

LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

8" new construction Downlight

Model: 24.5NCDRL8DIM/940/EXT

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ18030026i

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: **24.5NCDRL8DIM/940/EXT**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
96.5	2324.9	24.09	0.9916
CCT (K)	CRI	Stabilization Time (Light & Power)	
3868	92.9	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	: 8" new construction Downlight
Model	: 24.5NCDRL8DIM/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)	0.202
Power Factor	0.9916
Test Power (W)	24.09
THD A%	10.70
Luminous Efficacy (lm/W)	96.5
Total Luminous Flux (lm)	2324.9
Color Rendering Index (CRI)	92.9
R9	63
Correlated Color Temperature (CCT) (K)	3868
Chromaticity (Chroma x, Chroma y)	(0.3873, 0.3831)
Chromaticity (Chroma u, Chroma v)	(0.2270, 0.3369)
Chromaticity (Chroma u', Chroma v')	(0.2270, 0.5054)
Duv	0.0011
Average Beam Angle (°)	112.8
Center Beam Candle Power (cd)	804
Spacing Criteria	1.25 (0°-180°)/ 1.25 (90°-270°)
Zonal Lumens in the 0°-60°Zone	77.77%
Zonal Lumens in the 60°-90°Zone	22.11%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.09%

Special Rendering Indices	Color
R1	93
R2	97
R3	98
R4	91
R5	92
R6	94
R7	93
R8	84
R9	63
R10	91
R11	92
R12	72
R13	95
R14	99
Rf	89
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

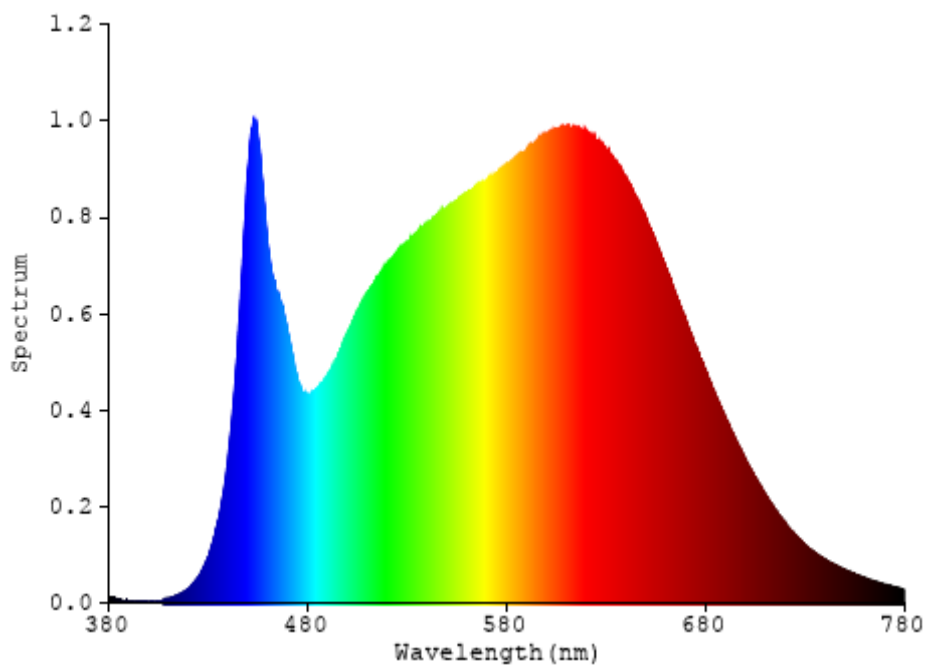


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	76.082	3.27%
10- 20	217.747	9.37%
20- 30	329.629	14.18%
30- 40	397.201	17.09%
40- 50	412.45	17.74%
50- 60	374.829	16.12%
60- 70	291.248	12.53%
70- 80	174.865	7.52%
80- 90	48.022	2.07%
90-100	0.14	0.01%
100-110	0.209	0.01%
110-120	0.308	0.01%
120-130	0.395	0.02%
130-140	0.476	0.02%
140-150	0.492	0.02%
150-160	0.404	0.02%
160-170	0.264	0.01%
170-180	0.091	0.00%
Total	2324.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1807.938	77.77%
60- 90	514.135	22.11%
0-90	2322.073	99.88%
90- 180	2.779	0.12%
0- 180	2324.9	100%

Table 3: Zonal Lumen Data

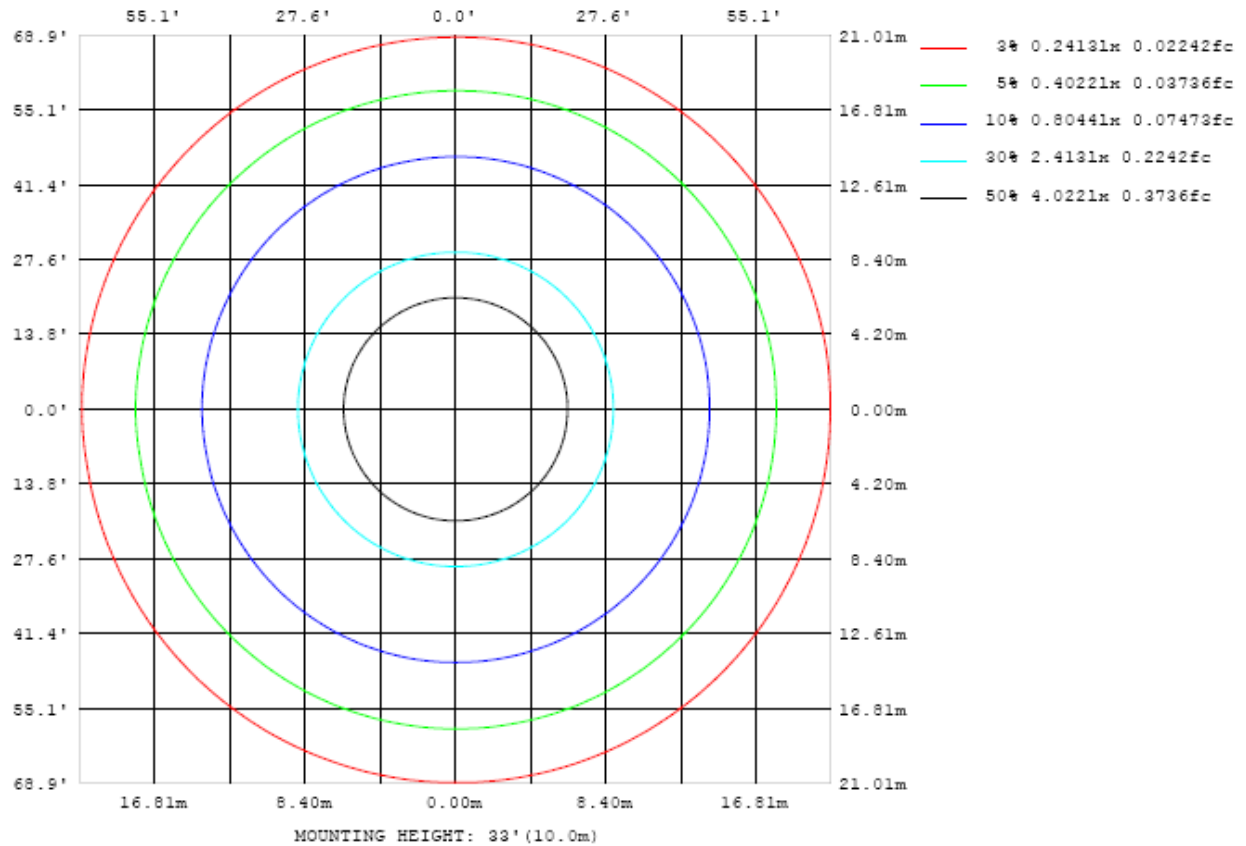


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

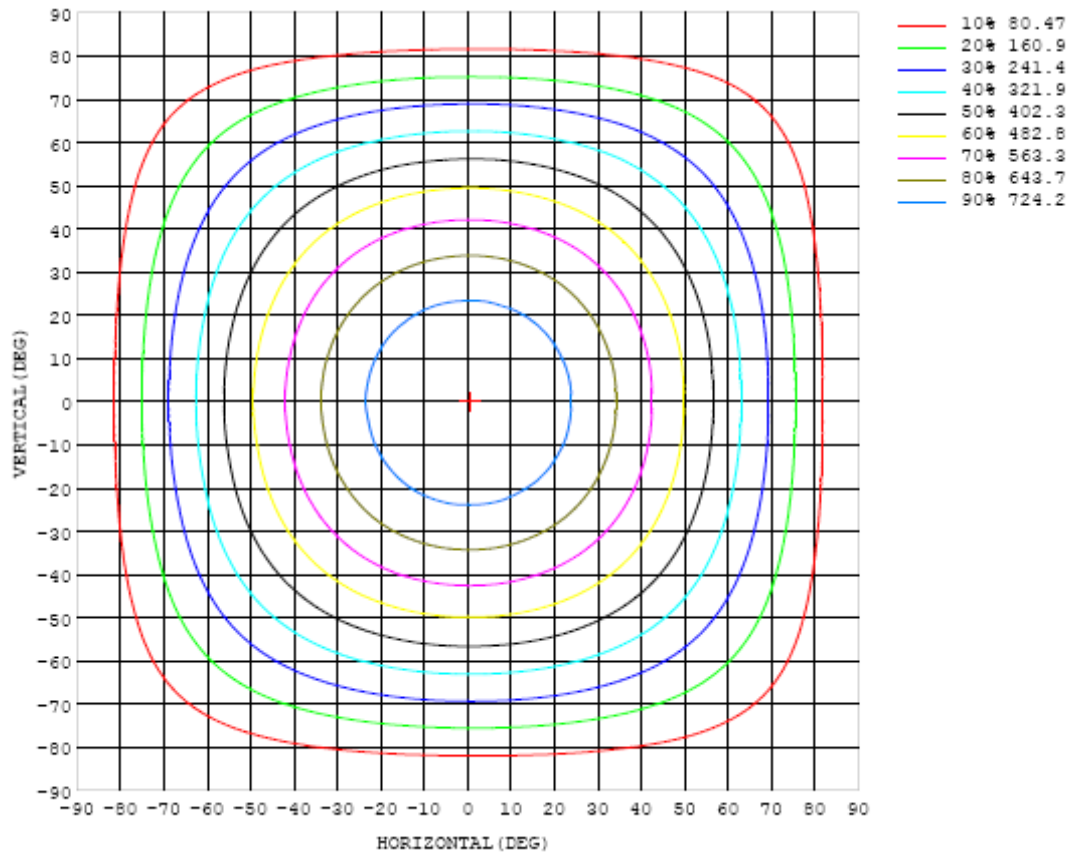


Chart 3: Isocandela Plot

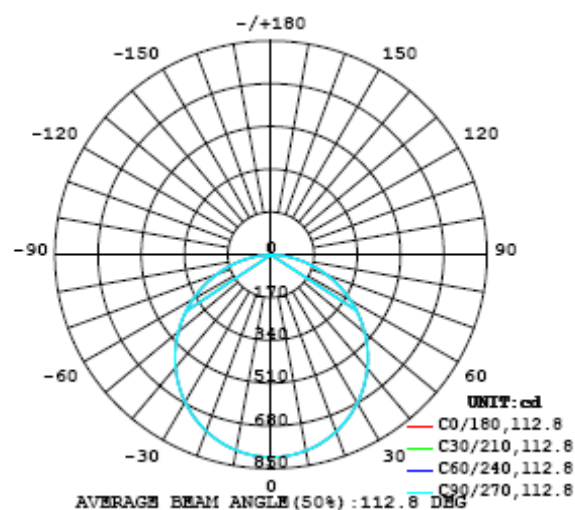


Chart 4: Polar Candela Distribution

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	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804
5	801	801	802	801	801	801	801	802	801	801	801	801	801	801	800	800	800	800	800
10	790	790	791	791	791	791	791	791	791	790	791	791	790	790	789	789	789	789	789
15	772	773	774	773	772	773	773	773	773	773	773	772	772	772	771	771	771	770	771
20	748	748	749	748	748	748	749	748	748	748	748	747	747	747	746	746	745	745	745
25	716	717	718	717	718	718	717	718	717	716	717	716	716	716	715	714	714	713	714
30	679	680	680	680	680	680	680	680	680	679	680	679	679	678	677	677	676	676	676
35	637	637	637	637	638	638	638	638	638	637	637	636	636	635	634	633	633	632	633
40	589	589	589	590	590	590	590	590	590	589	589	588	588	587	586	585	585	584	585
45	536	537	538	538	538	538	538	538	538	537	537	536	536	535	534	533	532	532	533
50	480	481	482	482	483	482	482	482	482	481	481	480	479	479	477	477	476	475	477
55	421	422	422	423	423	423	423	423	423	422	422	421	420	419	418	417	416	416	418
60	359	360	361	361	362	362	362	362	361	360	360	359	358	358	356	355	355	354	356
65	296	297	298	298	298	298	298	298	298	297	296	296	295	294	293	292	291	290	293
70	232	233	233	234	234	234	234	234	233	233	232	231	230	230	229	227	227	226	229
75	167	168	169	169	169	169	169	169	169	168	167	167	166	165	164	162	162	161	163
80	104	104	105	106	106	106	106	106	105	104	104	103	102	101	99.8	98.7	97.9	97.1	99.1
85	43.4	44.0	44.6	45.8	46.3	46.2	46.2	45.7	45.3	44.6	44.1	43.3	42.7	41.4	39.7	38.6	37.8	37.2	38.9
90	1.61	1.73	1.76	1.86	1.93	1.90	1.89	1.83	1.72	1.62	1.45	1.36	1.95	1.82	0.10	0.15	0.12	0.11	0.10
95	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.12
100	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.16
105	0.18	0.18	0.19	0.19	0.19	0.19	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.21
110	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.25	0.25	0.25	0.25	0.25	0.25	0.24	0.24	0.23	0.23	0.23	0.26
115	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.31	0.31	0.32	0.32	0.31	0.30	0.30	0.30	0.30	0.31
120	0.36	0.36	0.37	0.38	0.38	0.39	0.39	0.38	0.38	0.38	0.38	0.39	0.39	0.37	0.37	0.36	0.36	0.36	0.37
125	0.42	0.42	0.43	0.43	0.44	0.44	0.45	0.45	0.44	0.44	0.45	0.45	0.45	0.44	0.43	0.43	0.42	0.42	0.44
130	0.50	0.49	0.48	0.49	0.50	0.50	0.51	0.51	0.52	0.52	0.52	0.52	0.52	0.51	0.50	0.49	0.49	0.49	0.54
135	0.58	0.57	0.56	0.56	0.56	0.57	0.58	0.60	0.61	0.61	0.60	0.59	0.59	0.58	0.57	0.57	0.57	0.56	0.66
140	0.64	0.65	0.65	0.65	0.68	0.66	0.67	0.68	0.68	0.68	0.67	0.67	0.66	0.65	0.65	0.64	0.64	0.63	0.83
145	0.69	0.69	0.70	0.71	0.71	0.71	0.72	0.72	0.72	0.72	0.72	0.71	0.71	0.70	0.70	0.69	0.69	0.72	0.92
150	0.72	0.72	0.73	0.73	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.73	0.73	0.72	0.72	0.73	0.94
155	0.77	0.77	0.78	0.78	0.78	0.78	0.78	0.79	0.78	0.78	0.78	0.78	0.78	0.77	0.77	0.77	0.76	0.75	0.98
160	0.81	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.83	0.82	0.82	0.82	0.82	0.81	0.81	0.81	0.81	0.79	0.99
165	0.85	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.86	0.86	0.86	0.86	0.85	1.00
170	0.90	0.91	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.90	0.91	0.90	0.90	0.90	1.00
175	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.97	0.97	0.97	0.97	0.97	0.96	0.96	0.95	0.94	0.93	0.93	0.95
180	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89

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	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804		
5	800	801	800	800	800	801	800	800	800	801	800	801	801	800	800	801	801		
10	789	790	789	788	789	789	789	790	789	789	790	789	790	790	790	790	791		
15	771	771	771	770	770	770	770	771	771	771	771	771	772	772	772	772	772		
20	746	745	745	745	745	745	745	745	745	746	746	747	747	747	747	748	748		
25	714	714	714	713	713	713	713	714	713	714	714	715	716	716	716	717	717		
30	676	676	676	675	676	675	676	676	676	677	677	678	678	679	679	679	680		
35	633	633	633	632	632	632	633	633	633	634	634	635	635	636	636	637	638		
40	585	584	584	585	584	584	584	585	585	585	586	587	587	588	589	589	590		
45	533	532	532	532	532	531	532	532	532	534	533	534	535	536	536	537	538		
50	476	476	476	475	475	475	475	476	476	477	477	478	479	480	480	481	482		
55	417	416	416	417	416	416	416	416	417	418	418	419	420	421	421	422	423		
60	355	354	354	354	354	354	355	355	355	356	357	358	359	359	360	361	361		
65	291	291	290	291	290	291	291	291	292	293	293	294	295	295	297	297	298		
70	227	227	227	226	227	227	227	227	228	229	229	230	231	232	233	233	234		
75	163	162	162	162	162	162	163	163	163	164	165	166	166	167	168	169	170		
80	98.8	98.4	98.7	99.1	99.1	99.1	99.6	100	101	101	102	103	104	104	104	105	106		
85	38.2	38.1	38.2	39.0	38.9	39.1	39.4	39.9	40.4	41.2	41.9	42.8	43.3	43.1	43.7	44.5	45.3		
90	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.11	0.12	0.12		
95	0.11	0.11	0.12	0.11	0.11	0.12	0.11	0.11	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11		
100	0.16	0.16	0.16	0.15	0.15	0.15	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
105	0.21	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.21	0.21	0.21	0.21		
110	0.27	0.27	0.26	0.26	0.26	0.26	0.27	0.26	0.26	0.25	0.25	0.25	0.26	0.27	0.27	0.26	0.26		
115	0.32	0.32	0.31	0.31	0.31	0.32	0.32	0.31	0.31	0.30	0.30	0.30	0.31	0.32	0.32	0.32	0.31		
120	0.37	0.37	0.37	0.37	0.37	0.37	0.38	0.37	0.36	0.36	0.36	0.36	0.37	0.37	0.38	0.38	0.37		
125	0.44	0.44	0.44	0.44	0.44	0.44	0.45	0.44	0.43	0.43	0.43	0.43	0.44	0.44	0.45	0.46	0.45		
130	0.54	0.54	0.54	0.54	0.54	0.54	0.55	0.54	0.53	0.52	0.53	0.53	0.54	0.54	0.55	0.56	0.56		
135	0.66	0.65	0.65	0.65	0.65	0.66	0.66	0.66	0.65	0.64	0.64	0.65	0.66	0.66	0.66	0.67	0.67		
140	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.76	0.76	0.76	0.77	0.77	0.77	0.78	0.78	0.79		
145	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.86	0.86	0.86	0.87	0.87	0.87	0.88	0.88	0.89		
150	0.94	0.94	0.94	0.93	0.94	0.94	0.94	0.94	0.94	0.93	0.94	0.94	0.94	0.94	0.94	0.95	0.95		
155	0.98	0.98	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.99	0.98	0.98	0.99	0.99		
160	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00		
165	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.01	1.01	1.00	1.00	1.00	1.01	1.01	1.01	1.01	1.00		
170	1.00	1.00	1.01	0.99	1.00	1.00	1.01	1.02	1.02	1.01	1.01	1.01	1.00	1.00	1.01	1.01	1.01		
175	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.96	0.96	0.95	0.94	0.95	0.96	0.96	0.97	0.97		
180	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89		

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.

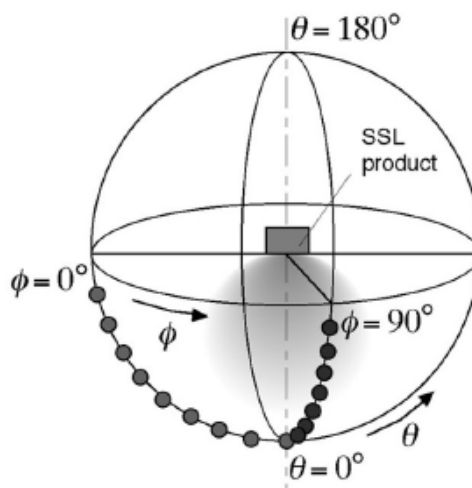
Color Characteristics Measurements

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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