

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

DOWNLIGHT

Model: 15SMPR7DIM/930/R

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17120058d

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/930/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
79.3	1175.2	14.82	0.9479
CCT (K)	CRI	Stabilization Time (Light & Power)	
3097	94.1	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/930/R
Electrical Ratings	: 120V, 60Hz
Product Description	: 3000K
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)	0.130
Power Factor	0.9479
Test Power (W)	14.82
THD A%	32.74
Luminous Efficacy (lm/W)	79.3
Total Luminous Flux (lm)	1175.2
Color Rendering Index (CRI)	94.1
R9	72
Correlated Color Temperature (CCT) (K)	3097
Chromaticity (Chroma x, Chroma y)	(0.4317, 0.4049)
Chromaticity (Chroma u, Chroma v)	(0.2469, 0.3473)
Chromaticity (Chroma u', Chroma v')	(0.2469, 0.5209)
Duv	0.0010
Average Beam Angle (°)	90.5
Center Beam Candle Power (cd)	555
Spacing Criteria	1.22 (0°-180°)/ 1.23 (90°-270°)
Zonal Lumens in the 0°-60°Zone	87.62%
Zonal Lumens in the 60°-90°Zone	12.23%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.12%

Special Rendering Indices	Color
R1	95
R2	96
R3	96
R4	94
R5	93
R6	94
R7	96
R8	88
R9	72
R10	89
R11	94
R12	76
R13	95
R14	97
Rf	91
Rg	99

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

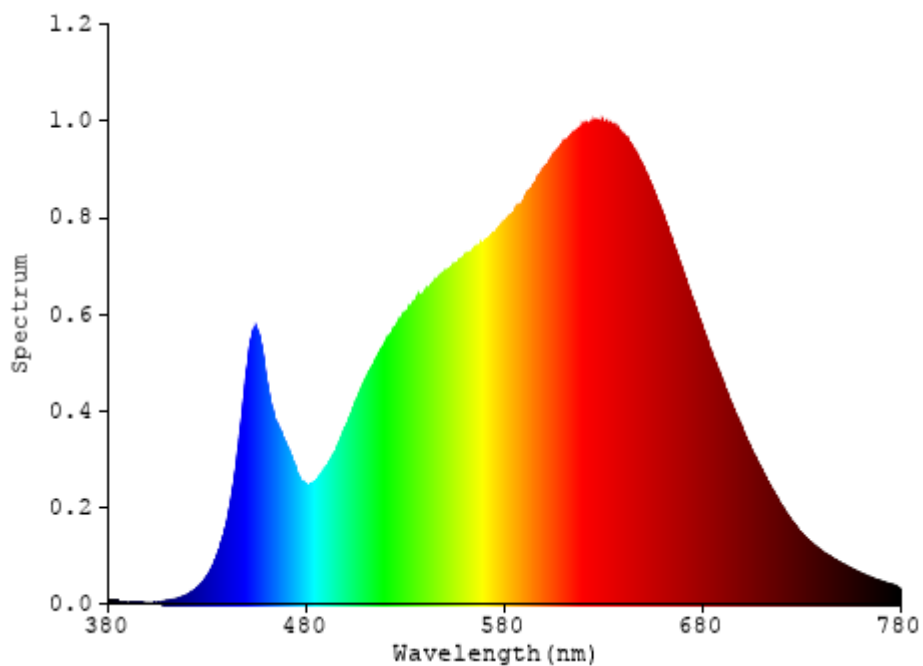


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	52.443	4.46%
10- 20	149.264	12.70%
20- 30	223.517	19.02%
30- 40	259.993	22.12%
40- 50	216.876	18.46%
50- 60	127.604	10.86%
60- 70	77.673	6.61%
70- 80	49.629	4.22%
80- 90	16.46	1.40%
90-100	0.06	0.01%
100-110	0.121	0.01%
110-120	0.162	0.01%
120-130	0.231	0.02%
130-140	0.292	0.02%
140-150	0.32	0.03%
150-160	0.274	0.02%
160-170	0.178	0.02%
170-180	0.06	0.01%
Total	1175.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1029.697	87.62%
60- 90	143.762	12.23%
0-90	1173.459	99.86%
90- 180	1.698	0.14%
0- 180	1175.2	100%

Table 3: Zonal Lumen Data

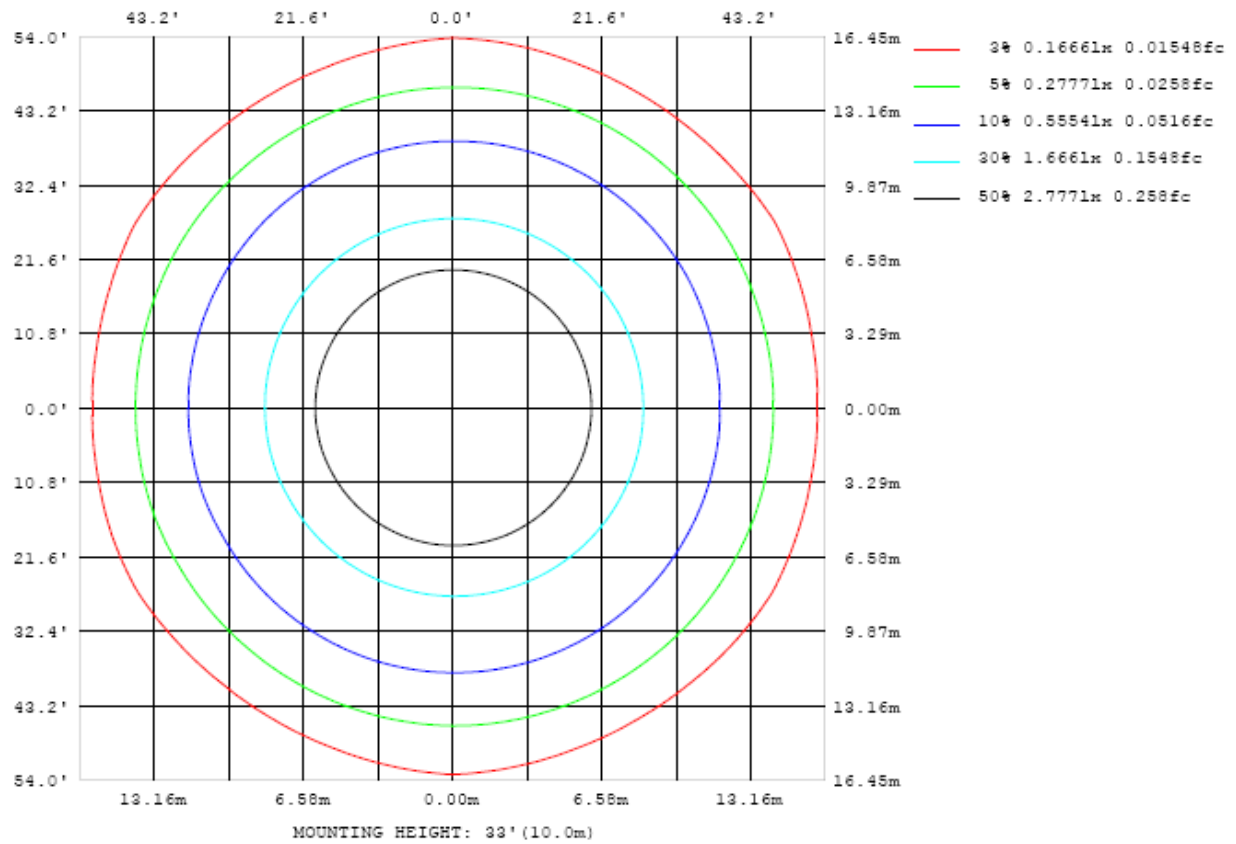


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

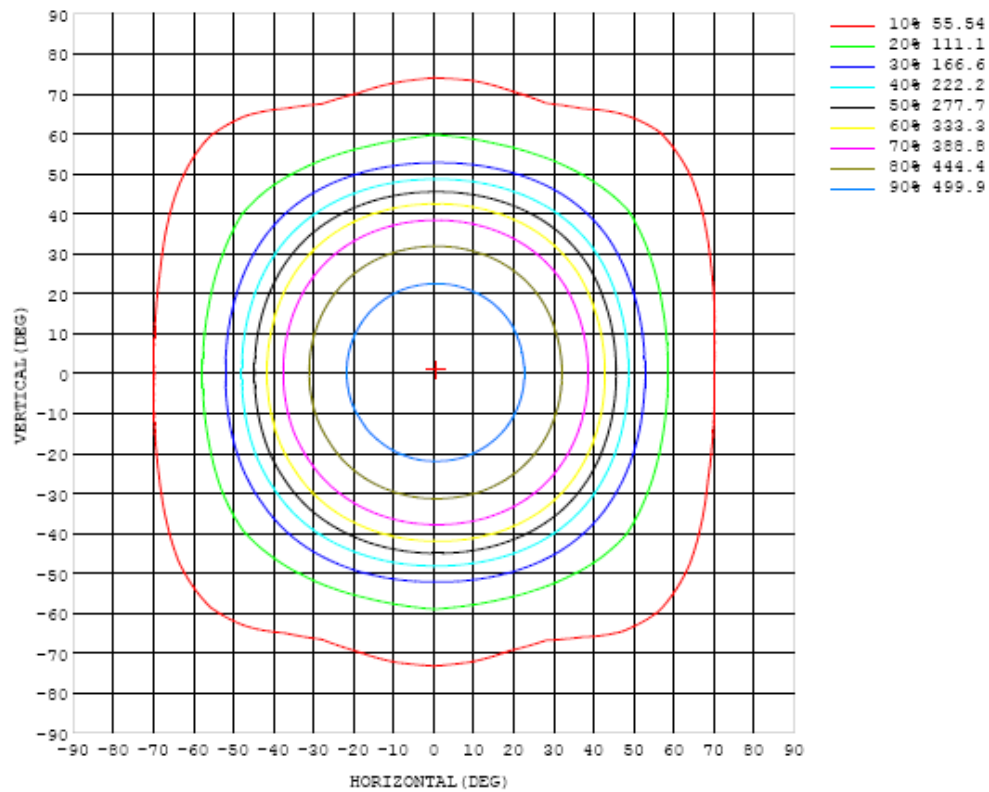


Chart 3: Isocandela Plot

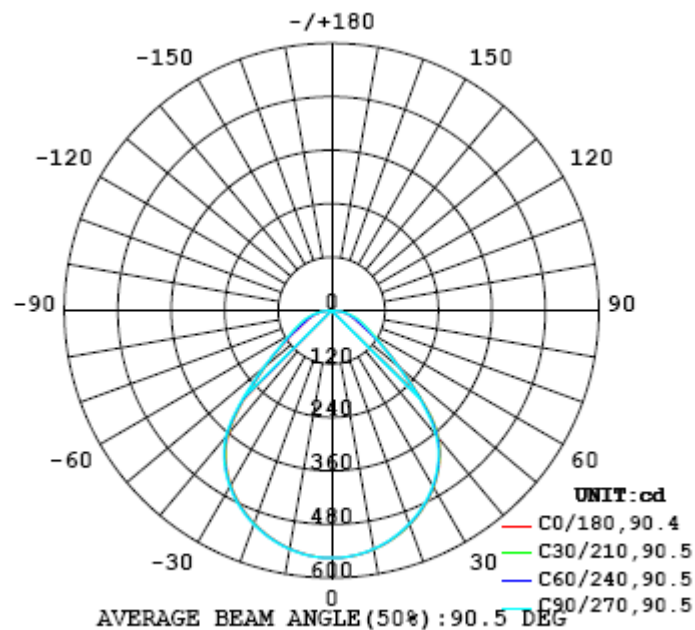


Chart 4: Polar Candela Distribution

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	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555
5	553	553	553	553	553	552	552	553	552	552	552	552	552	552	552	552	552	552	552
10	544	545	544	544	544	544	543	544	543	543	543	542	542	542	542	542	542	542	542
15	531	531	530	530	530	529	529	529	529	528	528	527	527	527	527	527	527	528	528
20	512	512	511	511	511	510	510	510	509	509	509	508	507	507	507	507	508	508	508
25	488	488	487	487	487	486	486	486	485	484	484	483	482	482	482	482	483	483	483
30	458	458	458	457	457	456	456	455	454	453	453	452	451	451	451	451	452	452	452
35	421	421	421	421	420	419	418	418	416	415	415	414	413	412	412	411	413	414	414
40	373	373	373	372	371	370	368	367	365	363	361	360	358	357	356	356	359	359	360
45	289	289	289	288	287	285	283	281	280	278	276	274	272	271	271	270	274	274	274
50	202	202	201	200	199	199	198	197	196	194	194	193	192	191	191	190	192	193	193
55	143	142	142	142	141	140	139	138	138	138	137	135	134	134	134	135	136	136	135
60	99.7	100	104	108	104	98.7	97.0	97.8	102	105	101	96.1	94.2	94.7	98.8	103	101	96.6	95.4
65	71.5	73.3	79.5	84.6	80.1	73.1	70.6	72.2	78.4	83.2	78.3	72.7	69.6	70.8	76.5	81.9	78.8	72.6	70.2
70	55.6	57.7	63.5	67.4	64.3	58.3	54.6	56.9	62.6	66.2	62.9	57.5	54.1	56.3	61.4	65.3	62.8	57.8	55.0
75	43.4	45.8	49.1	50.8	49.4	46.1	42.6	44.8	47.8	49.5	48.0	45.0	42.0	44.1	46.9	48.5	47.7	45.3	42.6
80	30.8	32.1	33.1	33.5	32.9	31.8	29.8	30.9	31.7	32.2	31.5	30.5	29.0	30.0	30.7	31.2	31.3	30.6	29.4
85	15.8	16.0	16.1	16.1	15.7	15.2	14.5	14.6	14.6	14.6	14.1	13.7	13.1	13.2	13.3	13.4	13.7	13.6	13.2
90	0.14	0.12	0.10	0.08	0.08	0.06	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
95	0.07	0.07	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.05	0.05	0.05	0.06	0.07	0.06	0.05	0.04	0.05	0.04
100	0.10	0.11	0.10	0.10	0.10	0.09	0.08	0.07	0.06	0.07	0.07	0.07	0.09	0.10	0.11	0.10	0.09	0.10	0.09
105	0.12	0.13	0.12	0.12	0.11	0.08	0.09	0.09	0.10	0.09	0.10	0.12	0.12	0.13	0.13	0.13	0.11	0.10	0.10
110	0.13	0.13	0.13	0.12	0.10	0.11	0.10	0.12	0.11	0.21	0.16	0.14	0.14	0.15	0.15	0.15	0.13	0.14	0.13
115	0.13	0.14	0.15	0.15	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.20	0.20	0.18	0.19	0.22	0.17	0.16	0.16
120	0.18	0.18	0.18	0.17	0.16	0.17	0.18	0.17	0.19	0.19	0.19	0.21	0.27	0.26	0.31	0.22	0.20	0.20	0.20
125	0.23	0.30	0.22	0.21	0.21	0.21	0.22	0.23	0.23	0.23	0.23	0.24	0.27	0.50	0.34	0.25	0.26	0.26	0.26
130	0.29	0.27	0.27	0.26	0.26	0.26	0.28	0.30	0.29	0.28	0.28	0.33	0.56	0.40	0.38	0.36	0.34	0.33	0.34
135	0.33	0.33	0.32	0.32	0.31	0.32	0.35	0.36	0.36	0.34	0.32	0.33	0.39	0.40	0.38	0.37	0.41	0.42	0.43
140	0.38	0.38	0.37	0.38	0.39	0.39	0.40	0.41	0.41	0.41	0.40	0.40	0.44	0.42	0.42	0.42	0.51	0.53	0.52
145	0.44	0.44	0.44	0.44	0.44	0.43	0.46	0.45	0.45	0.48	0.46	0.46	0.47	0.47	0.48	0.48	0.60	0.61	0.59
150	0.48	0.48	0.48	0.48	0.48	0.47	0.49	0.48	0.48	0.51	0.50	0.50	0.50	0.52	0.52	0.51	0.64	0.64	0.65
155	0.52	0.52	0.52	0.52	0.51	0.50	0.51	0.51	0.51	0.53	0.53	0.54	0.54	0.55	0.55	0.54	0.67	0.66	0.68
160	0.55	0.55	0.55	0.55	0.55	0.53	0.54	0.53	0.53	0.55	0.56	0.56	0.57	0.57	0.57	0.56	0.68	0.68	0.67
165	0.58	0.58	0.58	0.58	0.58	0.57	0.57	0.56	0.56	0.58	0.58	0.58	0.59	0.59	0.59	0.58	0.68	0.70	0.70
170	0.60	0.60	0.60	0.60	0.59	0.60	0.60	0.59	0.58	0.60	0.61	0.61	0.61	0.61	0.61	0.61	0.68	0.69	0.68
175	0.61	0.61	0.61	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.62	0.62	0.62	0.63	0.64	0.65	0.65
180	0.56	0.60	0.60	0.60	0.60	0.60	0.56	0.50	0.53	0.58	0.60	0.60	0.59	0.59	0.60	0.60	0.58	0.59	0.59

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555		
5	552	552	552	552	552	552	553	553	553	553	553	553	553	553	553	553	553		
10	543	543	543	543	543	543	544	544	544	544	544	544	545	545	545	545	545		
15	528	528	528	529	529	529	530	530	530	531	531	531	531	531	531	531	531		
20	508	508	509	509	510	510	510	511	511	512	512	512	512	513	513	513	512		
25	484	484	484	485	485	486	486	487	487	488	488	488	489	489	489	489	488		
30	453	453	454	454	455	456	456	457	457	458	458	459	459	460	460	460	459		
35	415	415	416	417	417	418	419	420	420	421	421	422	423	423	423	423	422		
40	361	362	363	365	366	367	368	369	371	372	372	373	374	375	375	375	373		
45	275	277	278	279	280	282	284	286	288	289	290	291	292	293	294	294	291		
50	194	194	194	196	197	198	200	201	202	203	204	205	206	206	206	206	203		
55	136	137	139	139	139	140	141	142	144	144	144	145	145	146	146	146	144		
60	96.3	101	106	103	99.5	98.4	99.8	104	110	107	103	102	102	106	111	107	102		
65	71.8	77.8	84.0	80.5	74.4	72.0	73.9	80.2	86.7	83.2	76.4	73.5	75.1	81.4	87.6	83.0	75.2		
70	57.1	62.4	66.8	64.3	59.1	56.2	58.6	64.4	69.2	66.5	60.4	56.6	59.0	64.8	69.6	66.5	59.8		
75	45.0	48.1	50.2	49.2	46.7	43.8	46.5	49.9	52.2	51.1	47.9	44.4	46.9	50.5	52.7	50.9	47.3		
80	30.7	31.9	32.5	32.4	32.0	30.7	32.2	33.5	34.5	34.3	33.4	31.6	33.1	34.5	35.2	34.0	32.9		
85	13.6	14.1	14.5	14.7	14.8	14.6	15.3	16.0	16.5	16.7	16.6	16.2	16.8	17.2	17.5	16.8	16.5		
90	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.07	0.10	0.16	0.20	0.25	0.31	0.34	0.38	0.18	0.15		
95	0.05	0.05	0.05	0.06	0.07	0.07	0.08	0.09	0.07	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.06		
100	0.09	0.09	0.08	0.10	0.11	0.12	0.16	0.15	0.12	0.11	0.10	0.10	0.10	0.09	0.10	0.09	0.09		
105	0.10	0.11	0.11	0.11	0.14	0.15	0.18	0.17	0.13	0.12	0.11	0.11	0.10	0.09	0.09	0.10	0.10		
110	0.13	0.13	0.15	0.13	0.16	0.18	0.18	0.17	0.15	0.12	0.13	0.10	0.10	0.10	0.12	0.10	0.11		
115	0.16	0.15	0.16	0.17	0.19	0.21	0.20	0.20	0.17	0.15	0.15	0.13	0.12	0.12	0.13	0.11	0.13		
120	0.19	0.21	0.21	0.21	0.22	0.24	0.24	0.25	0.21	0.21	0.18	0.18	0.16	0.16	0.16	0.14	0.16		
125	0.26	0.26	0.25	0.25	0.26	0.31	0.37	0.30	0.27	0.24	0.23	0.23	0.23	0.21	0.20	0.18	0.19		
130	0.34	0.34	0.32	0.31	0.37	0.39	0.37	0.35	0.33	0.30	0.30	0.31	0.30	0.29	0.28	0.23	0.24		
135	0.42	0.42	0.41	0.40	0.44	0.44	0.44	0.42	0.41	0.39	0.39	0.39	0.38	0.38	0.36	0.29	0.31		
140	0.50	0.50	0.50	0.50	0.52	0.53	0.53	0.51	0.51	0.51	0.48	0.47	0.46	0.46	0.45	0.36	0.36		
145	0.58	0.58	0.58	0.58	0.60	0.62	0.61	0.60	0.59	0.59	0.57	0.57	0.54	0.54	0.55	0.42	0.41		
150	0.63	0.64	0.65	0.64	0.67	0.67	0.66	0.64	0.64	0.63	0.62	0.60	0.60	0.61	0.61	0.47	0.46		
155	0.66	0.67	0.68	0.69	0.69	0.69	0.68	0.68	0.66	0.66	0.67	0.65	0.63	0.65	0.66	0.53	0.52		
160	0.67	0.67	0.67	0.68	0.70	0.70	0.70	0.70	0.69	0.69	0.68	0.68	0.65	0.65	0.65	0.54	0.54		
165	0.67	0.67	0.68	0.68	0.69	0.70	0.70	0.69	0.69	0.69	0.69	0.69	0.66	0.66	0.66	0.58	0.57		
170	0.66	0.66	0.67	0.67	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.65	0.65	0.65	0.61	0.60		
175	0.65	0.65	0.64	0.64	0.64	0.64	0.63	0.62	0.62	0.63	0.62	0.62	0.63	0.63	0.63	0.62	0.61		
180	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.57	0.57		

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.

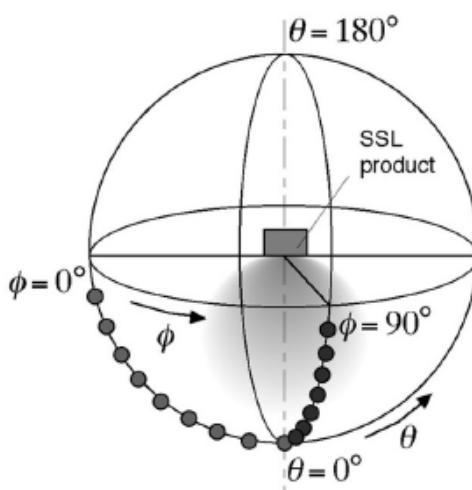
Color Characteristics Measurements

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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