

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

DOWNLIGHT

Model: 15SMPS7DIM/930/R

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17120058c

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: 

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/930/R

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
78.3	1173.1	14.99	0.9610
CCT (K)	CRI	Stabilization Time (Light & Power)	
3059	93.8	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/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	0.9610
Test Power (W)	14.99
THD A%	27.41
Luminous Efficacy (lm/W)	78.3
Total Luminous Flux (lm)	1173.1
Color Rendering Index (CRI)	93.8
R9	72
Correlated Color Temperature (CCT) (K)	3059
Chromaticity (Chroma x, Chroma y)	(0.4352, 0.4078)
Chromaticity (Chroma u, Chroma v)	(0.2479, 0.3484)
Chromaticity (Chroma u', Chroma v')	(0.2479, 0.5226)
Duv	0.0017
Average Beam Angle (°)	91.5
Center Beam Candle Power (cd)	548
Spacing Criteria	1.22 (0°-180°)/ 1.23 (90°-270°)
Zonal Lumens in the 0°-60°Zone	87.89%
Zonal Lumens in the 60°-90°Zone	11.97%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.11%

Special Rendering Indices	Color
R1	94
R2	95
R3	94
R4	95
R5	93
R6	93
R7	96
R8	89
R9	72
R10	87
R11	96
R12	79
R13	94
R14	96
Rf	92
Rg	101

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

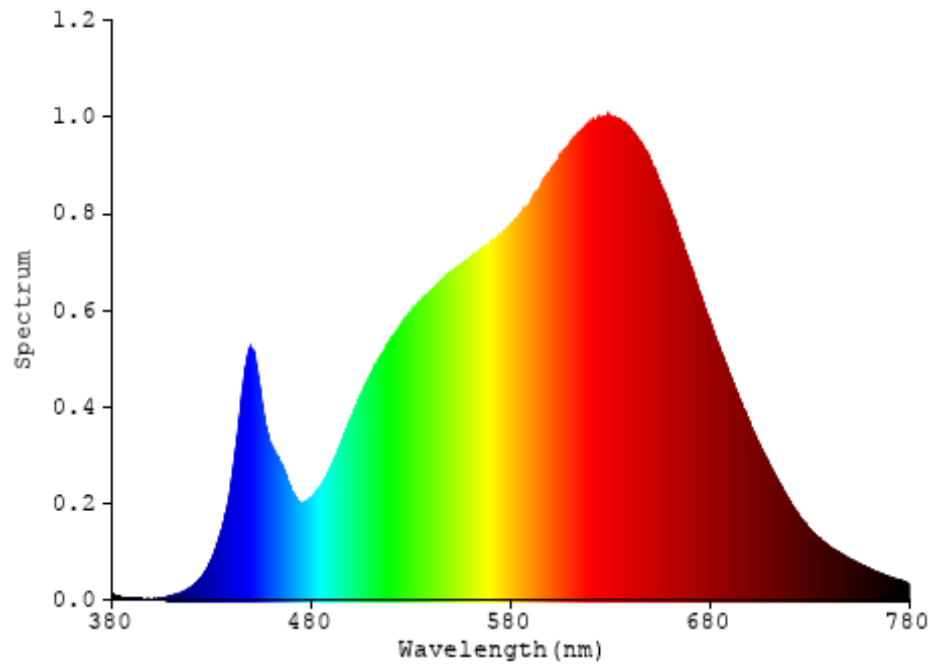


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	51.755	4.41%
10- 20	147.391	12.56%
20- 30	221.137	18.85%
30- 40	258.844	22.06%
40- 50	221.449	18.88%
50- 60	130.499	11.12%
60- 70	76.956	6.56%
70- 80	48.092	4.10%
80- 90	15.43	1.32%
90-100	0.05	0.00%
100-110	0.103	0.01%
110-120	0.152	0.01%
120-130	0.217	0.02%
130-140	0.274	0.02%
140-150	0.298	0.03%
150-160	0.255	0.02%
160-170	0.166	0.01%
170-180	0.057	0.00%
Total	1173.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1031.075	87.89%
60- 90	140.478	11.97%
0-90	1171.553	99.87%
90- 180	1.572	0.13%
0- 180	1173.1	100%

Table 3: Zonal Lumen Data

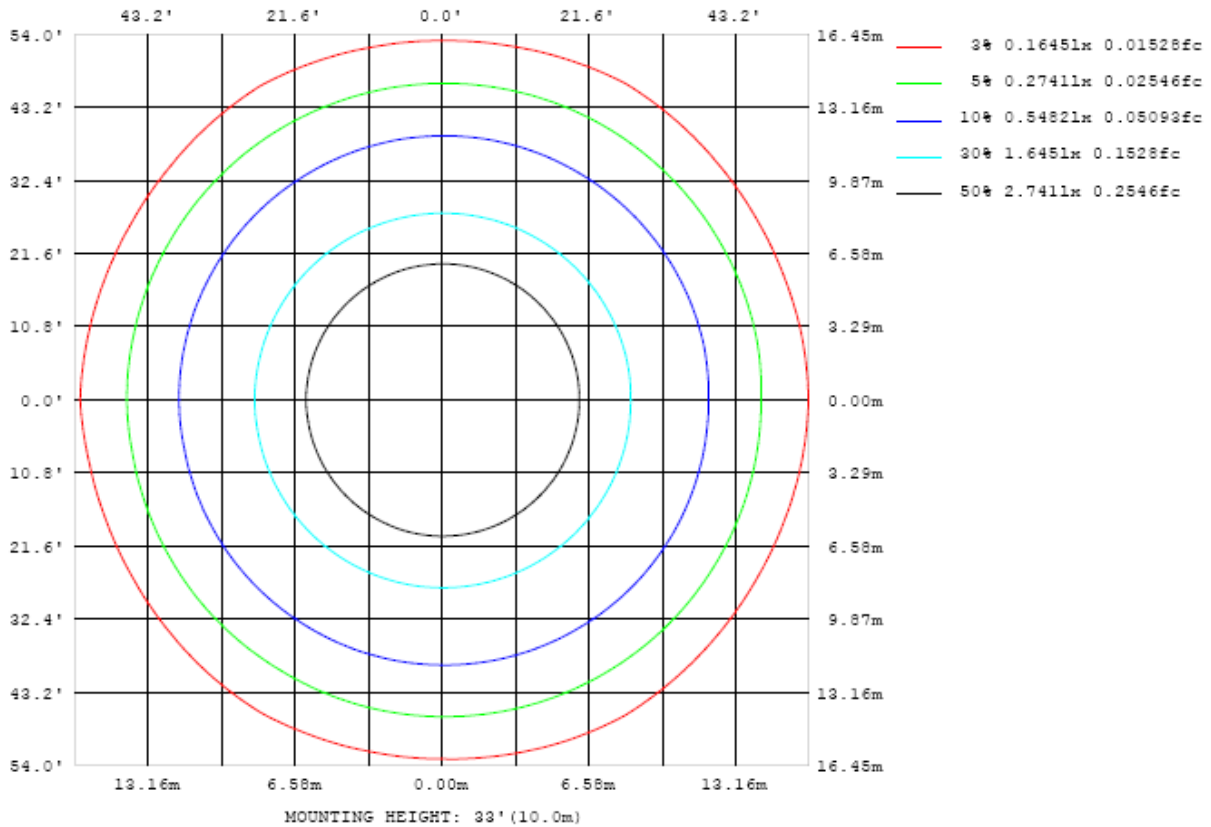


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

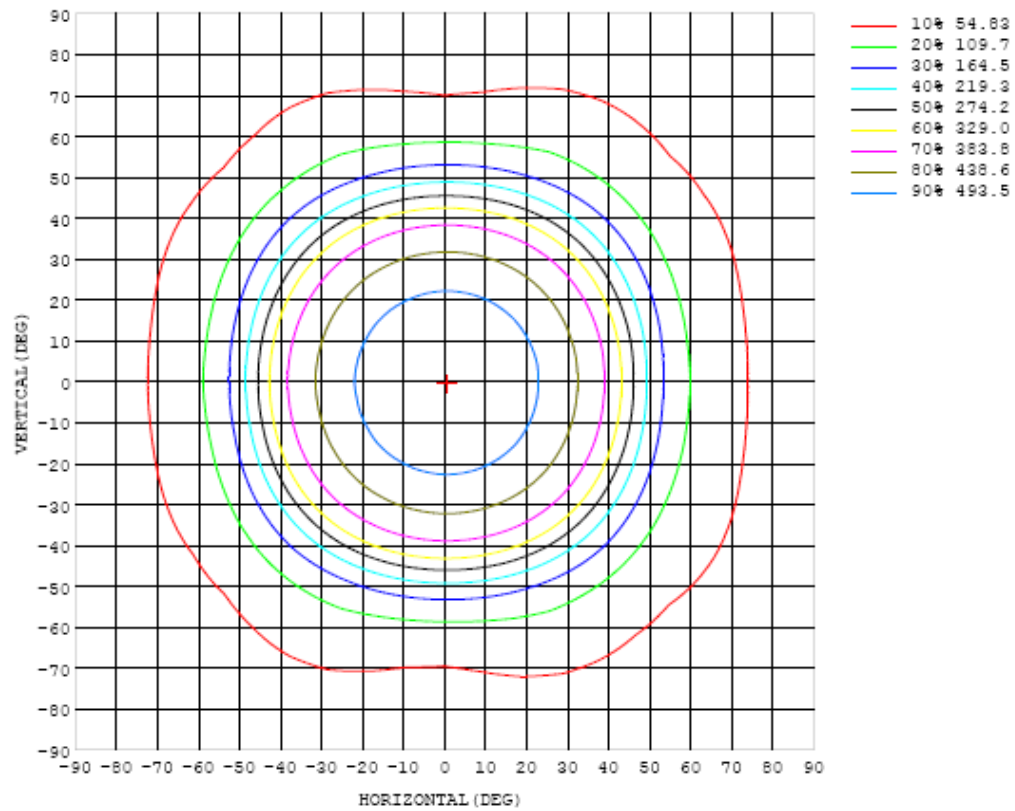


Chart 3: Isocandela Plot

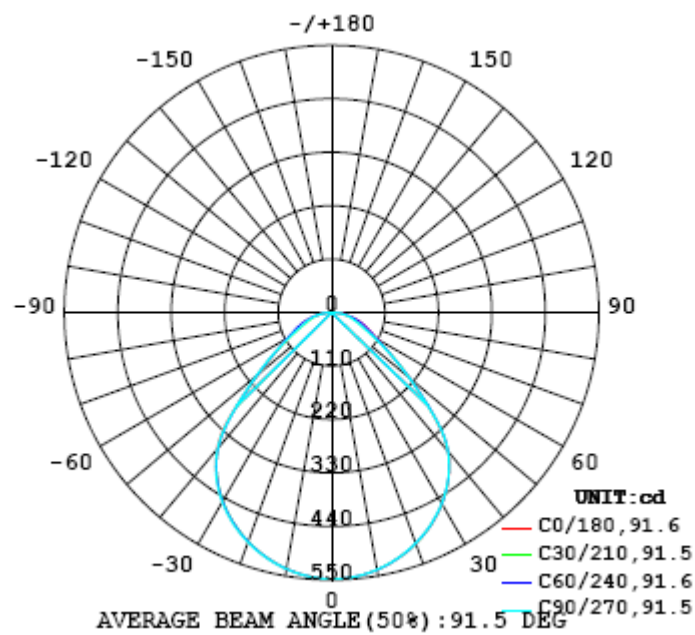


Chart 4: Polar Candela Distribution

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	546	546	546	546	546	546	545	546	545	545	545	545	545	545	545	545	544	545	545
10	537	537	537	538	538	538	537	537	537	537	537	536	536	536	536	535	535	535	536
15	524	524	524	524	524	524	524	524	523	523	523	522	522	522	522	521	521	521	521
20	506	506	506	506	506	506	505	505	505	505	505	504	503	503	503	502	502	502	502
25	483	483	483	483	483	482	482	482	482	482	481	480	480	479	479	478	478	478	478
30	454	454	454	454	454	454	454	454	453	453	452	451	451	450	449	448	448	448	449
35	419	419	419	419	419	419	419	418	418	418	417	416	415	414	413	412	412	412	413
40	372	372	373	373	373	373	373	373	372	372	371	370	369	368	367	366	365	365	367
45	294	294	294	295	295	295	295	295	295	294	293	291	290	288	287	285	284	283	287
50	208	209	209	210	210	210	209	209	208	207	206	204	202	201	200	198	197	196	198
55	146	146	147	146	147	146	146	146	145	144	143	142	141	140	140	138	138	137	139
60	109	106	103	101	102	105	108	105	101	99.0	99.0	102	104	102	97.6	95.0	95.5	98.7	104
65	85.2	82.1	75.6	72.7	73.7	78.8	83.8	80.6	73.7	70.4	71.1	76.1	80.9	77.4	71.1	67.5	68.8	74.2	80.3
70	68.7	65.6	59.7	55.8	57.6	62.5	67.1	64.1	57.8	53.4	54.9	59.9	64.1	61.1	55.3	50.9	52.8	58.3	63.0
75	51.5	50.0	46.8	43.0	45.2	48.3	50.3	48.7	45.4	41.2	43.0	45.9	47.4	45.9	42.8	39.0	41.1	44.2	46.6
80	33.7	33.1	32.2	30.0	31.3	32.5	32.8	32.2	31.1	28.8	29.6	30.5	30.5	29.6	28.7	26.6	27.7	28.6	29.8
85	15.7	15.4	15.3	14.5	15.0	15.2	15.3	14.9	14.7	13.7	13.8	13.8	13.5	12.9	12.6	11.7	11.9	12.1	12.8
90	0.18	0.21	0.23	0.25	0.24	0.21	0.18	0.18	0.14	0.10	0.06	0.06	0.04	0.03	0.02	0.02	0.02	0.02	0.02
95	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.06	0.06	0.05	0.04
100	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.08	0.07	0.07	0.08	0.09	0.09	0.09	0.09	0.09
105	0.08	0.08	0.09	0.09	0.09	0.09	0.08	0.09	0.10	0.10	0.10	0.10	0.08	0.12	0.11	0.11	0.11	0.10	0.10
110	0.08	0.10	0.11	0.10	0.10	0.10	0.11	0.11	0.12	0.12	0.13	0.12	0.12	0.13	0.13	0.13	0.13	0.12	0.12
115	0.10	0.12	0.14	0.13	0.15	0.13	0.13	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.17	0.16	0.16	0.15
120	0.14	0.16	0.20	0.26	0.19	0.17	0.16	0.17	0.18	0.18	0.18	0.19	0.19	0.20	0.21	0.26	0.27	0.24	0.20
125	0.19	0.21	0.28	0.24	0.23	0.21	0.20	0.21	0.22	0.22	0.22	0.22	0.23	0.24	0.25	0.27	0.36	0.39	0.26
130	0.23	0.27	0.27	0.27	0.26	0.25	0.25	0.25	0.26	0.27	0.26	0.27	0.27	0.29	0.29	0.31	0.33	0.34	0.36
135	0.30	0.32	0.31	0.31	0.31	0.30	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.33	0.35	0.35	0.36	0.36	0.45
140	0.34	0.36	0.36	0.36	0.37	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.38	0.40	0.38	0.40	0.41	0.52
145	0.38	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.40	0.42	0.43	0.42	0.44	0.45	0.58
150	0.42	0.43	0.43	0.43	0.44	0.44	0.45	0.45	0.46	0.44	0.44	0.44	0.45	0.46	0.46	0.47	0.45	0.47	0.61
155	0.47	0.47	0.47	0.47	0.46	0.46	0.47	0.48	0.48	0.47	0.48	0.48	0.49	0.49	0.50	0.50	0.50	0.48	0.63
160	0.49	0.49	0.49	0.50	0.49	0.49	0.50	0.50	0.50	0.49	0.50	0.51	0.51	0.52	0.52	0.53	0.53	0.53	0.64
165	0.51	0.51	0.52	0.52	0.53	0.53	0.53	0.53	0.52	0.52	0.53	0.54	0.54	0.55	0.55	0.55	0.55	0.55	0.65
170	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.55	0.56	0.57	0.57	0.57	0.58	0.58	0.58	0.58	0.64
175	0.59	0.59	0.59	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.61	0.60	0.61	0.61	0.60	0.60	0.60	0.60	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	0.59	0.59	0.59	0.59

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	544	544	544	545	545	544	544	545	545	545	545	545	545	546	546	546	546		
10	535	535	535	535	535	535	535	536	536	536	537	536	537	537	537	537	538		
15	521	521	521	521	521	521	521	522	522	522	523	523	523	524	524	524	524		
20	502	502	502	502	502	502	502	503	503	504	504	504	505	505	505	506	506		
25	478	478	477	478	478	478	478	479	480	480	480	481	481	482	482	483	483		
30	449	448	448	448	448	448	449	450	451	451	451	452	452	453	454	454	455		
35	412	412	411	411	412	412	413	414	414	415	415	416	416	417	418	419	420		
40	366	365	364	364	364	364	364	365	366	366	367	368	369	370	371	372	374		
45	285	283	282	282	282	282	283	283	284	285	286	288	289	291	292	294	296		
50	198	198	198	199	199	199	201	202	203	204	205	205	206	208	209	210	210		
55	139	139	139	140	141	141	142	142	143	144	145	146	146	147	147	148	148		
60	101	97.1	96.0	97.7	102	106	103	100	99.3	101	105	109	107	104	102	103	106		
65	76.2	70.5	68.4	70.9	77.8	82.7	78.8	73.7	71.7	73.7	80.0	85.8	82.4	76.9	74.3	75.3	80.6		
70	59.8	55.1	51.9	55.0	61.1	65.4	62.4	58.1	55.1	57.7	63.5	68.3	65.6	60.8	57.2	58.9	63.9		
75	45.4	42.9	39.8	42.7	46.0	48.1	47.4	45.1	42.5	45.2	48.5	50.9	50.0	47.6	44.2	46.5	49.7		
80	29.5	28.8	27.2	28.7	29.8	30.7	30.7	30.5	29.3	30.9	32.1	33.0	32.9	32.5	30.8	32.2	33.7		
85	12.6	12.4	11.8	12.3	12.7	13.0	13.2	13.4	13.2	14.0	14.4	14.8	15.0	15.2	14.7	15.4	16.1		
90	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.05	0.10	0.19	0.25	0.33		
95	0.05	0.04	0.04	0.05	0.04	0.06	0.06	0.07	0.07	0.06	0.05	0.05	0.04	0.04	0.04	0.04	0.04		
100	0.09	0.08	0.09	0.07	0.08	0.10	0.08	0.09	0.10	0.09	0.08	0.07	0.08	0.07	0.07	0.06	0.07		
105	0.09	0.09	0.09	0.09	0.09	0.09	0.12	0.13	0.13	0.12	0.09	0.08	0.09	0.09	0.08	0.07	0.08		
110	0.12	0.12	0.12	0.12	0.12	0.11	0.13	0.18	0.23	0.13	0.11	0.10	0.10	0.10	0.09	0.09	0.09		
115	0.15	0.15	0.16	0.16	0.15	0.14	0.15	0.20	0.19	0.18	0.14	0.14	0.15	0.14	0.12	0.12	0.12		
120	0.20	0.21	0.20	0.20	0.19	0.18	0.19	0.21	0.22	0.21	0.23	0.35	0.19	0.17	0.17	0.16	0.16		
125	0.26	0.26	0.26	0.24	0.23	0.22	0.23	0.25	0.26	0.26	0.25	0.23	0.23	0.22	0.21	0.21	0.22		
130	0.33	0.33	0.31	0.31	0.29	0.28	0.31	0.32	0.32	0.31	0.31	0.29	0.28	0.28	0.28	0.28	0.28		
135	0.43	0.40	0.39	0.38	0.37	0.37	0.39	0.41	0.40	0.39	0.39	0.39	0.36	0.36	0.36	0.36	0.36		
140	0.53	0.51	0.47	0.49	0.47	0.45	0.47	0.49	0.49	0.48	0.46	0.47	0.47	0.46	0.44	0.46	0.44		
145	0.58	0.58	0.54	0.56	0.54	0.52	0.54	0.56	0.56	0.55	0.54	0.53	0.54	0.53	0.52	0.53	0.51		
150	0.63	0.63	0.59	0.61	0.61	0.59	0.61	0.61	0.61	0.61	0.60	0.59	0.60	0.58	0.57	0.58	0.57		
155	0.65	0.65	0.62	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.63	0.62	0.61	0.62	0.61	0.63	0.63		
160	0.64	0.64	0.64	0.64	0.66	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.64	0.64	0.62	0.63	0.63		
165	0.66	0.66	0.63	0.63	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.63	0.63	0.63		
170	0.65	0.64	0.63	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.62	0.62	0.62		
175	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.60	0.60	0.60	0.61	0.60	0.60	0.61	0.61	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	0.59	0.59		

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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