

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

DOWNLIGHT

Model: 15SMPR7DIM/927/R

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17120058b

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/927/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
76.1	1126.1	14.80	0.9554
CCT (K)	CRI	Stabilization Time (Light & Power)	
2670	93.7	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/927/R
Electrical Ratings	: 120V, 60Hz
Product Description	: 2700K
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 24.9°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)	0.129
Power Factor	0.9554
Test Power (W)	14.80
THD A%	29.69
Luminous Efficacy (lm/W)	76.1
Total Luminous Flux (lm)	1126.1
Color Rendering Index (CRI)	93.7
R9	68
Correlated Color Temperature (CCT) (K)	2670
Chromaticity (Chroma x, Chroma y)	(0.4669, 0.4192)
Chromaticity (Chroma u, Chroma v)	(0.2632, 0.3544)
Chromaticity (Chroma u', Chroma v')	(0.2632, 0.5316)
Duv	0.0025
Average Beam Angle (°)	88.6
Center Beam Candle Power (cd)	548
Spacing Criteria	1.23 (0°-180°)/ 1.21 (90°-270°)
Zonal Lumens in the 0°-60°Zone	88.05%
Zonal Lumens in the 60°-90°Zone	11.81%
Zonal Lumens in the 90°-120°Zone	0.02%
Zonal Lumens in the 120°-180°Zone	0.11%

Special Rendering Indices	Color
R1	94
R2	96
R3	95
R4	95
R5	93
R6	95
R7	95
R8	87
R9	68
R10	88
R11	96
R12	80
R13	94
R14	96
Rf	92
Rg	98

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

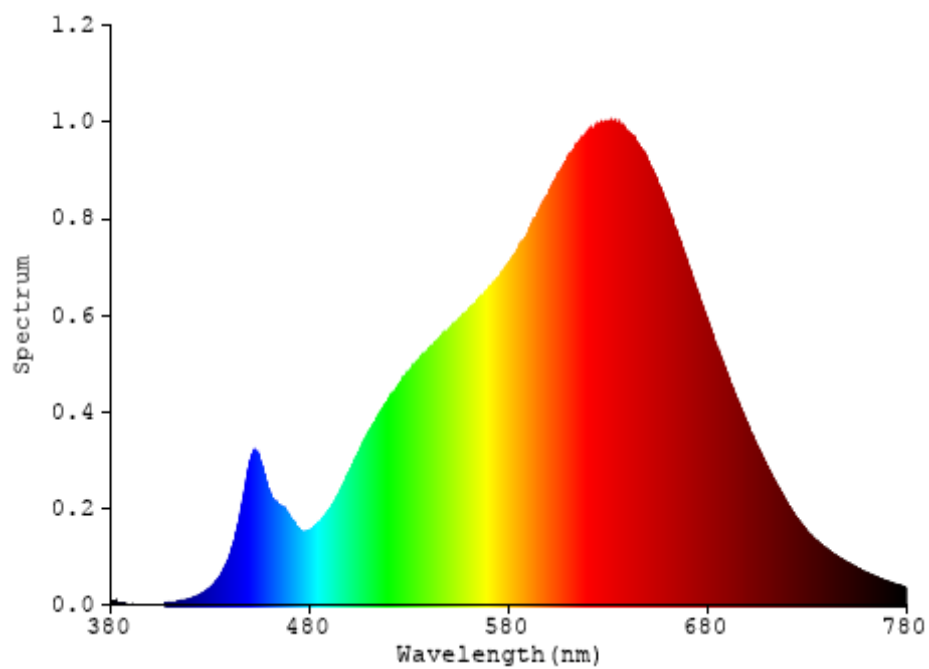


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	51.707	4.59%
10- 20	147.195	13.07%
20- 30	220.038	19.54%
30- 40	252.938	22.46%
40- 50	201.731	17.91%
50- 60	117.935	10.47%
60- 70	72.977	6.48%
70- 80	45.299	4.02%
80- 90	14.706	1.31%
90-100	0.046	0.00%
100-110	0.092	0.01%
110-120	0.135	0.01%
120-130	0.205	0.02%
130-140	0.269	0.02%
140-150	0.3	0.03%
150-160	0.262	0.02%
160-170	0.171	0.02%
170-180	0.058	0.01%
Total	1126.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	991.544	88.05%
60- 90	132.982	11.81%
0-90	1124.526	99.86%
90- 180	1.538	0.14%
0- 180	1126.1	100%

Table 3: Zonal Lumen Data

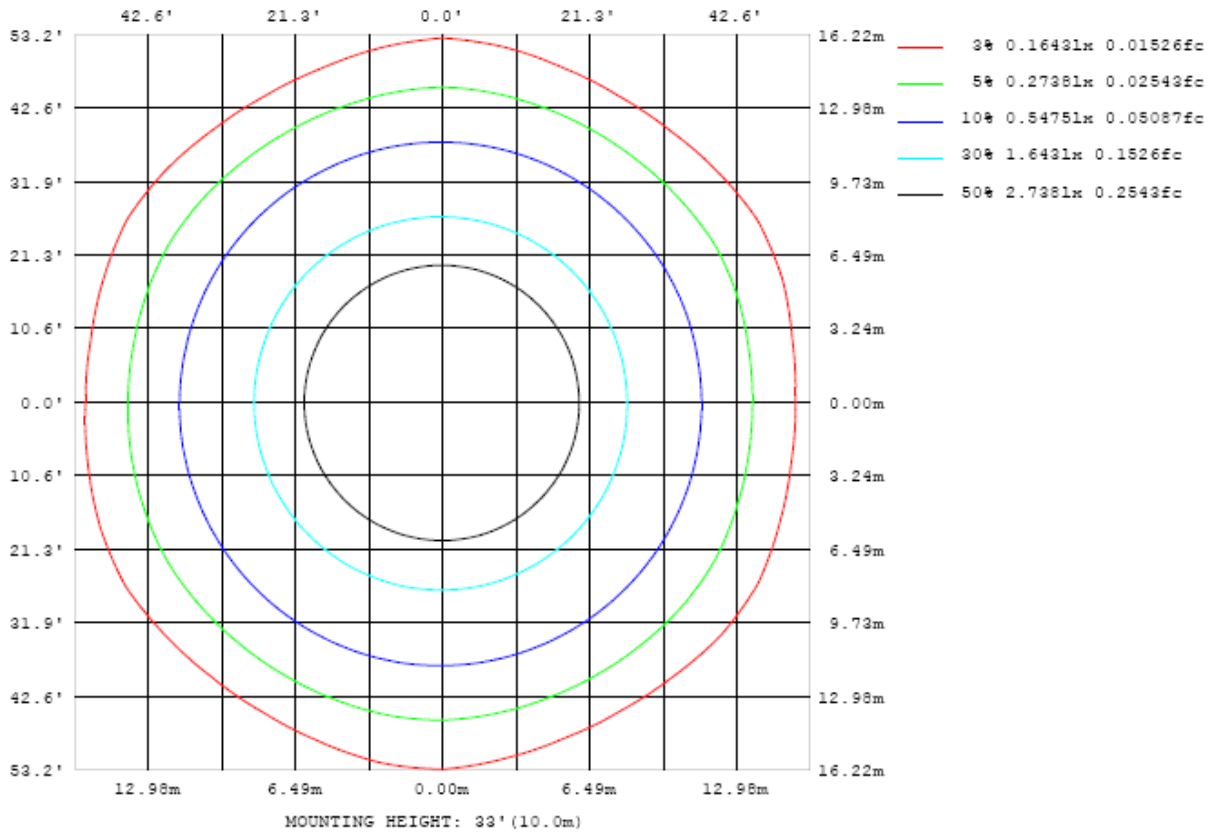


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

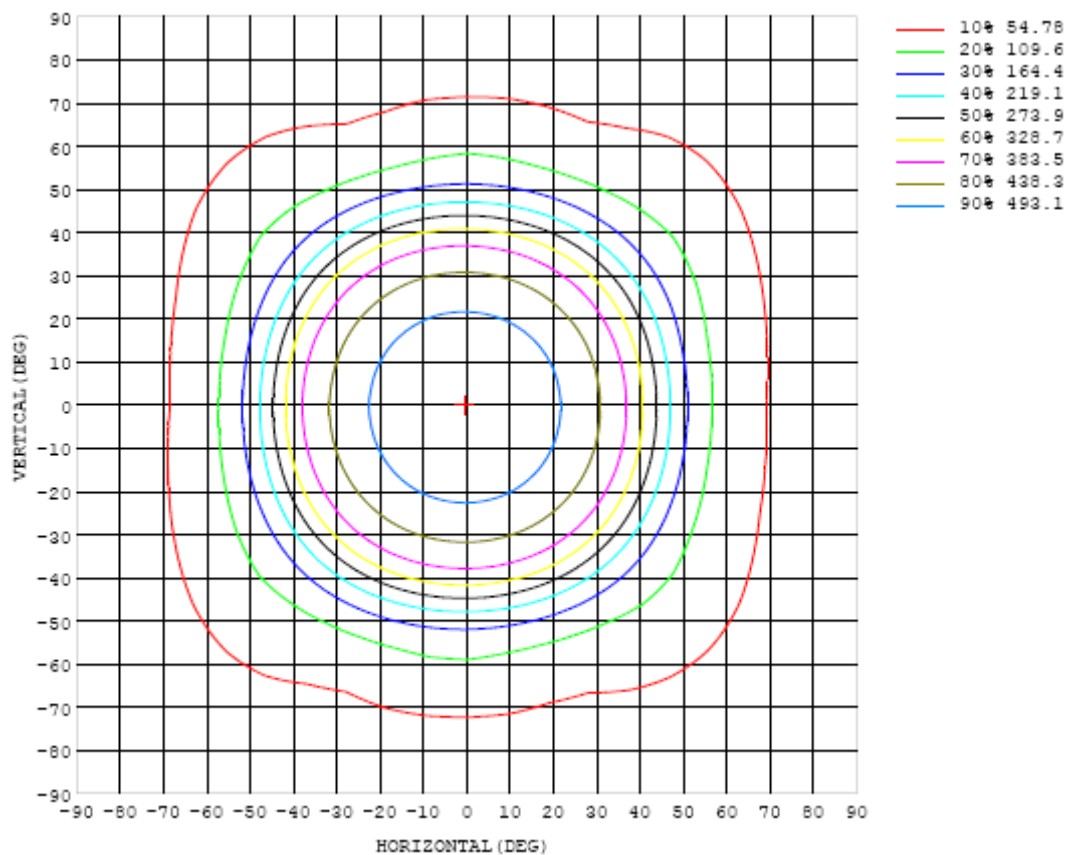


Chart 3: Isocandela Plot

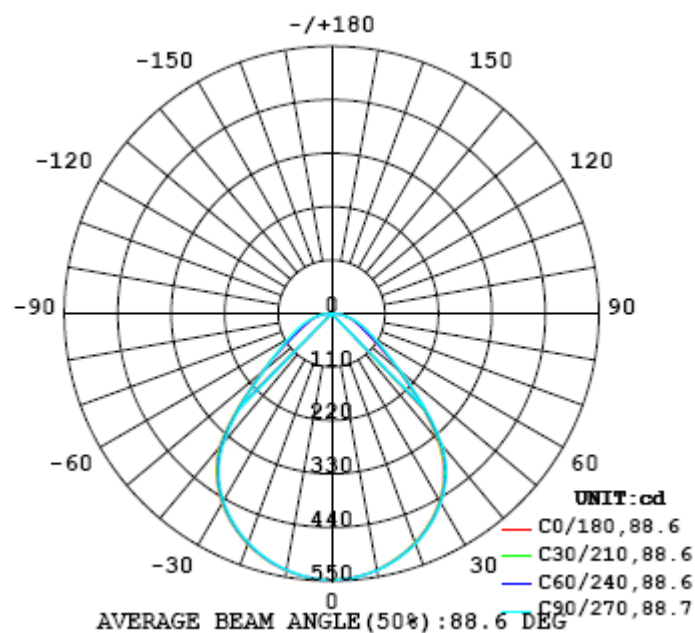


Chart 4: Polar Candela Distribution

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	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548
5	544	544	544	544	545	545	545	545	545	545	545	545	545	545	545	545	545	545	545
10	535	535	535	536	536	536	536	537	537	537	537	537	537	538	537	537	537	537	537
15	521	520	521	521	522	522	523	523	523	523	524	524	524	524	524	524	524	524	524
20	501	501	501	502	503	503	504	504	504	505	505	505	505	505	505	505	505	505	505
25	476	476	477	477	478	479	480	480	480	481	481	481	481	481	481	481	481	481	481
30	444	444	445	446	447	448	449	450	450	450	451	451	451	452	451	451	451	451	451
35	403	404	405	406	407	408	410	411	411	412	412	413	413	413	413	413	413	413	413
40	339	340	343	344	347	349	351	353	354	355	356	357	358	359	359	359	359	360	359
45	252	254	256	257	259	261	263	265	267	269	270	271	271	272	272	272	271	271	269
50	176	177	178	180	181	182	183	185	186	188	189	189	189	189	189	189	189	188	187
55	122	123	127	132	131	128	127	128	132	136	136	133	131	131	134	136	135	132	130
60	87.3	88.5	94.3	101	99.6	93.5	90.0	91.3	97.1	104	102	95.6	91.7	92.6	97.7	103	101	94.5	90.2
65	66.9	68.1	74.0	79.1	77.9	72.3	68.3	69.2	75.3	80.7	79.4	72.8	67.7	69.4	75.0	80.1	77.9	71.3	66.0
70	52.8	54.4	59.1	61.6	61.0	57.9	53.5	55.2	60.1	62.7	62.0	58.1	53.0	54.7	59.5	61.8	60.7	56.5	51.1
75	40.6	41.9	44.3	45.0	44.9	44.2	41.6	42.9	45.2	45.9	45.6	44.4	41.2	42.4	44.7	45.2	44.6	43.2	39.9
80	27.2	27.9	29.0	29.2	29.3	29.6	28.4	29.1	30.2	30.3	30.2	30.1	28.6	29.1	30.0	29.8	29.6	29.4	27.6
85	12.0	12.3	12.9	13.2	13.5	13.9	13.7	14.2	14.8	15.0	15.2	15.2	14.8	15.0	15.3	15.4	15.3	14.8	14.2
90	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.10	0.13	0.18	0.23	0.28	0.32	0.33	0.32	0.30	0.28	0.32	0.26
95	0.04	0.03	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.04
100	0.06	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.06	0.06	0.06	0.07	0.08	0.09	0.10	0.08	0.08	0.07
105	0.09	0.10	0.10	0.10	0.11	0.10	0.07	0.07	0.07	0.07	0.07	0.08	0.09	0.12	0.12	0.12	0.09	0.09	0.09
110	0.11	0.13	0.13	0.12	0.12	0.10	0.09	0.09	0.09	0.08	0.09	0.10	0.11	0.13	0.12	0.11	0.12	0.11	0.09
115	0.15	0.20	0.17	0.16	0.15	0.13	0.12	0.12	0.11	0.11	0.12	0.13	0.12	0.14	0.14	0.15	0.17	0.14	0.15
120	0.18	0.22	0.28	0.21	0.19	0.17	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.16	0.18	0.23	0.18	0.20	0.21
125	0.22	0.25	0.34	0.49	0.24	0.21	0.20	0.21	0.20	0.19	0.20	0.20	0.21	0.22	0.30	0.26	0.22	0.23	0.23
130	0.28	0.33	0.31	0.33	0.36	0.25	0.27	0.26	0.25	0.25	0.24	0.24	0.25	0.39	0.30	0.28	0.25	0.31	0.29
135	0.32	0.34	0.35	0.36	0.36	0.31	0.32	0.32	0.31	0.30	0.29	0.28	0.29	0.35	0.34	0.33	0.32	0.40	0.40
140	0.36	0.38	0.38	0.40	0.40	0.35	0.35	0.36	0.35	0.34	0.35	0.34	0.35	0.38	0.38	0.37	0.38	0.48	0.49
145	0.41	0.41	0.42	0.43	0.43	0.39	0.45	0.41	0.40	0.39	0.39	0.39	0.40	0.42	0.43	0.43	0.44	0.56	0.56
150	0.47	0.46	0.48	0.48	0.47	0.45	0.47	0.48	0.43	0.45	0.46	0.44	0.43	0.45	0.46	0.46	0.48	0.62	0.62
155	0.49	0.51	0.51	0.50	0.49	0.50	0.51	0.50	0.47	0.48	0.48	0.50	0.50	0.50	0.50	0.50	0.52	0.65	0.65
160	0.53	0.53	0.53	0.52	0.53	0.53	0.53	0.53	0.50	0.50	0.53	0.53	0.53	0.53	0.53	0.53	0.54	0.67	0.67
165	0.55	0.56	0.56	0.55	0.55	0.55	0.55	0.55	0.53	0.53	0.56	0.56	0.56	0.55	0.55	0.54	0.55	0.65	0.66
170	0.58	0.58	0.58	0.57	0.57	0.57	0.58	0.57	0.56	0.56	0.57	0.58	0.58	0.58	0.58	0.58	0.59	0.65	0.65
175	0.59	0.59	0.58	0.58	0.59	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.59	0.59	0.60	0.62	0.62
180	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.57	0.58

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	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548	548		
5	545	545	545	545	544	544	544	544	544	544	544	544	544	544	544	544	544		
10	537	537	536	536	536	535	535	535	535	535	535	535	535	535	535	535	535		
15	523	523	523	522	522	521	521	521	520	520	520	520	520	520	520	520	520		
20	504	504	504	503	502	502	502	501	501	500	500	500	500	500	500	500	500		
25	480	480	479	478	478	477	477	476	476	475	475	475	475	475	475	475	475		
30	450	449	449	448	447	446	446	445	444	443	443	443	443	443	443	443	443		
35	412	411	410	409	408	407	406	404	403	402	402	401	401	401	401	401	402		
40	359	358	356	354	352	350	348	345	343	341	339	338	337	337	338	338	338		
45	268	267	265	263	261	259	258	256	255	254	252	251	251	251	252	252	251		
50	185	184	183	182	181	179	179	179	179	177	176	176	176	176	177	177	175		
55	129	131	133	130	127	125	125	128	132	128	124	123	123	127	131	129	124		
60	90.9	96.3	101	97.1	90.3	87.0	88.9	95.3	101	96.6	90.2	87.0	88.8	94.9	101	98.1	90.8		
65	67.6	73.9	78.2	75.4	68.8	64.3	67.0	73.8	78.2	75.6	69.7	65.3	67.7	74.2	78.8	76.8	70.7		
70	53.4	58.1	59.8	58.7	54.8	50.3	53.0	57.8	59.8	59.0	55.5	51.5	53.8	58.5	60.5	59.7	56.4		
75	41.4	43.4	43.6	43.3	41.9	39.0	40.9	42.9	43.4	43.3	42.1	39.7	41.4	43.5	43.9	43.8	42.7		
80	28.2	28.9	28.4	28.4	28.0	26.6	27.4	28.1	28.0	27.9	27.8	26.7	27.5	28.3	28.3	28.3	28.1		
85	14.2	14.2	13.9	13.7	13.3	12.6	12.6	12.8	12.6	12.4	12.2	11.8	12.0	12.3	12.3	12.3	12.3		
90	0.18	0.11	0.06	0.03	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.01		
95	0.03	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.05	0.04		
100	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.06	0.07	0.06	0.06	0.06	0.06	0.06		
105	0.09	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.08	0.07	0.07	0.08	0.09	0.09	0.07		
110	0.10	0.11	0.09	0.09	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.09	0.10	0.10	0.11	0.11	0.11		
115	0.22	0.12	0.11	0.12	0.11	0.12	0.13	0.14	0.14	0.14	0.12	0.12	0.13	0.13	0.14	0.14	0.13		
120	0.17	0.15	0.15	0.15	0.14	0.15	0.16	0.18	0.19	0.17	0.16	0.15	0.16	0.16	0.17	0.18	0.17		
125	0.22	0.21	0.20	0.20	0.19	0.20	0.21	0.28	0.26	0.22	0.21	0.21	0.21	0.21	0.22	0.23	0.21		
130	0.29	0.29	0.28	0.27	0.26	0.26	0.30	0.30	0.31	0.32	0.30	0.28	0.28	0.29	0.30	0.30	0.25		
135	0.37	0.38	0.37	0.35	0.34	0.35	0.37	0.38	0.38	0.38	0.39	0.41	0.37	0.39	0.39	0.39	0.33		
140	0.47	0.46	0.45	0.44	0.44	0.43	0.44	0.46	0.46	0.46	0.46	0.48	0.50	0.48	0.49	0.48	0.35		
145	0.56	0.55	0.53	0.55	0.53	0.51	0.52	0.54	0.54	0.54	0.55	0.56	0.57	0.55	0.57	0.56	0.41		
150	0.61	0.60	0.58	0.61	0.60	0.60	0.61	0.61	0.61	0.61	0.61	0.61	0.62	0.60	0.62	0.62	0.47		
155	0.65	0.62	0.62	0.64	0.64	0.64	0.64	0.65	0.65	0.65	0.64	0.64	0.65	0.63	0.64	0.64	0.49		
160	0.66	0.65	0.64	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.65	0.64	0.65	0.64	0.52		
165	0.66	0.66	0.64	0.65	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.65	0.64	0.64	0.55		
170	0.65	0.64	0.63	0.64	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.64	0.64	0.64	0.58		
175	0.62	0.62	0.62	0.62	0.62	0.62	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.60		
180	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58		

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.

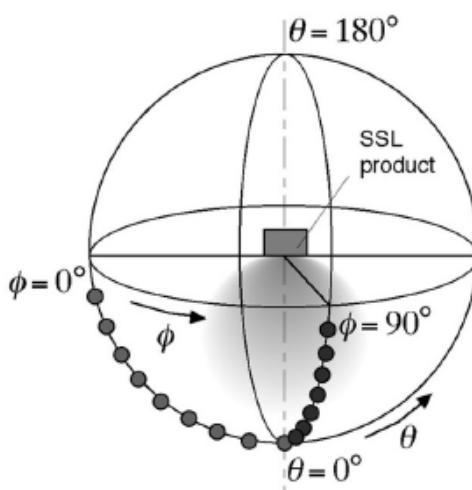
Color Characteristics Measurements

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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