

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

DOWNLIGHT

Model: 15SMPS7DIM/940/R

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17120058e

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: 15SMPS7DIM/940/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
84.7	1242.8	14.68	0.9518
CCT (K)	CRI	Stabilization Time (Light & Power)	
3995	93.5	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	: 15SMPS7DIM/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 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	0.9518
Test Power (W)	14.68
THD A%	31.14
Luminous Efficacy (lm/W)	84.7
Total Luminous Flux (lm)	1242.8
Color Rendering Index (CRI)	93.5
R9	73
Correlated Color Temperature (CCT) (K)	3995
Chromaticity (Chroma x, Chroma y)	(0.3818, 0.3810)
Chromaticity (Chroma u, Chroma v)	(0.2243, 0.3357)
Chromaticity (Chroma u', Chroma v')	(0.2243, 0.5036)
Duv	0.0016
Average Beam Angle (°)	90.5
Center Beam Candle Power (cd)	592
Spacing Criteria	1.22 (0°-180°)/ 1.22 (90°-270°)
Zonal Lumens in the 0°-60°Zone	88.27%
Zonal Lumens in the 60°-90°Zone	11.60%
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	93
R5	92
R6	92
R7	96
R8	89
R9	73
R10	88
R11	92
R12	67
R13	95
R14	97
Rf	89
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

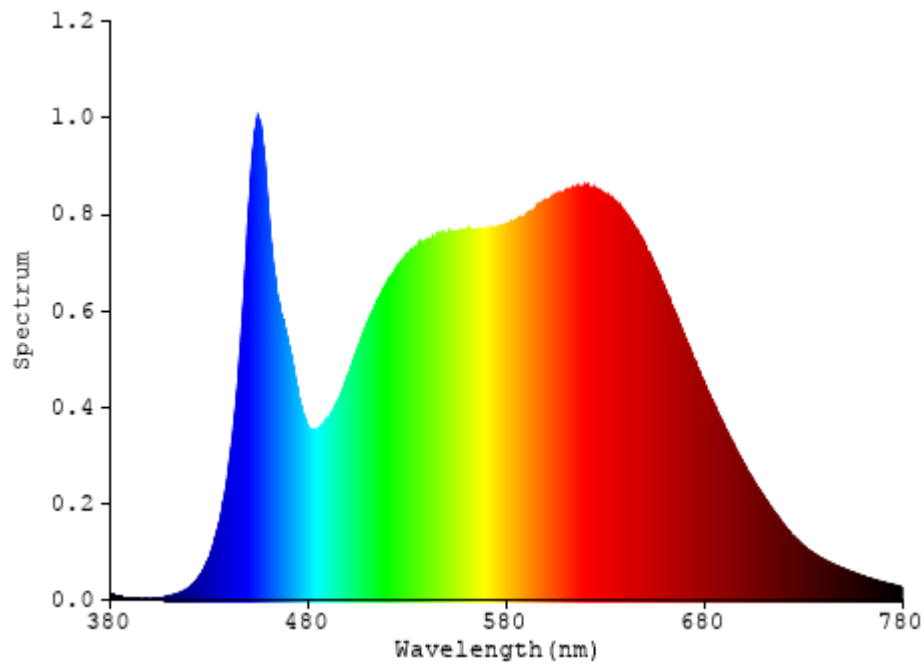


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	55.929	4.50%
10- 20	159.291	12.82%
20- 30	238.725	19.21%
30- 40	277.957	22.37%
40- 50	231.577	18.63%
50- 60	133.547	10.75%
60- 70	78.622	6.33%
70- 80	49.373	3.97%
80- 90	16.145	1.30%
90-100	0.053	0.00%
100-110	0.104	0.01%
110-120	0.152	0.01%
120-130	0.222	0.02%
130-140	0.287	0.02%
140-150	0.318	0.03%
150-160	0.275	0.02%
160-170	0.18	0.01%
170-180	0.062	0.00%
Total	1242.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1097.026	88.27%
60- 90	144.14	11.60%
0-90	1241.166	99.87%
90- 180	1.653	0.13%
0- 180	1242.8	100%

Table 3: Zonal Lumen Data

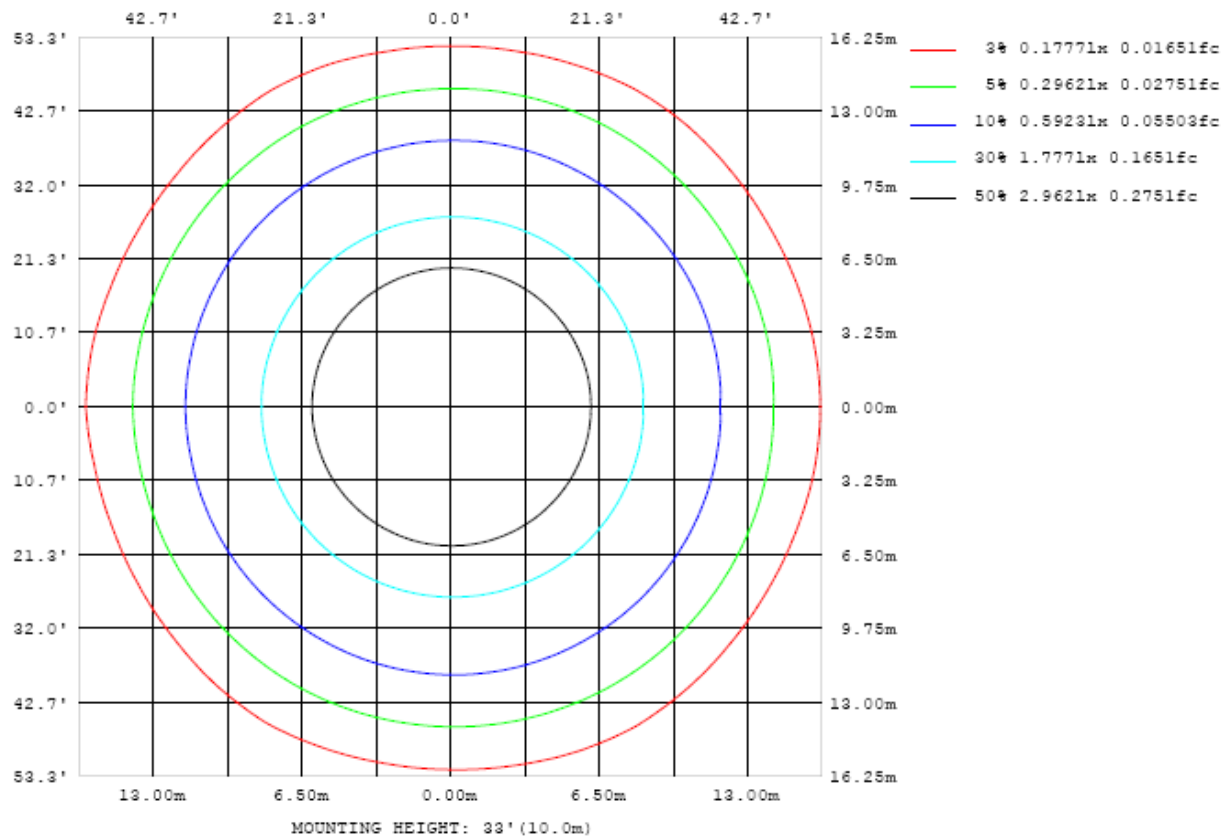


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

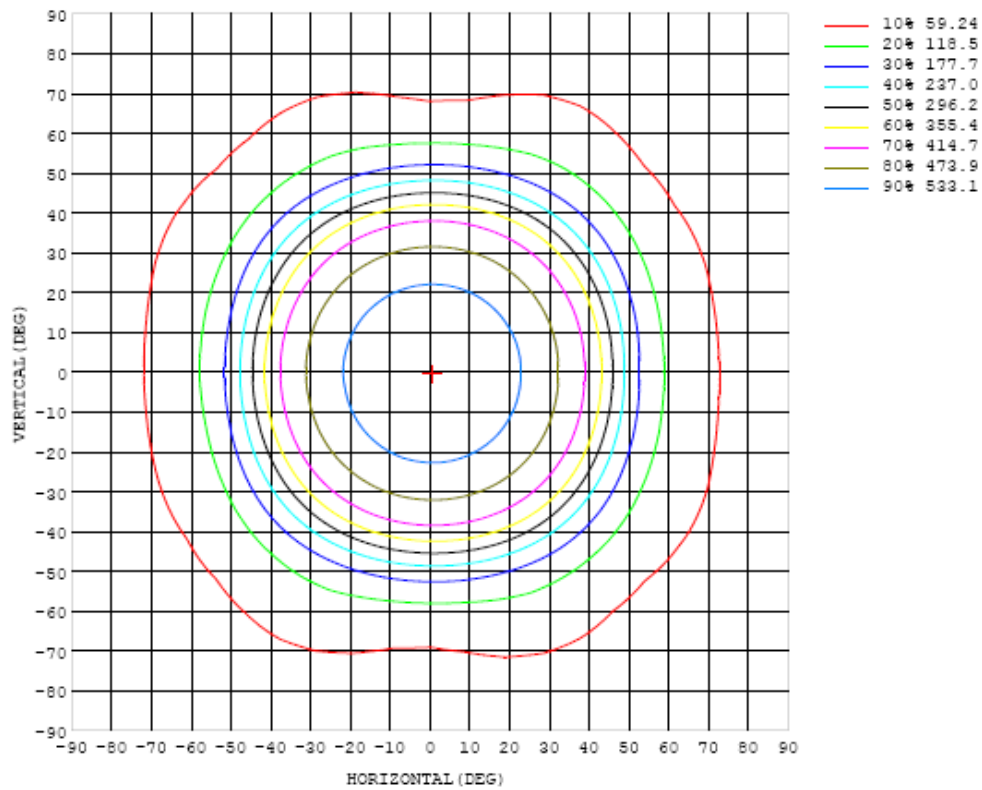


Chart 3: Isocandela Plot

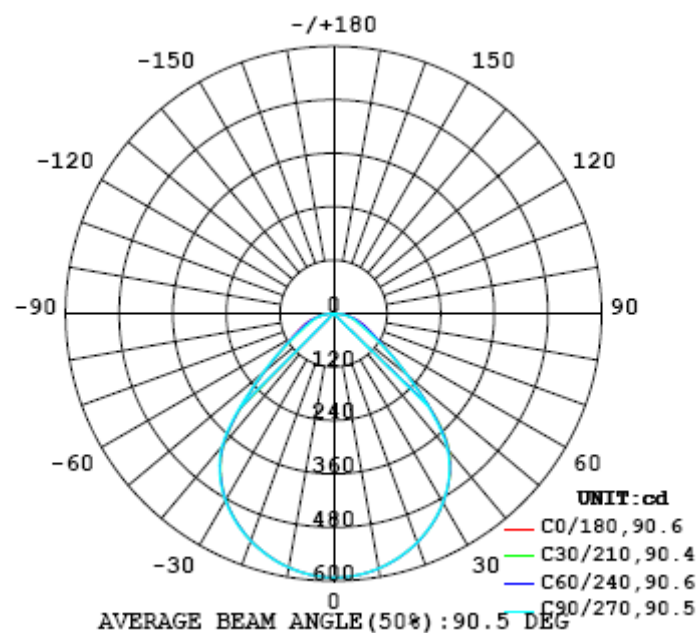


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592
5	590	590	590	590	590	590	590	590	590	589	589	589	589	589	589	589	588	588	589
10	581	581	581	581	581	581	581	581	581	580	580	580	580	579	579	579	578	578	579
15	566	567	567	567	567	567	567	567	567	566	565	565	565	564	563	563	563	563	563
20	547	547	547	547	547	547	547	547	546	546	546	545	544	543	543	542	542	542	542
25	521	522	522	522	522	522	522	521	521	520	520	519	518	517	517	516	516	515	516
30	490	491	491	491	491	490	490	490	490	489	488	487	486	485	484	484	483	483	483
35	452	452	452	452	452	452	451	451	450	450	448	447	446	444	443	442	442	441	443
40	402	402	402	401	401	400	399	398	397	395	393	391	389	387	385	384	382	382	384
45	315	315	315	314	314	313	311	310	307	305	302	301	298	296	293	291	288	288	290
50	217	218	219	219	219	219	218	217	216	215	213	211	208	206	205	203	201	200	201
55	151	151	152	152	152	152	152	151	150	149	147	147	146	144	142	140	139	139	142
60	111	110	106	104	105	109	113	110	105	102	102	106	109	106	100	97.2	97.0	101	106
65	85.7	83.7	76.9	73.6	75.5	82.1	87.5	84.2	77.0	73.2	74.4	80.3	85.4	82.1	75.1	71.9	71.6	76.9	83.4
70	68.1	66.4	60.3	56.1	58.2	64.7	69.3	67.1	60.9	56.6	58.1	63.9	67.7	65.5	59.8	55.6	56.5	61.7	66.1
75	51.8	51.2	47.7	44.1	45.6	50.0	52.2	51.4	47.8	44.4	45.5	49.1	50.6	49.5	46.4	43.3	44.0	47.2	49.3
80	34.5	34.5	33.4	31.6	32.3	34.0	34.5	34.2	33.0	31.3	31.6	32.7	32.7	32.2	30.9	29.6	29.6	30.8	31.6
85	17.1	17.2	16.8	16.2	16.4	16.7	16.7	16.5	16.0	15.2	14.9	14.9	14.5	13.9	13.3	12.6	12.4	12.7	13.2
90	0.37	0.43	0.44	0.43	0.39	0.33	0.25	0.19	0.13	0.09	0.08	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02
95	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.04	0.04	0.04	0.04	0.06	0.07	0.05	0.05
100	0.07	0.07	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.07	0.07	0.08	0.09	0.09	0.10	0.09	0.08
105	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.09	0.09	0.10	0.10	0.11	0.10	0.10
110	0.08	0.09	0.09	0.10	0.10	0.11	0.12	0.11	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12
115	0.11	0.12	0.13	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.17	0.17	0.17	0.16	0.15
120	0.15	0.16	0.19	0.20	0.20	0.18	0.17	0.17	0.18	0.19	0.18	0.18	0.19	0.20	0.21	0.25	0.34	0.29	0.20
125	0.19	0.21	0.25	0.25	0.23	0.22	0.21	0.21	0.22	0.23	0.23	0.23	0.23	0.26	0.27	0.28	0.34	0.36	0.25
130	0.24	0.26	0.28	0.28	0.28	0.28	0.26	0.27	0.27	0.27	0.28	0.27	0.28	0.30	0.31	0.33	0.36	0.36	0.33
135	0.30	0.32	0.33	0.33	0.33	0.33	0.33	0.32	0.33	0.33	0.33	0.33	0.33	0.34	0.36	0.37	0.39	0.41	0.43
140	0.36	0.37	0.38	0.39	0.39	0.39	0.39	0.39	0.38	0.38	0.39	0.39	0.39	0.40	0.41	0.42	0.42	0.46	0.54
145	0.41	0.41	0.43	0.43	0.43	0.44	0.44	0.44	0.44	0.43	0.44	0.44	0.44	0.44	0.45	0.46	0.46	0.49	0.59
150	0.46	0.47	0.47	0.47	0.47	0.47	0.48	0.48	0.47	0.47	0.48	0.47	0.48	0.49	0.50	0.49	0.48	0.53	0.64
155	0.51	0.50	0.51	0.51	0.51	0.51	0.51	0.51	0.52	0.51	0.52	0.53	0.53	0.54	0.54	0.52	0.51	0.56	0.67
160	0.54	0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.54	0.53	0.54	0.55	0.55	0.56	0.56	0.56	0.54	0.58	0.70
165	0.56	0.57	0.57	0.58	0.58	0.57	0.57	0.57	0.57	0.56	0.57	0.57	0.58	0.59	0.59	0.59	0.57	0.60	0.71
170	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.59	0.60	0.60	0.60	0.61	0.61	0.62	0.62	0.62	0.61	0.62	0.69
175	0.64	0.64	0.64	0.64	0.64	0.64	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.64	0.64	0.64	0.64	0.65
180	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.62	0.63	0.63	0.63	0.63	0.62

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	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592	592		
5	588	588	588	589	588	588	588	588	588	589	589	589	589	589	589	590	590		
10	578	578	578	578	579	579	579	579	579	579	579	580	580	580	581	581	581		
15	563	563	563	563	563	563	563	564	564	564	565	565	565	565	566	566	567		
20	542	542	542	542	542	542	542	543	543	544	544	545	545	545	546	546	547		
25	516	515	515	515	515	516	516	517	517	518	518	519	519	520	520	521	522		
30	483	482	482	482	482	483	484	485	485	486	486	487	487	488	489	490	490		
35	442	441	441	441	441	442	443	444	445	446	447	448	449	449	450	451	452		
40	383	383	382	383	384	385	386	388	390	391	393	394	396	398	399	401	402		
45	289	288	288	289	290	292	294	296	298	300	303	305	308	310	312	315	317		
50	201	201	201	201	202	203	204	206	208	209	211	212	213	215	217	218	218		
55	141	140	139	140	141	142	143	143	144	145	147	148	150	150	151	153	153		
60	104	98.4	96.1	97.2	101	106	106	101	98.7	100	104	109	109	105	104	105	108		
65	80.8	73.6	69.8	71.1	76.8	82.7	81.1	74.3	70.4	72.0	78.2	84.6	83.4	76.8	73.0	74.4	80.4		
70	64.2	58.3	54.2	55.7	60.8	65.0	63.9	58.1	53.7	55.4	61.5	66.6	65.3	59.6	55.1	56.9	63.3		
75	48.2	45.3	42.2	43.3	46.4	48.2	47.6	44.9	41.9	43.3	47.3	49.7	49.2	46.4	43.1	44.8	49.6		
80	31.0	30.1	28.8	29.1	30.3	30.9	30.7	30.2	29.2	29.9	31.6	32.4	32.6	31.9	30.8	31.9	34.0		
85	12.9	12.5	12.1	12.3	12.8	13.1	13.3	13.5	13.6	14.1	14.7	15.2	15.6	15.8	15.7	16.3	17.1		
90	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.11	0.22	0.35	0.49	0.57		
95	0.05	0.05	0.04	0.05	0.04	0.07	0.06	0.07	0.08	0.07	0.04	0.05	0.04	0.04	0.04	0.04	0.04		
100	0.09	0.09	0.09	0.09	0.08	0.11	0.10	0.07	0.09	0.09	0.07	0.08	0.08	0.07	0.07	0.07	0.07		
105	0.09	0.09	0.09	0.09	0.09	0.10	0.13	0.13	0.13	0.12	0.09	0.11	0.12	0.09	0.09	0.09	0.08		
110	0.12	0.12	0.12	0.12	0.12	0.12	0.14	0.19	0.27	0.23	0.13	0.11	0.11	0.10	0.09	0.09	0.09		
115	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.18	0.21	0.19	0.16	0.15	0.14	0.14	0.13	0.13	0.13		
120	0.20	0.20	0.20	0.20	0.19	0.18	0.19	0.22	0.22	0.21	0.21	0.22	0.18	0.18	0.18	0.18	0.17		
125	0.26	0.26	0.25	0.25	0.24	0.23	0.24	0.27	0.27	0.26	0.26	0.24	0.23	0.23	0.23	0.23	0.23		
130	0.34	0.33	0.32	0.32	0.31	0.30	0.33	0.35	0.34	0.33	0.33	0.32	0.30	0.30	0.30	0.30	0.29		
135	0.42	0.41	0.40	0.40	0.40	0.39	0.42	0.43	0.42	0.41	0.41	0.41	0.39	0.39	0.39	0.39	0.37		
140	0.52	0.50	0.49	0.49	0.49	0.48	0.49	0.50	0.51	0.51	0.50	0.50	0.50	0.49	0.47	0.49	0.47		
145	0.63	0.62	0.58	0.59	0.59	0.56	0.57	0.59	0.59	0.59	0.58	0.58	0.58	0.57	0.56	0.57	0.55		
150	0.67	0.66	0.64	0.65	0.66	0.64	0.64	0.65	0.65	0.65	0.64	0.64	0.64	0.64	0.62	0.63	0.61		
155	0.69	0.69	0.68	0.69	0.71	0.69	0.69	0.69	0.69	0.68	0.68	0.67	0.68	0.68	0.66	0.67	0.65		
160	0.69	0.70	0.68	0.70	0.72	0.71	0.71	0.71	0.71	0.71	0.71	0.70	0.70	0.69	0.68	0.69	0.67		
165	0.70	0.70	0.69	0.68	0.71	0.71	0.70	0.71	0.71	0.71	0.71	0.70	0.70	0.70	0.69	0.68	0.67		
170	0.69	0.67	0.67	0.67	0.69	0.70	0.69	0.69	0.69	0.70	0.69	0.69	0.69	0.69	0.68	0.68	0.67		
175	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.66	0.66	0.65	0.65	0.66	0.67	0.66		
180	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63		

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.

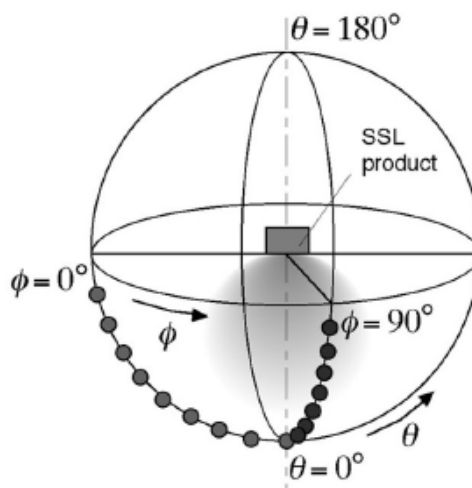
Color Characteristics Measurements

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 ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.