

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

6" new construction Downlight

Model: 12NCDRL6DIM/940/EXT

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ18030026f

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

Review by:



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Mar. 20, 2018



Approved by: 

Manager: Jim Zhang
Mar. 20, 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: 12NCDRL6DIM/940/EXT

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
85.8	1077.7	12.56	0.9825
CCT (K)	CRI	Stabilization Time (Light & Power)	
3849	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	: Mar. 15, 2018
Date of Test	: Mar. 19, 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	: 6" new construction Downlight
Model	: 12NCDRL6DIM/940/EXT
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)	0.107
Power Factor	0.9825
Test Power (W)	12.56
THD A%	12.23
Luminous Efficacy (lm/W)	85.8
Total Luminous Flux (lm)	1077.7
Color Rendering Index (CRI)	93.7
R9	67
Correlated Color Temperature (CCT) (K)	3849
Chromaticity (Chroma x, Chroma y)	(0.3865, 0.3782)
Chromaticity (Chroma u, Chroma v)	(0.2285, 0.3354)
Chromaticity (Chroma u', Chroma v')	(0.2285, 0.5031)
Duv	0.0010
Average Beam Angle (°)	113.1
Center Beam Candle Power (cd)	372
Spacing Criteria	1.25 (0°-180°)/ 1.26 (90°-270°)
Zonal Lumens in the 0°-60°Zone	77.79%
Zonal Lumens in the 60°-90°Zone	22.07%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.11%

Special Rendering Indices	Color
R1	95
R2	99
R3	98
R4	92
R5	94
R6	95
R7	92
R8	85
R9	67
R10	96
R11	93
R12	74
R13	97
R14	100
Rf	88
Rg	97

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

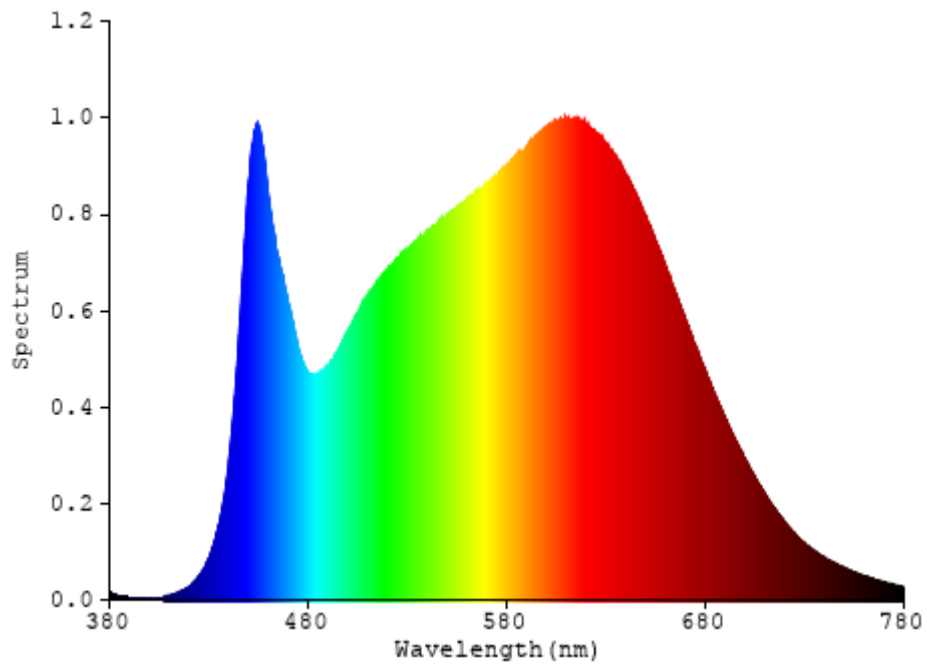


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	35.218	3.27%
10- 20	100.823	9.36%
20- 30	152.72	14.17%
30- 40	184.147	17.09%
40- 50	191.303	17.75%
50- 60	174.119	16.16%
60- 70	135.684	12.59%
70- 80	80.969	7.51%
80- 90	21.223	1.97%
90-100	0.055	0.01%
100-110	0.103	0.01%
110-120	0.162	0.02%
120-130	0.213	0.02%
130-140	0.258	0.02%
140-150	0.269	0.02%
150-160	0.224	0.02%
160-170	0.147	0.01%
170-180	0.049	0.00%
Total	1077.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	838.33	77.79%
60- 90	237.876	22.07%
0-90	1076.206	99.86%
90- 180	1.48	0.14%
0- 180	1077.7	100%

Table 3: Zonal Lumen Data

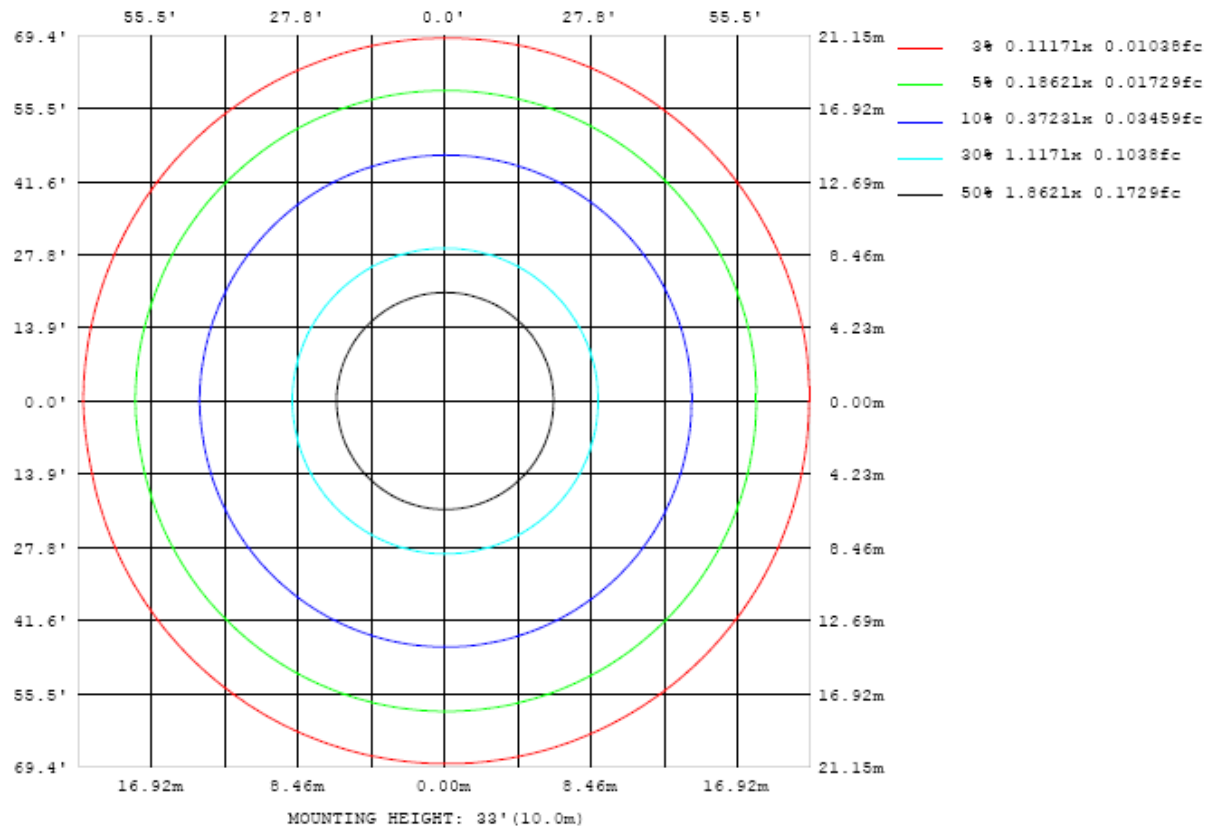


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

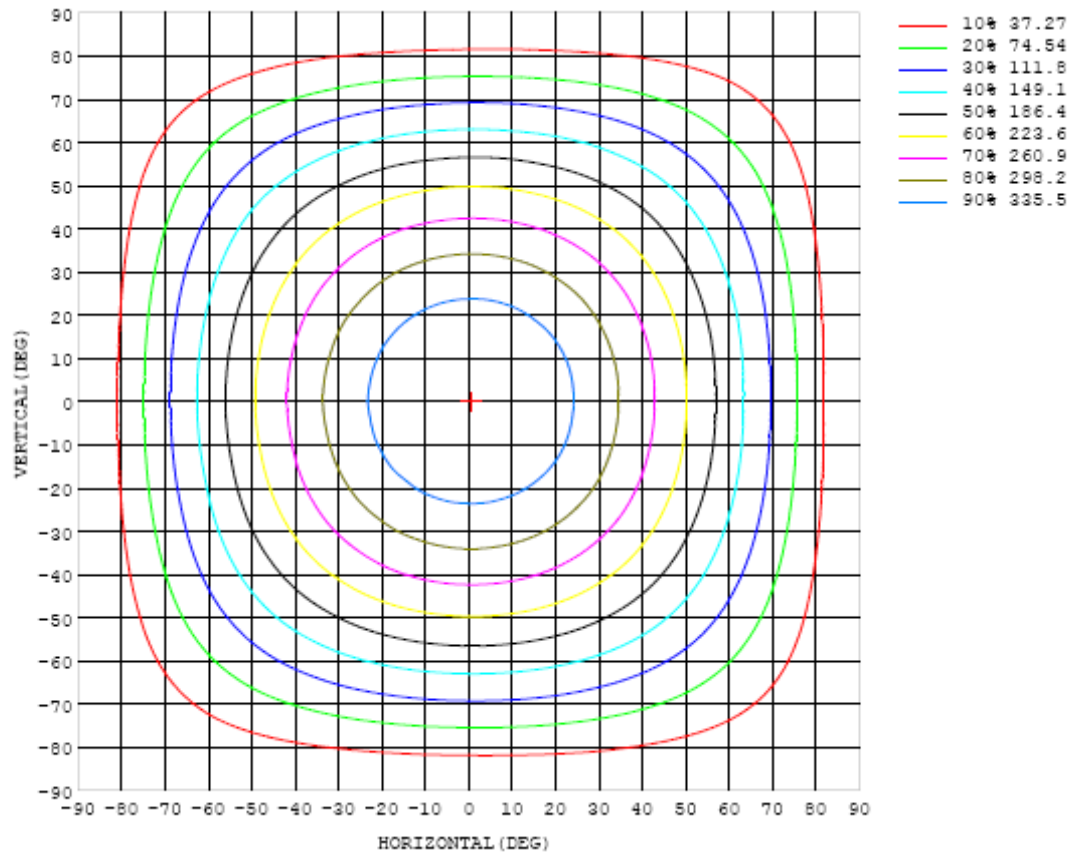


Chart 3: Isocandela Plot

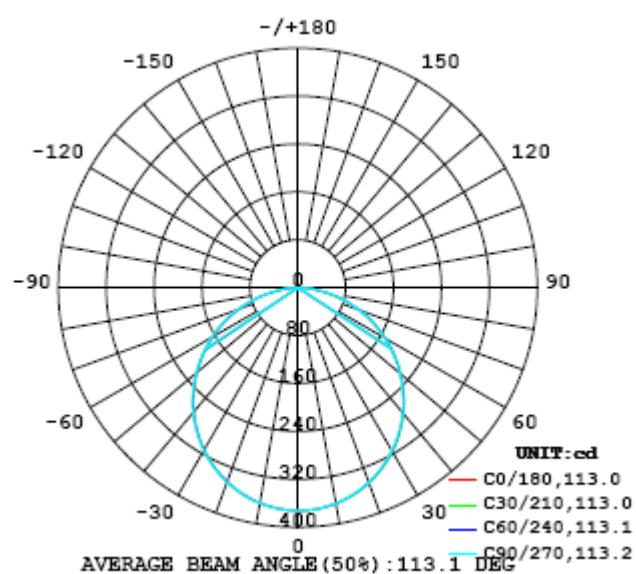


Chart 4: Polar Candela Distribution

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	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372
5	371	371	371	371	371	370	371	371	371	371	371	371	370	370	370	370	370	370	370
10	366	366	366	366	366	365	366	365	366	365	365	365	365	365	365	365	365	365	365
15	358	358	358	358	358	357	358	357	357	357	357	357	357	356	357	356	356	356	356
20	347	347	347	347	346	346	346	346	346	346	345	345	345	344	345	345	344	344	345
25	333	333	332	333	332	332	332	332	331	331	331	330	330	330	330	330	330	329	330
30	316	316	316	316	315	315	315	314	314	314	314	313	313	312	312	312	312	312	313
35	296	296	296	296	296	295	295	295	294	294	294	293	293	292	292	292	292	292	293
40	274	274	274	274	274	273	273	273	272	272	272	271	271	270	270	270	270	269	270
45	250	250	250	250	250	249	249	249	248	248	248	247	247	246	246	246	245	245	246
50	224	224	224	224	224	223	223	223	222	222	221	221	221	220	220	219	219	219	220
55	197	197	197	197	197	196	196	196	195	195	194	194	193	193	193	192	192	191	193
60	169	169	169	169	168	168	168	167	167	166	166	165	165	164	164	164	163	163	164
65	139	139	139	139	139	139	138	138	137	137	137	136	136	135	135	134	134	133	135
70	109	109	109	109	109	109	108	108	108	107	107	106	106	105	105	104	104	103	105
75	78.5	78.1	78.4	78.7	78.9	78.7	78.4	78.1	77.7	77.1	76.7	75.9	75.6	74.8	74.6	74.0	73.6	72.9	74.2
80	48.3	48.5	48.5	48.6	48.9	49.1	49.2	48.8	48.6	48.0	47.5	47.1	46.4	45.8	45.5	44.7	43.5	42.7	43.4
85	19.3	19.4	19.5	19.6	20.4	20.8	20.7	20.4	20.0	19.5	19.0	18.6	18.0	17.4	16.9	16.3	15.6	14.6	15.4
90	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.35	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05
95	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.05
100	0.06	0.06	0.06	0.07	0.07	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.07	0.08
105	0.08	0.08	0.09	0.10	0.10	0.09	0.09	0.09	0.10	0.11	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.11
110	0.10	0.11	0.12	0.13	0.13	0.13	0.12	0.13	0.13	0.14	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.15
115	0.14	0.15	0.16	0.17	0.17	0.16	0.16	0.17	0.17	0.18	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.17
120	0.19	0.19	0.20	0.21	0.20	0.20	0.20	0.20	0.21	0.21	0.21	0.20	0.19	0.19	0.21	0.20	0.20	0.20	0.21
125	0.21	0.23	0.24	0.24	0.24	0.24	0.24	0.24	0.25	0.25	0.24	0.24	0.23	0.22	0.22	0.23	0.24	0.24	0.26
130	0.26	0.27	0.28	0.28	0.28	0.27	0.28	0.28	0.28	0.29	0.28	0.27	0.27	0.26	0.26	0.25	0.25	0.25	0.28
135	0.31	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.31	0.30	0.29	0.29	0.34
140	0.35	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.35	0.35	0.34	0.34	0.34	0.34	0.34	0.34	0.41
145	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.38	0.37	0.37	0.36	0.36	0.36	0.37	0.37	0.47
150	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.40	0.40	0.39	0.39	0.38	0.38	0.38	0.39	0.39	0.51
155	0.42	0.43	0.44	0.44	0.44	0.44	0.44	0.43	0.43	0.43	0.43	0.42	0.41	0.41	0.41	0.41	0.42	0.42	0.54
160	0.45	0.46	0.47	0.47	0.47	0.47	0.47	0.46	0.45	0.45	0.45	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.55
165	0.47	0.48	0.49	0.49	0.49	0.50	0.49	0.49	0.48	0.48	0.48	0.47	0.47	0.46	0.46	0.47	0.47	0.47	0.55
170	0.49	0.50	0.51	0.51	0.52	0.52	0.52	0.51	0.50	0.50	0.50	0.49	0.49	0.48	0.49	0.49	0.51	0.51	0.56
175	0.49	0.49	0.49	0.48	0.47	0.47	0.47	0.48	0.49	0.50	0.51	0.51	0.51	0.50	0.50	0.49	0.48	0.47	0.47
180	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40

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	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372		
5	370	370	371	370	370	370	371	371	370	371	371	371	371	371	371	371	371		
10	365	365	365	365	365	365	366	366	366	366	366	366	366	366	367	367	366		
15	356	357	357	357	357	357	357	357	358	358	358	358	358	358	358	359	358		
20	345	345	345	345	345	345	346	346	346	347	347	347	347	347	347	347	347		
25	330	330	330	330	330	331	331	331	332	333	333	333	333	333	333	333	333		
30	313	313	313	313	313	314	314	314	315	315	315	316	316	316	316	316	316		
35	293	293	293	293	293	294	294	295	295	295	295	296	296	297	297	297	297		
40	270	270	271	271	271	271	272	272	273	273	273	274	274	275	275	275	275		
45	246	246	246	246	247	247	247	248	249	249	249	250	250	251	251	251	251		
50	220	220	220	220	221	221	221	222	222	223	223	224	224	225	225	225	225		
55	192	193	193	193	193	194	194	194	195	196	196	197	197	197	198	198	198		
60	164	164	164	165	164	165	165	167	167	167	167	168	168	169	170	170	170		
65	135	135	135	135	136	136	136	137	137	138	139	139	140	140	140	140	141		
70	105	105	105	105	105	105	106	106	107	108	108	109	110	110	111	111	111		
75	73.6	73.9	74.3	74.2	74.4	74.8	75.4	75.8	76.7	77.1	77.7	78.2	78.9	79.4	79.9	79.9	79.9		
80	42.9	42.9	43.2	43.5	44.5	44.8	45.4	45.8	46.6	47.1	47.7	48.4	48.9	49.5	50.0	49.6	49.4		
85	15.1	15.0	15.0	15.3	15.9	16.5	16.8	17.3	17.9	18.5	19.1	19.8	20.3	21.0	21.2	21.1	20.8		
90	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.06		
95	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04		
100	0.07	0.07	0.07	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06		
105	0.11	0.10	0.11	0.11	0.12	0.12	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09		
110	0.14	0.14	0.14	0.15	0.16	0.16	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12		
115	0.17	0.17	0.18	0.18	0.19	0.20	0.18	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.14	0.14		
120	0.20	0.21	0.21	0.22	0.23	0.22	0.21	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.18		
125	0.24	0.25	0.25	0.26	0.27	0.27	0.26	0.24	0.24	0.23	0.23	0.23	0.22	0.23	0.22	0.23	0.22		
130	0.29	0.30	0.31	0.32	0.32	0.32	0.31	0.30	0.30	0.29	0.28	0.27	0.27	0.27	0.27	0.27	0.27		
135	0.36	0.37	0.38	0.38	0.38	0.38	0.38	0.37	0.36	0.36	0.36	0.34	0.33	0.33	0.33	0.34	0.35		
140	0.43	0.43	0.44	0.44	0.45	0.45	0.44	0.44	0.43	0.43	0.43	0.42	0.41	0.41	0.41	0.41	0.41		
145	0.48	0.49	0.49	0.50	0.50	0.50	0.50	0.50	0.49	0.49	0.48	0.48	0.47	0.47	0.47	0.47	0.47		
150	0.52	0.53	0.53	0.53	0.54	0.54	0.54	0.54	0.53	0.53	0.52	0.51	0.51	0.51	0.51	0.50	0.51		
155	0.54	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.54	0.53	0.53	0.53	0.53	0.53	0.53		
160	0.56	0.56	0.56	0.57	0.57	0.57	0.57	0.57	0.58	0.57	0.56	0.54	0.54	0.54	0.54	0.53	0.53		
165	0.56	0.56	0.57	0.58	0.57	0.58	0.58	0.57	0.59	0.58	0.58	0.56	0.54	0.54	0.54	0.54	0.54		
170	0.56	0.57	0.56	0.54	0.55	0.57	0.58	0.59	0.59	0.58	0.57	0.58	0.56	0.55	0.56	0.55	0.55		
175	0.47	0.47	0.50	0.53	0.54	0.55	0.55	0.55	0.55	0.55	0.52	0.51	0.51	0.51	0.51	0.51	0.50		
180	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		

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.

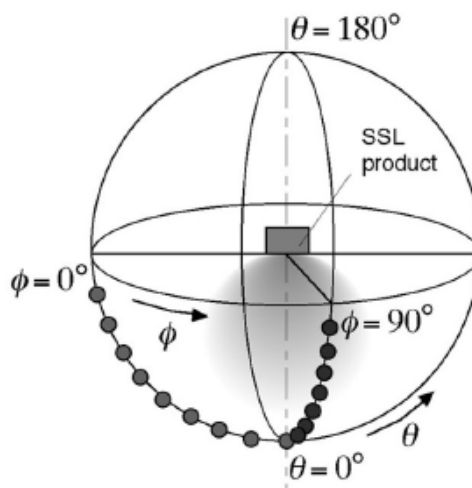
Color Characteristics Measurements

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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