

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

DOWNLIGHT

Model: 15SMPR7DIM/940/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

Report No.: HZ17120058f

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

Review by:



Engineer: April Zou
Jan. 08, 2018



Approved by: 

Manager: Jim Zhang
Jan. 08, 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: 15SMPR7DIM/940/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
79.6	1191.7	14.97	0.9581
CCT (K)	CRI	Stabilization Time (Light & Power)	
4005	95.2	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	: Dec. 27, 2017
Date of Test	: Jan. 02, 2018
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



Overview of the sample

Equipment Under Test (EUT)

Name	: DOWNLIGHT
Model	: 15SMPR7DIM/940/R
Electrical Ratings	: 120V, 60Hz
Product Description	: 4000K
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 25.1 °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 95 minutes.

The photometric distance of Goniophotometer is 2.47 m.

Luminous data was taken at 0.5° vertical intervals and 10.0° horizontal intervals.

Parameter	Result
Test Voltage (V)	120.0
Voltage frequency (Hz)	60
Test Current (A)	0.131
Power Factor	0.9581
Test Power (W)	14.97
THD A%	28.73
Luminous Efficacy (lm/W)	79.6
Total Luminous Flux (lm)	1191.7
Color Rendering Index (CRI)	95.2
R9	91
Correlated Color Temperature (CCT) (K)	4005
Chromaticity (Chroma x, Chroma y)	(0.3799, 0.3753)
Chromaticity (Chroma u, Chroma v)	(0.2253, 0.3339)
Chromaticity (Chroma u', Chroma v')	(0.2253, 0.5009)
Duv	0.0005
Average Beam Angle (°)	90.1
Center Beam Candle Power (cd)	571
Spacing Criteria	1.22 (0°-180°)/ 1.23 (90°-270°)
Zonal Lumens in the 0°-60°Zone	88.24%
Zonal Lumens in the 60°-90°Zone	11.61%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.11%

Special Rendering Indices	Color
R1	99
R2	96
R3	88
R4	94
R5	98
R6	93
R7	96
R8	98
R9	91
R10	87
R11	91
R12	71
R13	100
R14	92
Rf	91
Rg	103

Table 2: Test data per Goniophotometer Method

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

Spectral Power Distribution

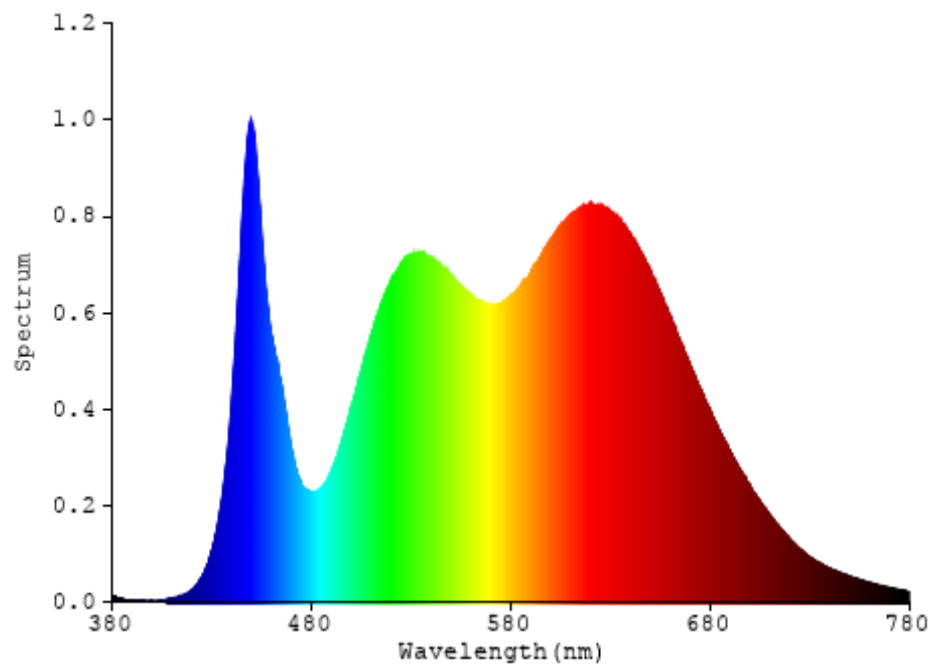


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	53.897	4.52%
10- 20	153.468	12.88%
20- 30	229.832	19.29%
30- 40	266.992	22.40%
40- 50	220.437	18.50%
50- 60	127.021	10.66%
60- 70	75.568	6.34%
70- 80	47.371	3.97%
80- 90	15.477	1.30%
90-100	0.052	0.00%
100-110	0.107	0.01%
110-120	0.155	0.01%
120-130	0.228	0.02%
130-140	0.291	0.02%
140-150	0.323	0.03%
150-160	0.279	0.02%
160-170	0.18	0.02%
170-180	0.061	0.01%
Total	1191.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1051.647	88.24%
60- 90	138.416	11.61%
0-90	1190.063	99.86%
90- 180	1.676	0.14%
0- 180	1191.7	100%

Table 3: Zonal Lumen Data

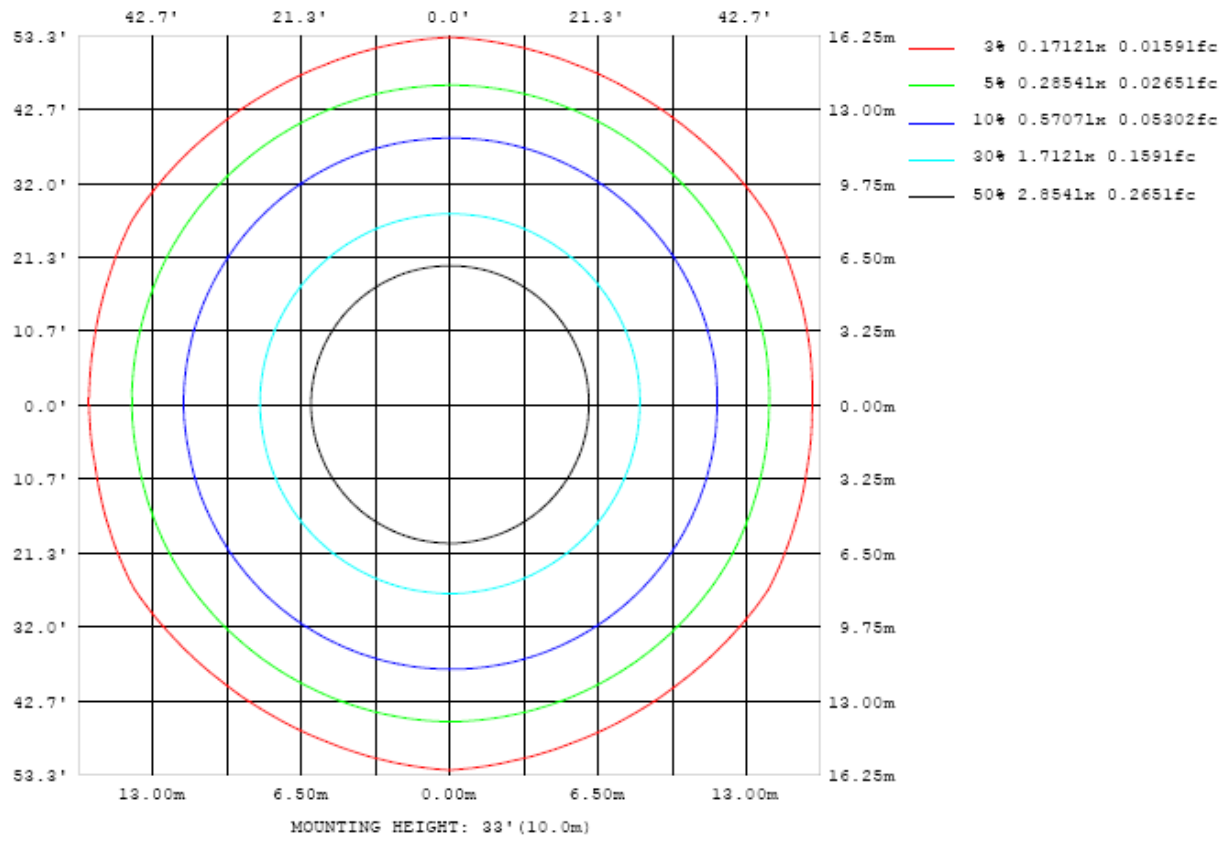


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

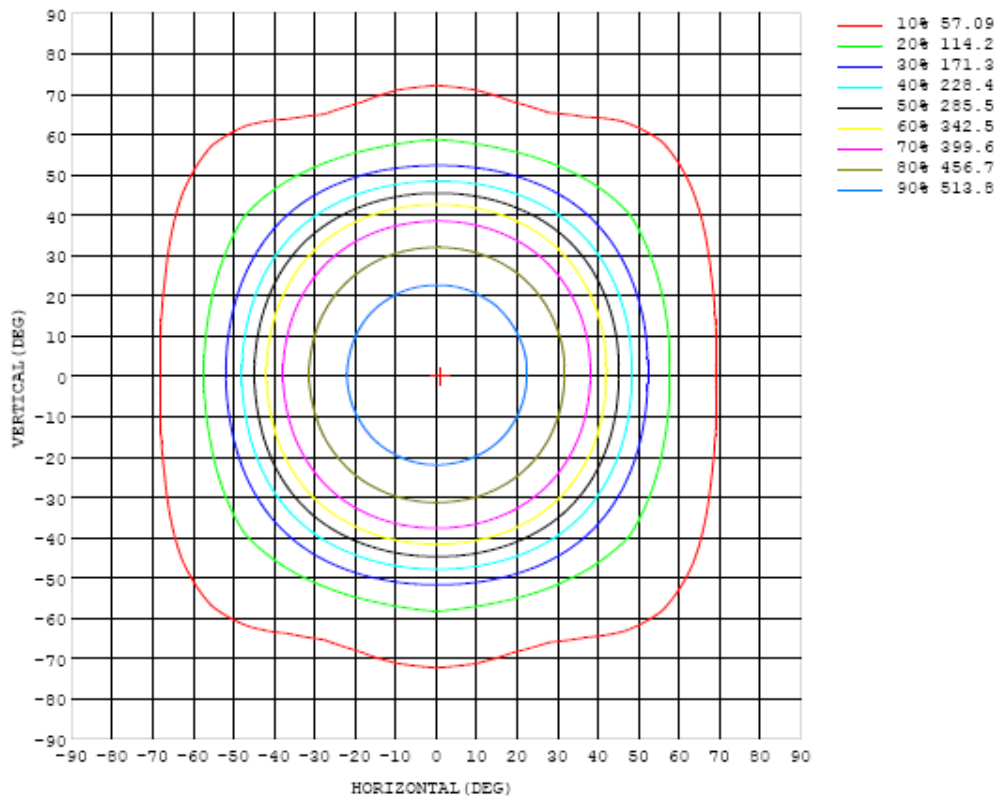


Chart 3: Isocandela Plot

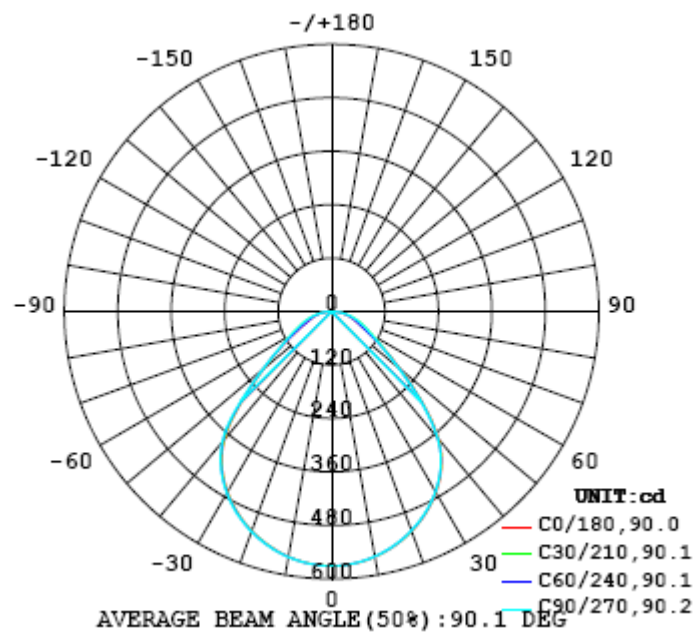


Chart 4: Polar Candela Distribution

Luminous Intensity Data

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	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571
5	568	567	568	568	568	567	567	567	567	567	567	567	567	567	567	567	567	567	568
10	559	558	558	559	558	558	558	558	558	558	558	558	558	558	557	557	558	558	558
15	545	544	544	544	544	543	543	543	543	543	543	543	542	543	542	543	543	543	544
20	525	524	524	524	524	524	523	523	523	523	523	523	522	523	522	522	523	523	524
25	500	499	499	499	499	498	498	498	498	497	498	497	497	497	497	497	497	497	498
30	469	468	468	468	467	467	466	466	466	466	466	466	465	465	465	465	466	466	467
35	430	429	428	428	428	427	427	427	426	426	426	426	426	426	426	425	426	426	428
40	375	373	373	372	371	371	370	370	369	369	369	369	369	369	370	370	370	371	374
45	287	287	286	285	284	283	282	281	281	280	279	279	279	279	280	280	281	281	285
50	202	201	200	199	198	198	197	196	195	194	194	194	193	194	194	194	195	195	198
55	140	139	140	141	139	137	136	135	136	137	136	134	133	134	135	137	136	135	137
60	97.0	98.0	103	107	102	96.3	94.6	95.1	99.4	104	99.5	94.1	92.5	93.7	98.4	104	99.7	94.5	94.6
65	70.5	72.6	79.1	84.2	78.5	71.4	70.3	71.1	76.7	82.0	76.9	70.3	67.8	69.9	75.5	81.1	76.6	69.7	67.9
70	54.3	57.6	63.2	66.7	62.8	57.3	54.2	56.5	61.5	64.7	61.5	56.0	52.6	55.4	60.3	63.8	60.9	55.3	51.9
75	42.0	45.1	48.0	49.4	47.8	44.8	41.8	44.2	46.7	47.9	46.4	43.7	40.6	43.2	45.7	47.0	45.8	43.1	40.1
80	29.3	30.9	31.7	32.1	31.3	30.4	28.7	29.9	30.5	30.8	30.2	29.4	27.8	29.1	29.7	30.2	29.7	29.1	28.0
85	14.1	14.6	14.7	14.6	14.2	13.8	13.0	13.2	13.3	13.3	13.1	12.9	12.4	12.8	13.1	13.4	13.3	13.3	13.3
90	0.06	0.05	0.06	0.05	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
95	0.05	0.06	0.05	0.05	0.06	0.05	0.04	0.04	0.03	0.04	0.04	0.05	0.05	0.06	0.07	0.09	0.08	0.05	0.04
100	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.06	0.05	0.06	0.07	0.07	0.07	0.08	0.09	0.11	0.11	0.10	0.09
105	0.07	0.09	0.10	0.10	0.12	0.10	0.08	0.06	0.07	0.09	0.08	0.10	0.10	0.10	0.12	0.12	0.12	0.12	0.11
110	0.09	0.10	0.11	0.11	0.12	0.11	0.08	0.08	0.08	0.08	0.09	0.11	0.15	0.15	0.14	0.15	0.15	0.14	0.14
115	0.11	0.12	0.18	0.14	0.14	0.17	0.11	0.12	0.12	0.12	0.12	0.13	0.14	0.17	0.24	0.19	0.18	0.21	0.17
120	0.14	0.15	0.22	0.23	0.23	0.18	0.15	0.14	0.15	0.16	0.16	0.17	0.16	0.17	0.22	0.31	0.31	0.22	0.21
125	0.18	0.19	0.22	0.35	0.26	0.22	0.19	0.19	0.19	0.20	0.21	0.21	0.21	0.22	0.27	0.43	0.39	0.28	0.26
130	0.23	0.24	0.39	0.31	0.31	0.26	0.25	0.24	0.25	0.27	0.26	0.26	0.26	0.29	0.44	0.36	0.36	0.39	0.34
135	0.29	0.30	0.33	0.35	0.34	0.32	0.33	0.32	0.32	0.32	0.32	0.31	0.31	0.35	0.38	0.39	0.39	0.39	0.42
140	0.36	0.36	0.38	0.40	0.40	0.40	0.40	0.39	0.38	0.38	0.38	0.39	0.38	0.39	0.42	0.42	0.43	0.42	0.51
145	0.41	0.41	0.43	0.44	0.44	0.45	0.44	0.44	0.44	0.43	0.43	0.47	0.44	0.44	0.47	0.47	0.47	0.47	0.61
150	0.45	0.47	0.48	0.48	0.48	0.48	0.48	0.47	0.48	0.47	0.47	0.51	0.50	0.51	0.51	0.51	0.51	0.50	0.66
155	0.51	0.52	0.52	0.52	0.52	0.52	0.51	0.50	0.51	0.51	0.51	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.69
160	0.55	0.55	0.55	0.55	0.55	0.56	0.55	0.53	0.53	0.52	0.52	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.70
165	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.57	0.58	0.56	0.55	0.56	0.58	0.59	0.59	0.58	0.59	0.58	0.69
170	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.60	0.61	0.58	0.58	0.60	0.61	0.61	0.61	0.61	0.61	0.61	0.68
175	0.63	0.63	0.62	0.61	0.61	0.62	0.63	0.62	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.62	0.62	0.64	0.66
180	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61

Table 4: 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	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571	571		
5	567	568	568	568	568	568	568	568	568	568	568	568	568	568	568	568	568		
10	558	559	559	559	559	559	559	559	560	560	560	559	560	559	559	560	559		
15	544	544	544	544	545	545	545	545	545	546	546	545	546	545	546	545	545		
20	524	524	525	525	525	526	526	526	526	526	526	526	526	526	526	526	526		
25	498	499	499	500	500	501	501	502	502	502	502	502	502	502	501	501	501		
30	467	468	468	469	469	470	471	471	471	471	472	471	471	471	470	470	470		
35	428	429	430	431	431	432	433	433	434	434	434	433	433	433	432	432	432		
40	375	376	377	379	379	381	382	383	383	383	384	383	382	381	380	379	378		
45	286	287	289	290	291	292	293	295	296	296	296	295	296	295	294	293	292		
50	199	199	199	200	201	202	202	203	203	204	205	205	205	205	205	205	205		
55	138	139	141	141	140	140	141	142	143	143	142	142	143	144	145	144	143		
60	96.0	101	106	102	97.7	96.2	97.8	102	107	103	98.5	97.7	99.8	105	109	104	99.5		
65	70.3	76.6	82.5	78.0	70.9	68.2	70.6	77.5	82.7	77.5	71.4	69.4	72.6	80.0	84.9	79.1	73.1		
70	54.9	60.4	64.3	61.2	55.5	51.6	55.0	60.9	64.4	61.0	55.5	52.7	56.5	62.9	66.5	62.7	57.5		
75	43.1	46.1	47.6	46.3	43.3	39.8	43.3	46.4	47.8	46.7	43.7	40.7	44.3	47.6	49.6	48.2	45.1		
80	29.5	30.5	31.2	30.7	29.9	28.2	30.1	31.0	31.5	31.2	30.5	28.7	30.7	31.8	32.6	32.2	31.3		
85	14.0	14.4	14.7	14.7	14.7	14.2	14.8	15.0	15.2	15.2	15.0	14.4	15.1	15.3	15.6	15.4	15.1		
90	0.02	0.02	0.03	0.03	0.04	0.07	0.09	0.13	0.16	0.18	0.20	0.23	0.21	0.20	0.20	0.19	0.14		
95	0.04	0.05	0.04	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.05	0.04	0.05	0.04	0.04	0.04	0.05		
100	0.09	0.10	0.08	0.07	0.07	0.08	0.09	0.10	0.09	0.11	0.10	0.07	0.07	0.06	0.07	0.06	0.07		
105	0.10	0.10	0.10	0.10	0.10	0.11	0.13	0.14	0.14	0.14	0.11	0.10	0.08	0.07	0.07	0.08	0.09		
110	0.13	0.13	0.12	0.13	0.13	0.14	0.15	0.17	0.15	0.15	0.14	0.12	0.11	0.09	0.10	0.10	0.11		
115	0.16	0.16	0.15	0.16	0.17	0.18	0.18	0.20	0.19	0.19	0.18	0.15	0.14	0.13	0.12	0.12	0.14		
120	0.20	0.21	0.20	0.20	0.21	0.21	0.20	0.23	0.28	0.28	0.22	0.21	0.18	0.17	0.17	0.17	0.17		
125	0.26	0.27	0.26	0.26	0.26	0.25	0.25	0.27	0.37	0.31	0.27	0.24	0.23	0.23	0.22	0.23	0.22		
130	0.33	0.34	0.35	0.35	0.32	0.31	0.32	0.36	0.37	0.36	0.34	0.31	0.31	0.31	0.31	0.31	0.29		
135	0.42	0.43	0.44	0.43	0.43	0.40	0.40	0.43	0.44	0.43	0.42	0.41	0.40	0.41	0.39	0.39	0.38		
140	0.51	0.52	0.51	0.51	0.51	0.51	0.51	0.52	0.53	0.53	0.52	0.52	0.52	0.50	0.48	0.47	0.46		
145	0.61	0.60	0.59	0.60	0.60	0.59	0.59	0.61	0.62	0.63	0.63	0.61	0.60	0.57	0.55	0.56	0.57		
150	0.66	0.67	0.65	0.65	0.65	0.65	0.65	0.67	0.68	0.67	0.68	0.67	0.66	0.62	0.62	0.62	0.64		
155	0.69	0.70	0.68	0.68	0.71	0.70	0.70	0.70	0.70	0.71	0.71	0.70	0.69	0.65	0.66	0.66	0.67		
160	0.71	0.71	0.69	0.69	0.71	0.71	0.71	0.71	0.72	0.72	0.71	0.71	0.70	0.69	0.69	0.67	0.68		
165	0.70	0.70	0.69	0.68	0.70	0.71	0.71	0.71	0.71	0.71	0.71	0.70	0.69	0.70	0.69	0.67	0.68		
170	0.68	0.68	0.67	0.67	0.68	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.67	0.66	0.67		
175	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.65	0.64	0.64	0.65	0.65	0.64	0.64	0.65	0.65		
180	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61		

Table 5: 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
Standard Source	D908	HZTE012-01	Aug. 20, 2017	Aug. 19, 2018
Standard source	SCL-1400	HZTE012-02	Aug. 20, 2017	Aug. 19, 2018
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 16, 2017	Aug. 15, 2018
Temperature recorder	JM624U	HZTE018-08	Aug. 17, 2017	Aug. 16, 2018

Table 6: 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.

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.

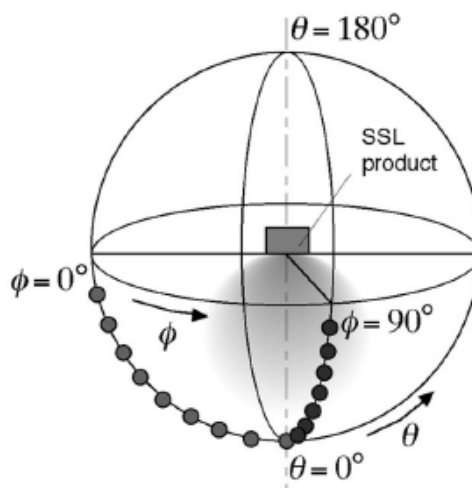
Color Characteristics Measurements

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° 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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