



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

DOWNLIGHT

Model: 15SMPS7DIM/927/R

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17120058a

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

Review by:

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Jan. 08, 2018

Approved by: *Jim Zhang*

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/927/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
70.7	1055.5	14.93	0.9526
CCT (K)	CRI	Stabilization Time (Light & Power)	
2658	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	: 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/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)	0.131
Power Factor	0.9526
Test Power (W)	14.93
THD A%	31.01
Luminous Efficacy (lm/W)	70.7
Total Luminous Flux (lm)	1055.5
Color Rendering Index (CRI)	92.8
R9	65
Correlated Color Temperature (CCT) (K)	2658
Chromaticity (Chroma x, Chroma y)	(0.4679, 0.4193)
Chromaticity (Chroma u, Chroma v)	(0.2637, 0.3545)
Chromaticity (Chroma u', Chroma v')	(0.2637, 0.5318)
Duv	0.0025
Average Beam Angle (°)	90.7
Center Beam Candle Power (cd)	501
Spacing Criteria	1.23 (0°-180°)/ 1.22 (90°-270°)
Zonal Lumens in the 0°-60°Zone	88.21%
Zonal Lumens in the 60°-90°Zone	11.66%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.11%

Special Rendering Indices	Color
R1	93
R2	95
R3	95
R4	94
R5	92
R6	93
R7	95
R8	85
R9	65
R10	86
R11	94
R12	78
R13	93
R14	96
Rf	92
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

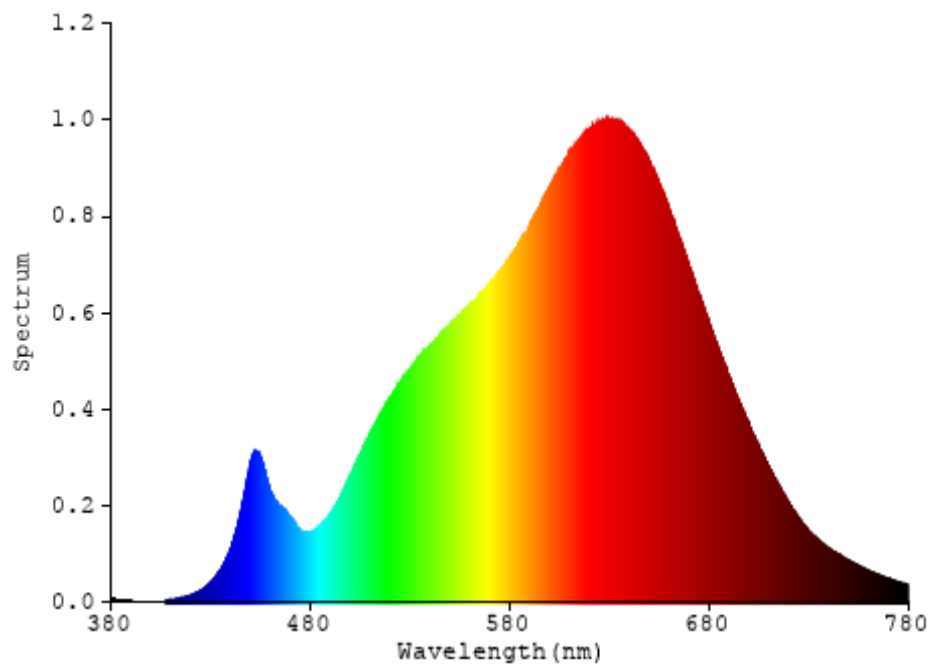


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	47.327	4.48%
10- 20	134.763	12.77%
20- 30	201.91	19.13%
30- 40	235.237	22.29%
40- 50	197.206	18.68%
50- 60	114.538	10.85%
60- 70	67.176	6.36%
70- 80	42.045	3.98%
80- 90	13.809	1.31%
90-100	0.044	0.00%
100-110	0.094	0.01%
110-120	0.139	0.01%
120-130	0.201	0.02%
130-140	0.255	0.02%
140-150	0.276	0.03%
150-160	0.239	0.02%
160-170	0.156	0.01%
170-180	0.053	0.01%
Total	1055.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	930.981	88.21%
60- 90	123.03	11.66%
0-90	1054.011	99.86%
90- 180	1.457	0.14%
0- 180	1055.5	100%

Table 3: Zonal Lumen Data

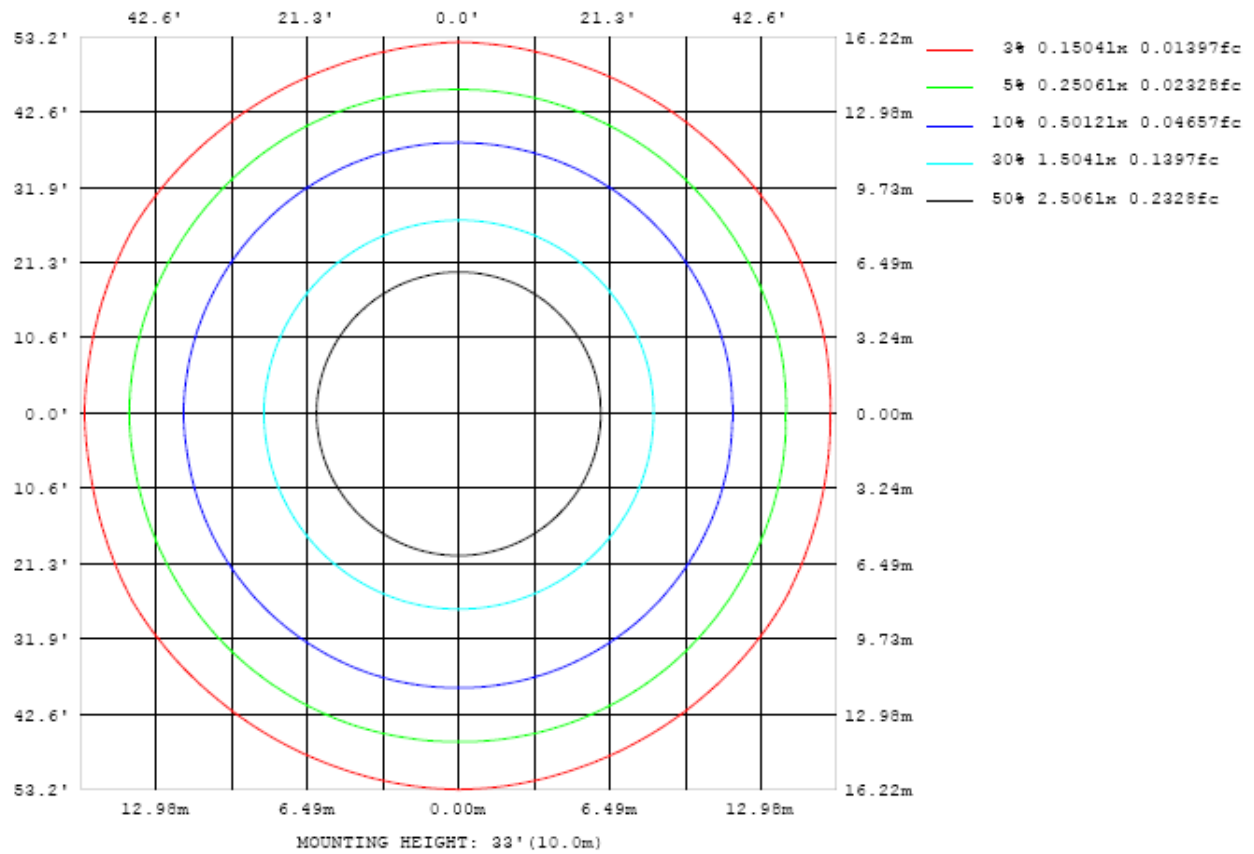


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

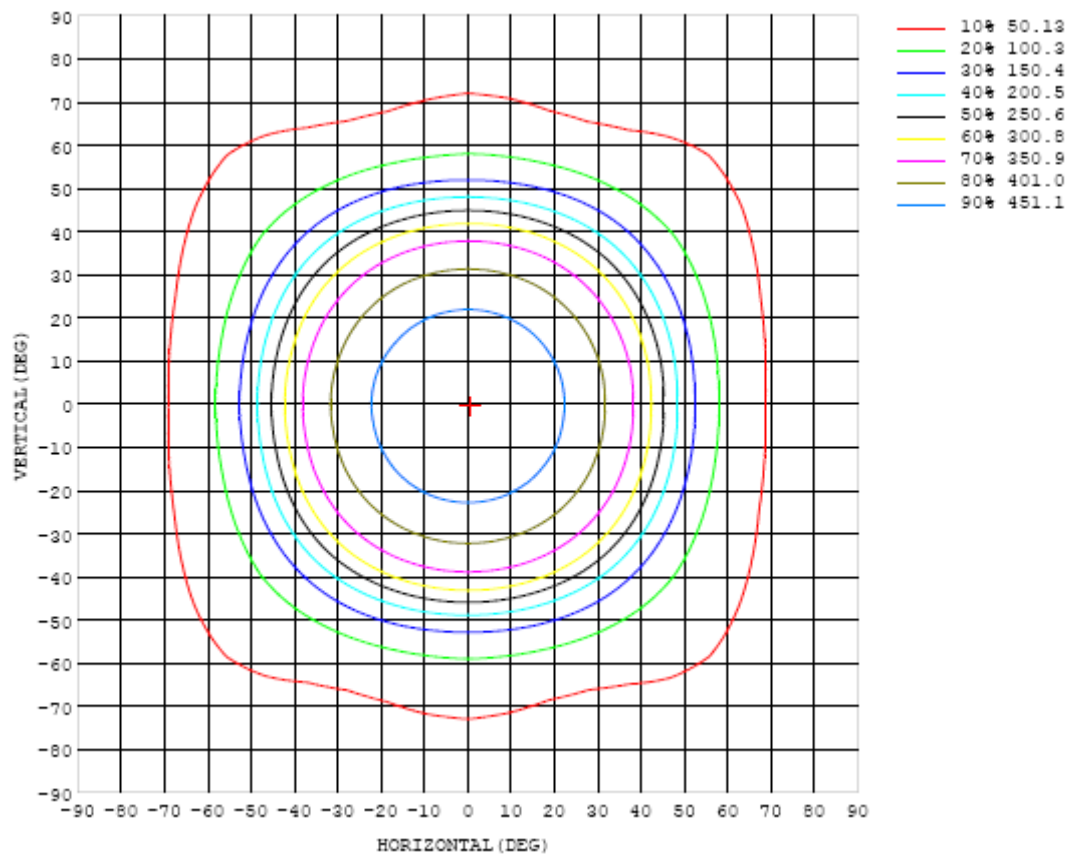


Chart 3: Isocandela Plot

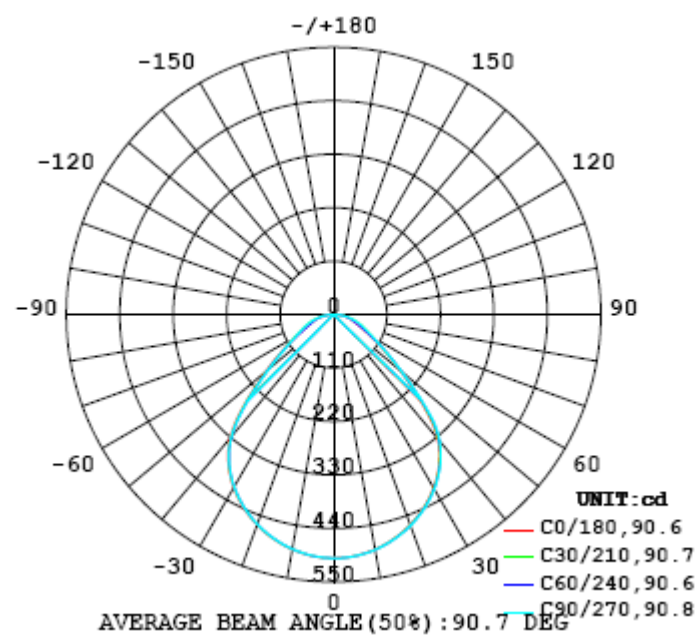


Chart 4: Polar Candela Distribution

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	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501
5	499	498	499	499	499	499	499	499	499	499	499	499	499	499	499	498	498	499	499
10	490	491	491	491	491	491	491	491	491	491	491	491	491	491	491	491	491	490	491
15	478	478	478	478	478	479	479	479	479	479	479	479	479	479	479	478	478	478	478
20	460	461	461	461	461	462	462	462	462	462	462	462	462	462	461	461	461	460	461
25	438	439	439	439	440	440	441	441	441	441	441	441	440	440	440	439	439	438	439
30	411	412	412	413	413	413	414	414	415	415	415	414	414	413	413	412	412	411	412
35	378	378	379	380	380	381	381	382	382	382	382	381	381	380	379	379	378	378	378
40	333	334	335	336	337	338	338	339	340	340	340	339	337	336	335	334	333	331	332
45	255	257	259	261	262	263	264	266	267	267	267	265	264	263	262	260	258	256	257
50	179	180	181	181	182	183	184	184	184	184	185	185	184	184	183	182	182	181	182
55	125	126	126	126	127	129	129	130	129	129	129	129	129	129	128	127	126	126	128
60	86.3	87.3	90.1	93.7	92.1	90.2	89.7	90.5	92.6	95.1	92.7	90.3	89.5	89.9	92.0	94.2	90.9	87.9	88.4
65	61.8	63.2	68.1	72.9	70.6	65.9	63.8	65.0	70.4	73.6	70.2	65.4	63.9	65.5	70.7	73.3	69.4	64.5	63.2
70	46.9	48.8	53.7	58.1	55.6	50.6	47.7	49.4	54.5	58.4	55.3	50.4	48.0	49.8	54.9	58.3	54.9	50.2	48.0
75	36.3	38.3	41.6	44.0	42.6	39.7	36.9	38.8	42.1	44.3	42.7	39.7	37.2	39.0	42.1	44.1	42.4	39.5	37.3
80	25.3	26.6	28.0	28.9	28.5	27.6	26.1	27.4	28.8	29.6	29.1	27.8	26.3	27.4	28.4	29.1	28.5	27.3	26.2
85	11.9	12.6	13.2	13.6	13.6	13.6	13.3	13.7	14.3	14.6	14.4	13.9	13.3	13.5	13.7	13.7	13.5	13.0	12.7
90	0.02	0.03	0.08	0.04	0.08	0.10	0.13	0.17	0.21	0.25	0.28	0.25	0.24	0.20	0.17	0.13	0.09	0.06	0.08
95	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.04	0.03	0.02	0.04	0.07	0.04	0.04
100	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.07	0.08	0.09	0.10	0.09	0.07
105	0.06	0.08	0.07	0.07	0.07	0.07	0.06	0.08	0.10	0.11	0.11	0.09	0.08	0.08	0.09	0.10	0.10	0.10	0.08
110	0.08	0.08	0.11	0.09	0.09	0.09	0.11	0.11	0.12	0.12	0.12	0.10	0.10	0.11	0.11	0.12	0.12	0.10	0.10
115	0.11	0.12	0.14	0.13	0.13	0.14	0.13	0.13	0.15	0.15	0.14	0.12	0.13	0.14	0.15	0.15	0.16	0.12	0.12
120	0.14	0.14	0.18	0.22	0.18	0.17	0.16	0.16	0.17	0.17	0.17	0.15	0.16	0.17	0.18	0.21	0.28	0.20	0.17
125	0.18	0.19	0.23	0.22	0.48	0.21	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.21	0.22	0.25	0.40	0.25	0.23
130	0.23	0.24	0.26	0.25	0.25	0.61	0.24	0.25	0.25	0.25	0.24	0.24	0.23	0.24	0.26	0.27	0.33	0.36	0.29
135	0.27	0.29	0.30	0.30	0.29	0.30	0.32	0.30	0.30	0.29	0.29	0.28	0.28	0.29	0.31	0.32	0.35	0.33	0.39
140	0.32	0.32	0.34	0.35	0.34	0.34	0.35	0.35	0.35	0.34	0.34	0.33	0.33	0.34	0.35	0.37	0.38	0.40	0.49
145	0.36	0.36	0.38	0.39	0.39	0.39	0.38	0.38	0.38	0.38	0.38	0.37	0.37	0.37	0.39	0.40	0.41	0.42	0.49
150	0.40	0.40	0.42	0.42	0.42	0.42	0.42	0.42	0.41	0.41	0.41	0.40	0.41	0.42	0.43	0.43	0.44	0.44	0.55
155	0.45	0.45	0.45	0.45	0.45	0.46	0.45	0.45	0.45	0.44	0.44	0.44	0.44	0.45	0.46	0.46	0.47	0.47	0.61
160	0.47	0.47	0.47	0.47	0.47	0.48	0.48	0.48	0.47	0.46	0.46	0.47	0.47	0.48	0.49	0.48	0.49	0.49	0.62
165	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.49	0.49	0.49	0.50	0.51	0.51	0.51	0.51	0.51	0.61
170	0.51	0.51	0.51	0.51	0.51	0.52	0.52	0.52	0.51	0.51	0.51	0.52	0.53	0.53	0.53	0.53	0.53	0.53	0.60
175	0.55	0.55	0.55	0.55	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.54	0.54	0.54	0.54	0.55
180	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53

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	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501		
5	498	498	498	498	498	498	498	498	498	498	498	498	498	498	498	498	498		
10	490	490	490	490	490	490	490	490	490	490	490	490	490	490	490	491	491		
15	478	477	477	477	477	477	477	477	477	477	477	477	477	477	477	478	478		
20	460	460	459	459	459	459	459	459	459	459	459	459	459	459	460	460	461		
25	438	438	437	437	437	437	437	437	437	437	437	437	437	437	438	438	439		
30	411	410	410	409	409	409	409	409	409	410	410	410	410	410	411	411	412		
35	377	376	376	375	375	374	374	375	375	375	375	375	376	376	377	378	378		
40	331	329	328	327	327	326	326	327	327	327	328	328	329	330	331	332	333		
45	256	255	253	252	250	249	249	249	249	249	249	249	251	252	254	256	257		
50	181	179	178	176	176	175	174	174	173	174	174	175	176	177	177	179	180		
55	126	125	124	123	123	122	122	121	121	121	122	122	123	123	124	125	126		
60	88.1	90.0	92.4	88.9	85.9	84.7	84.5	86.8	90.3	87.7	84.9	84.4	85.2	88.1	92.0	90.2	88.0		
65	63.9	68.3	72.1	68.0	62.9	61.0	61.5	65.9	70.6	67.3	61.9	60.5	62.0	66.9	71.8	69.0	63.9		
70	49.5	53.8	57.1	53.7	49.1	46.8	48.0	52.1	55.9	53.1	48.4	46.3	48.2	52.7	56.9	54.4	49.5		
75	38.8	41.3	42.9	41.0	38.3	36.0	37.5	40.0	41.8	40.4	37.7	35.6	37.7	40.6	42.7	41.6	38.9		
80	27.0	27.7	28.0	27.0	25.9	24.6	25.3	26.3	27.0	26.3	25.4	24.3	25.5	26.8	27.7	27.4	26.8		
85	12.7	12.5	12.3	11.7	11.2	10.7	10.7	11.0	11.2	11.0	10.7	10.5	10.9	11.5	12.0	12.2	12.3		
90	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
95	0.04	0.04	0.04	0.03	0.03	0.05	0.06	0.07	0.07	0.07	0.03	0.04	0.03	0.03	0.04	0.04	0.04		
100	0.08	0.07	0.08	0.07	0.06	0.09	0.09	0.09	0.10	0.09	0.07	0.08	0.07	0.07	0.07	0.06	0.06		
105	0.07	0.07	0.08	0.07	0.08	0.09	0.12	0.13	0.15	0.14	0.10	0.10	0.09	0.08	0.08	0.07	0.07		
110	0.10	0.09	0.10	0.10	0.10	0.11	0.12	0.15	0.23	0.17	0.12	0.10	0.10	0.10	0.09	0.08	0.08		
115	0.13	0.12	0.13	0.13	0.13	0.13	0.14	0.18	0.20	0.17	0.14	0.15	0.14	0.13	0.12	0.13	0.13		
120	0.17	0.17	0.17	0.17	0.16	0.16	0.18	0.22	0.21	0.20	0.18	0.20	0.17	0.17	0.16	0.16	0.16		
125	0.22	0.22	0.22	0.21	0.20	0.21	0.22	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.21	0.21	0.21		
130	0.29	0.28	0.27	0.27	0.26	0.27	0.29	0.31	0.31	0.30	0.29	0.28	0.28	0.27	0.27	0.27	0.27		
135	0.36	0.35	0.34	0.34	0.34	0.35	0.37	0.38	0.38	0.37	0.37	0.36	0.35	0.35	0.34	0.34	0.35		
140	0.43	0.43	0.42	0.42	0.42	0.42	0.44	0.45	0.45	0.44	0.45	0.45	0.43	0.42	0.41	0.42	0.42		
145	0.51	0.51	0.49	0.52	0.49	0.48	0.50	0.52	0.52	0.52	0.51	0.51	0.51	0.51	0.49	0.50	0.50		
150	0.54	0.54	0.54	0.56	0.55	0.53	0.56	0.57	0.56	0.56	0.56	0.56	0.55	0.56	0.54	0.55	0.55		
155	0.61	0.58	0.56	0.57	0.61	0.60	0.60	0.59	0.59	0.59	0.59	0.59	0.59	0.58	0.57	0.58	0.59		
160	0.60	0.62	0.58	0.59	0.61	0.62	0.61	0.61	0.61	0.60	0.61	0.61	0.60	0.60	0.59	0.59	0.60		
165	0.62	0.62	0.58	0.59	0.60	0.61	0.61	0.61	0.61	0.61	0.61	0.60	0.60	0.59	0.59	0.59	0.60		
170	0.60	0.59	0.57	0.57	0.58	0.60	0.60	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.58	0.58	0.58		
175	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.56	0.56	0.55	0.56	0.57	0.57	0.57		
180	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53		

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.