	665	1.46E-02	770	9.08E-04
460	5.92E-03	565	1.35E-02	670	1.33E-02	775	7.76E-04
465	5.45E-03	570	1.43E-02	675	1.21E-02	780	6.57E-04
470	4.95E-03	575	1.49E-02	680	1.10E-02		
475	4.46E-03	580	1.59E-02	685	9.84E-03		
480	4.57E-03	585	1.67E-02	690	8.75E-03		

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

## Chromaticity Diagram - Sphere Spectroradiometer Method



Tristimulus values(x, y): (0.4590, 0.4109)

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

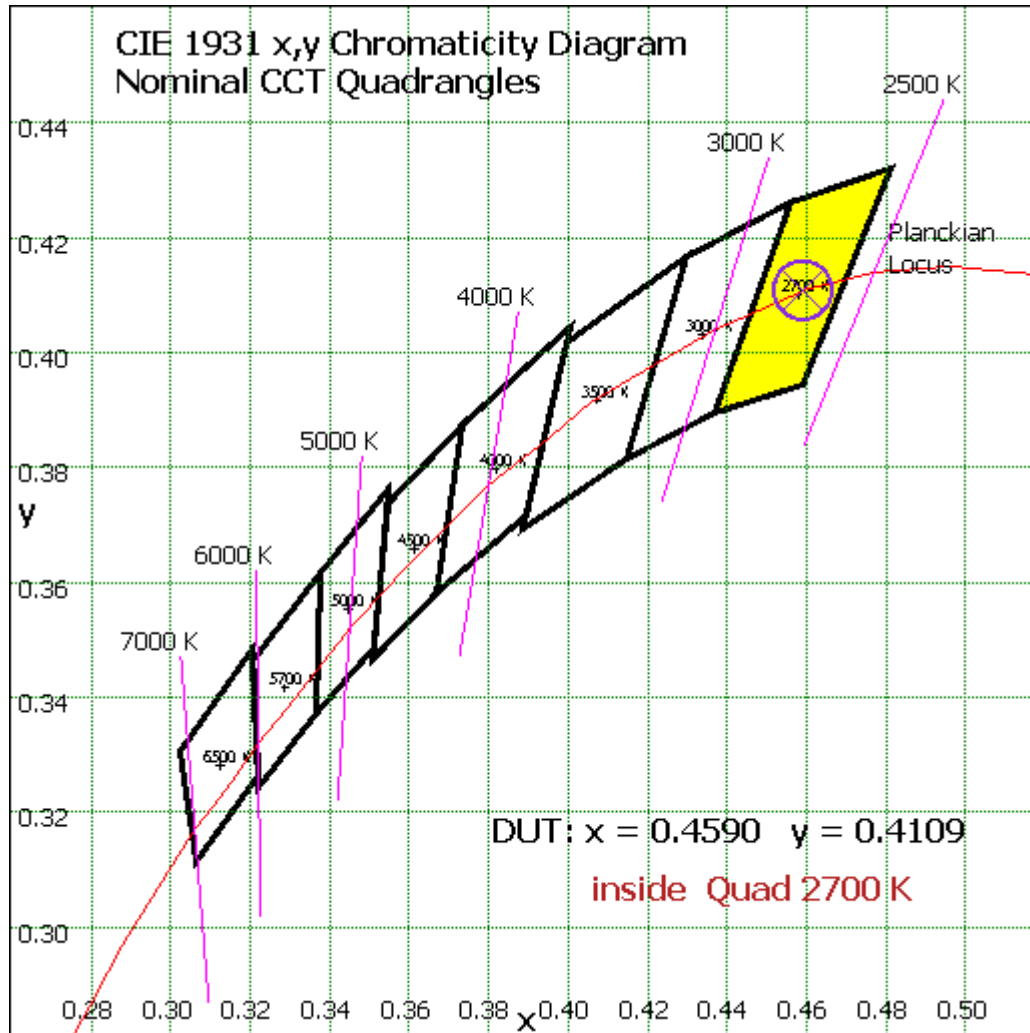


Chart 3: Plot of Lamp x/y coordinates on CIE 1931 Chromaticity Diagram

### Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	40.895	3.99%
10- 20	115.733	11.30%
20- 30	171.4	16.73%
30- 40	199.492	19.47%
40- 50	194.354	18.97%
50- 60	156.442	15.27%
60- 70	98.836	9.65%
70- 80	39.218	3.83%
80- 90	6.986	0.68%
90-100	0.022	0.00%
100-110	0.055	0.01%
110-120	0.093	0.01%
120-130	0.135	0.01%
130-140	0.183	0.02%
140-150	0.202	0.02%
150-160	0.171	0.02%
160-170	0.113	0.01%
170-180	0.04	0.00%
Total	1024.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	878.316	85.74%
60- 90	145.04	14.16%
0-90	1023.356	99.90%
90- 180	1.014	0.10%
0- 180	1024.4	100%

Table 5: Zonal Lumen Data

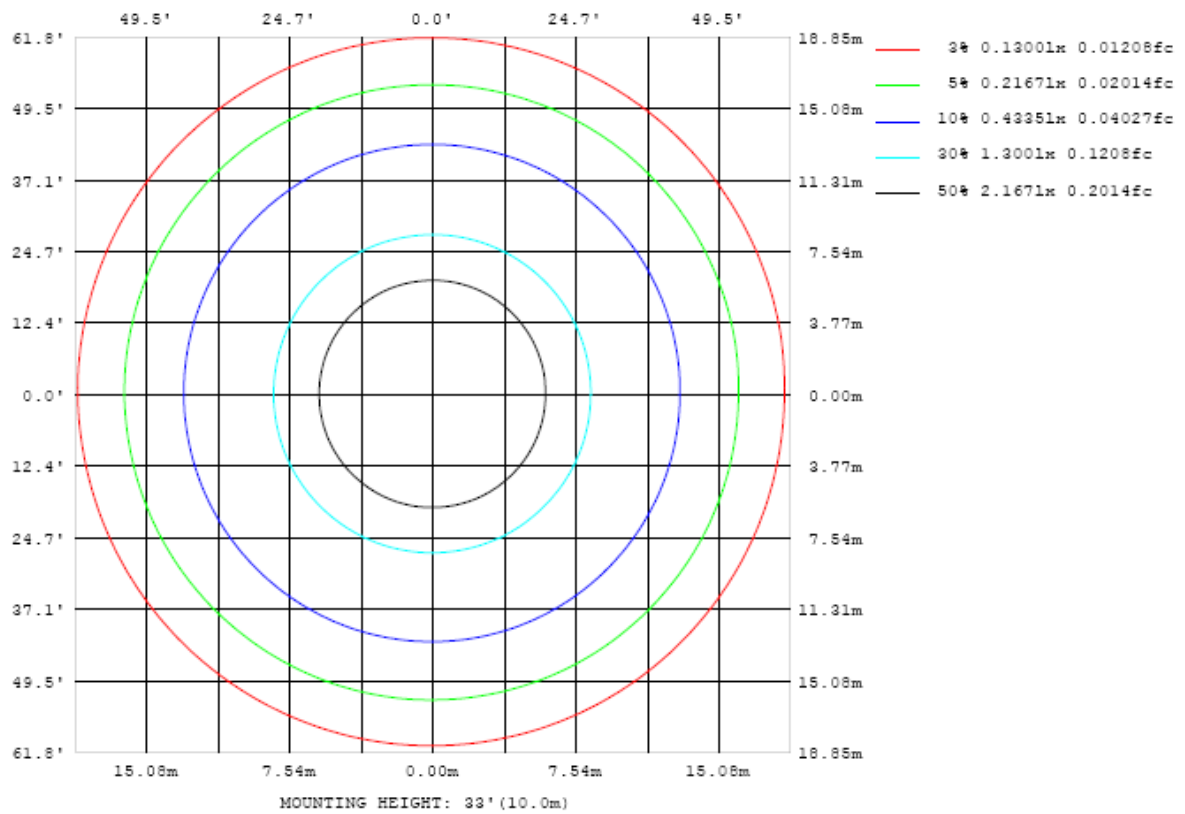


Chart 4: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots- Goniophotometer Method

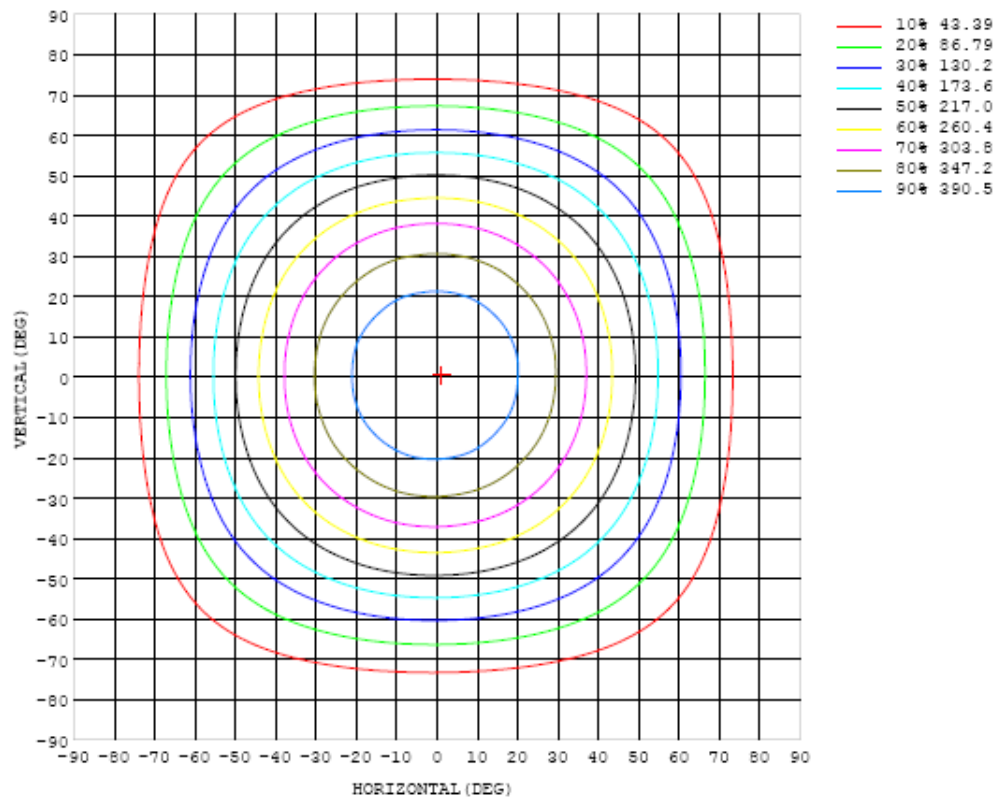


Chart 5: Isocandela Plot

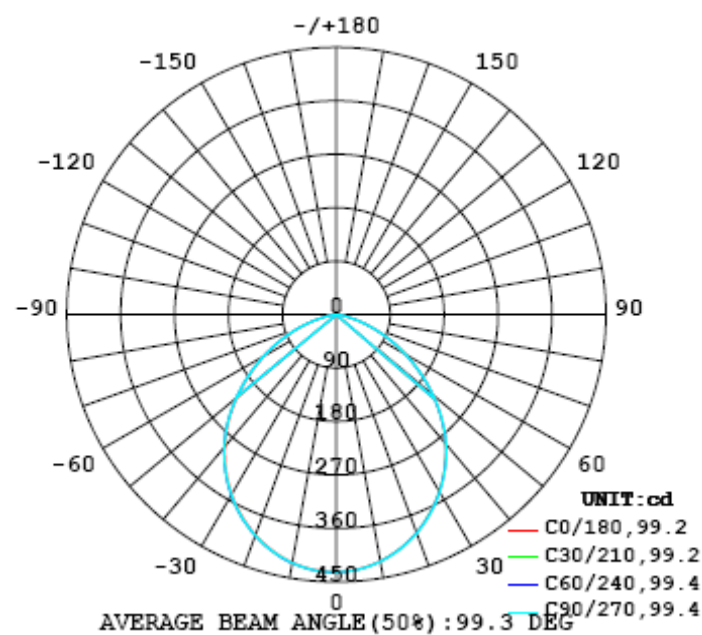


Chart 6: Polar Candela Distribution

## 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	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433
5	430	430	430	430	430	430	430	431	430	431	431	431	431	431	431	432	432	431	431
10	421	422	422	422	421	421	422	422	422	422	423	423	423	423	424	424	424	424	423
15	408	408	409	409	408	408	409	409	409	409	410	410	410	410	411	412	412	412	411
20	391	391	391	391	390	391	391	392	391	392	392	393	393	394	394	394	395	395	395
25	369	369	369	369	369	369	369	370	370	370	371	371	372	372	373	373	374	374	374
30	344	344	344	344	343	344	344	344	344	345	346	346	347	347	348	348	349	349	349
35	316	315	315	315	315	315	316	316	316	317	317	318	318	318	319	320	320	321	321
40	284	284	284	284	283	284	284	284	285	285	286	286	287	287	288	289	289	290	290
45	249	248	248	248	248	248	248	249	249	249	250	251	251	251	252	253	254	254	255
50	211	210	210	210	209	209	210	210	210	211	211	212	212	213	214	214	215	216	216
55	172	171	171	171	170	170	171	171	171	171	172	172	173	173	174	175	176	176	177
60	134	133	133	132	132	132	132	132	132	133	133	134	134	135	135	136	137	138	139
65	97.0	96.5	96.1	95.8	95.5	95.5	95.5	95.7	95.8	96.2	96.6	96.9	97.3	98.0	98.7	99.4	100	101	102
70	63.4	63.0	62.8	62.5	62.3	62.3	62.4	62.4	62.6	62.9	63.3	64.0	64.1	64.3	65.0	65.7	66.1	66.6	67.4
75	34.1	33.9	33.7	33.5	33.4	33.5	33.5	33.7	33.9	34.1	34.4	34.7	35.1	35.5	35.9	36.3	36.6	36.9	37.5
80	14.0	14.0	13.9	13.9	13.9	13.9	14.0	14.1	14.2	14.4	14.5	14.7	14.8	15.0	15.2	15.3	15.5	15.6	16.3
85	5.67	5.65	5.63	5.65	5.65	5.69	5.75	5.84	5.89	6.02	6.12	6.21	6.33	6.41	6.48	6.50	6.56	6.62	6.68
90	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
100	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
105	0.04	0.04	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06
110	0.06	0.06	0.06	0.06	0.06	0.07	0.06	0.06	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.08
115	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10
120	0.11	0.11	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12
125	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15
130	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.20
135	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.21	0.21	0.26
140	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.32
145	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.37
150	0.29	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.29	0.30	0.30	0.29	0.29	0.40
155	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.42
160	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.44
165	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.44
170	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.38	0.39	0.39	0.39	0.38	0.38	0.39	0.39	0.38	0.38	0.38	0.43
175	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
180	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43

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	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433	433		
5	431	432	432	431	431	432	432	431	432	432	432	431	431	431	431	431	431		
10	424	424	425	424	424	424	425	424	424	424	424	424	423	423	423	423	422		
15	412	412	413	412	412	412	413	412	412	412	412	411	411	411	411	410	410		
20	395	396	396	396	396	396	396	396	396	396	395	395	394	394	393	393	392		
25	374	375	375	375	375	376	376	375	375	375	374	374	373	373	372	371	370		
30	350	350	351	351	351	351	351	351	350	351	350	350	349	348	347	346	346		
35	322	322	323	323	324	323	323	322	323	322	322	322	321	320	319	318	317		
40	290	291	292	292	292	292	292	292	292	292	291	290	289	289	288	287	286		
45	255	256	257	257	256	257	257	257	257	257	256	255	254	253	252	251	250		
50	217	218	218	218	218	219	219	219	218	218	218	217	216	215	214	213	212		
55	178	179	179	179	180	180	180	179	179	179	179	178	177	176	175	174	173		
60	140	140	141	141	141	141	141	141	141	141	140	140	139	138	137	136	135		
65	102	103	103	104	104	104	104	103	104	103	103	102	101	101	99.9	99.2	98.5		
70	67.8	68.2	68.4	68.6	68.7	68.7	68.8	68.4	68.3	67.8	67.4	67.0	66.4	66.0	65.5	64.5	64.3		
75	37.6	38.0	38.1	38.1	38.0	38.1	37.9	37.8	37.5	37.2	36.9	36.6	36.2	35.9	35.4	35.1	34.7		
80	16.4	16.5	16.5	16.5	16.5	16.4	16.4	16.2	16.1	15.9	15.7	15.6	15.4	15.2	15.0	14.9	14.8		
85	6.75	6.76	6.75	6.71	6.68	6.64	6.56	6.51	6.41	6.36	6.29	6.18	6.10	5.98	5.92	5.84	5.75		
90	0.03	0.04	0.03	0.03	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
100	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
105	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06		
110	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08		
115	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10		
120	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13		
125	0.16	0.16	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16		
130	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.21	0.20	0.21	0.21	0.21	0.21	0.21	0.21	0.21		
135	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.27	0.27		
140	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32		
145	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37		
150	0.41	0.41	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41		
155	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43		
160	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44		
165	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44		
170	0.44	0.44	0.44	0.44	0.43	0.44	0.44	0.43	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44		
175	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43		
180	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43		

Table 7: Luminous Intensity Data

## EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 23, 2017	Aug. 22, 2018
Digital Power Meter	PF2010A	HZTE028-01	Aug. 10, 2017	Aug. 09, 2018
AC Power Supply	DPS1060	HZTE001-06	Aug. 10, 2017	Aug. 09, 2018
DC Power Supply	WY12010	HZTE004-03	Aug. 10, 2017	Aug. 09, 2018
Temperature Meter	TES1310	HZTE017-01	Aug. 17, 2017	Aug. 16, 2018
Standard source	D908	HZTE012-01	Aug. 15, 2017	Aug. 14, 2018
Integrate Sphere system	2M	HZTE015-01	Aug. 23, 2017	Aug. 22, 2018
Digital Power Meter	WT210	HZTE008-01	Aug. 10, 2017	Aug. 09, 2018
AC Power Supply	PCR 500L	HZTE001-07	Aug. 10, 2017	Aug. 09, 2018
DC Power Supply	IT6154	HZTE004-04	Aug. 10, 2017	Aug. 09, 2018
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 16, 2017	Aug. 15, 2018
Standard source	SCL-1400	HZTE012-02	Aug. 15, 2017	Aug. 14, 2018

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 FA19 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 FA19 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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