

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/930/EXT

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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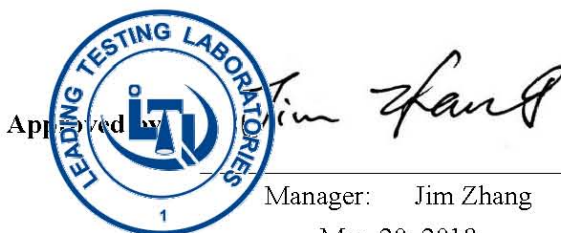
Report No.: HZ18030026h


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

Review by:



Engineer: April Zou
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/930/EXT**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
89.1	2139.2	24.00	0.9913
CCT (K)	CRI	Stabilization Time (Light & Power)	
2959	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	: 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/930/EXT
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)	0.202
Power Factor	0.9913
Test Power (W)	24.00
THD A%	11.23
Luminous Efficacy (lm/W)	89.1
Total Luminous Flux (lm)	2139.2
Color Rendering Index (CRI)	92.8
R9	60
Correlated Color Temperature (CCT) (K)	2959
Chromaticity (Chroma x, Chroma y)	(0.4358, 0.3968)
Chromaticity (Chroma u, Chroma v)	(0.2530, 0.3455)
Chromaticity (Chroma u', Chroma v')	(0.2530, 0.5183)
Duv	0.0028
Average Beam Angle (°)	112.9
Center Beam Candle Power (cd)	740
Spacing Criteria	1.25 (0°-180°)/ 1.26 (90°-270°)
Zonal Lumens in the 0°-60°Zone	77.78%
Zonal Lumens in the 60°-90°Zone	22.10%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.09%

Special Rendering Indices	Color
R1	94
R2	99
R3	96
R4	92
R5	94
R6	96
R7	89
R8	81
R9	60
R10	97
R11	93
R12	83
R13	96
R14	99
Rf	90
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

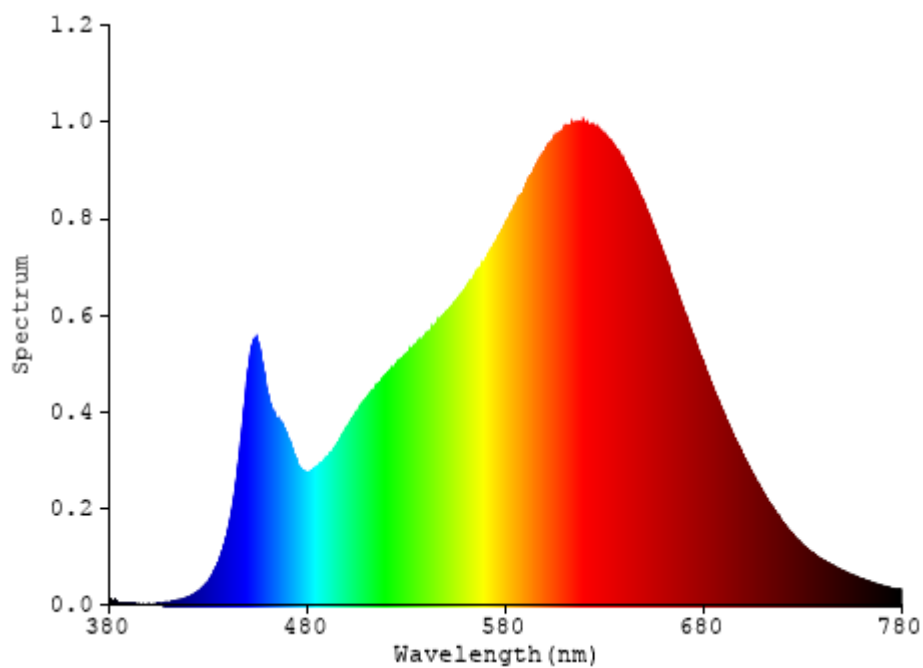


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	69.972	3.27%
10- 20	200.295	9.36%
20- 30	303.3	14.18%
30- 40	365.587	17.09%
40- 50	379.699	17.75%
50- 60	345.046	16.13%
60- 70	267.912	12.52%
70- 80	160.704	7.51%
80- 90	44.153	2.06%
90-100	0.134	0.01%
100-110	0.188	0.01%
110-120	0.28	0.01%
120-130	0.36	0.02%
130-140	0.434	0.02%
140-150	0.447	0.02%
150-160	0.369	0.02%
160-170	0.242	0.01%
170-180	0.084	0.00%
Total	2139.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1663.899	77.78%
60- 90	472.769	22.10%
0-90	2136.668	99.88%
90- 180	2.538	0.12%
0- 180	2139.2	100%

Table 3: Zonal Lumen Data

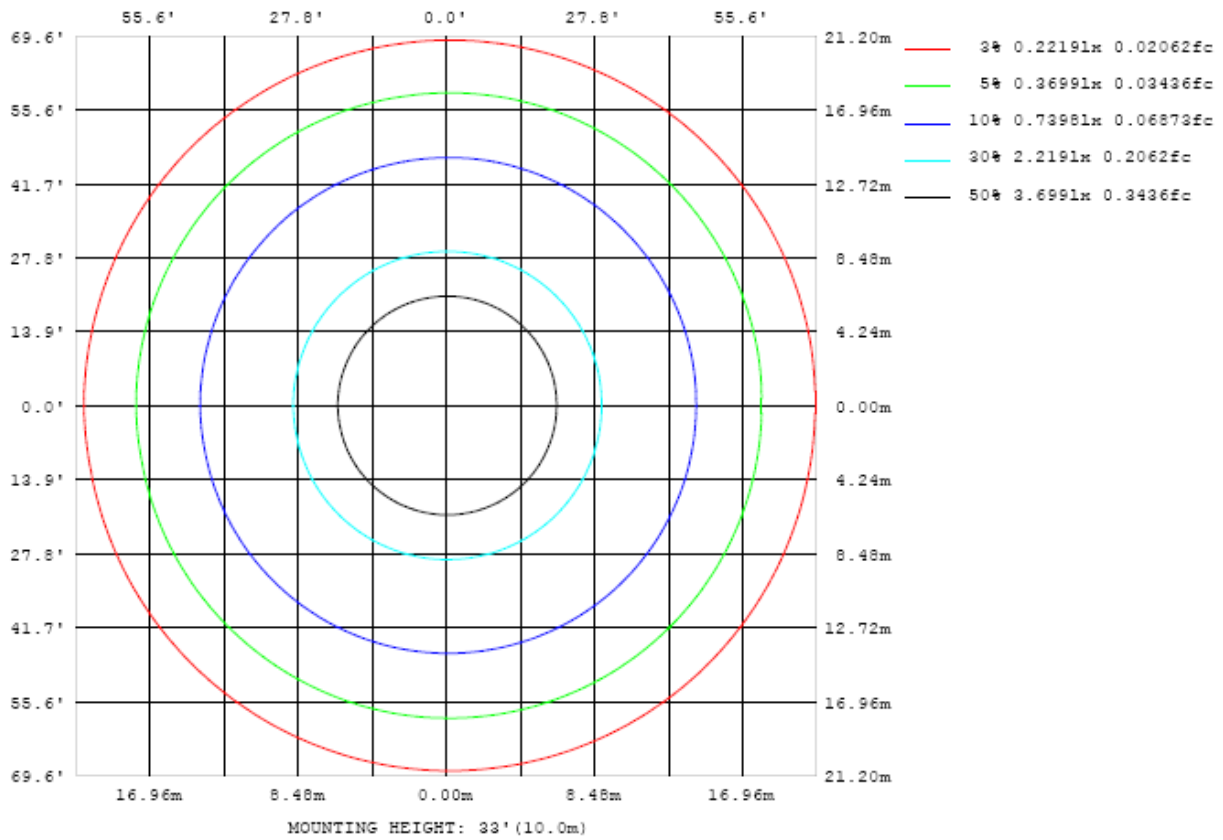


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

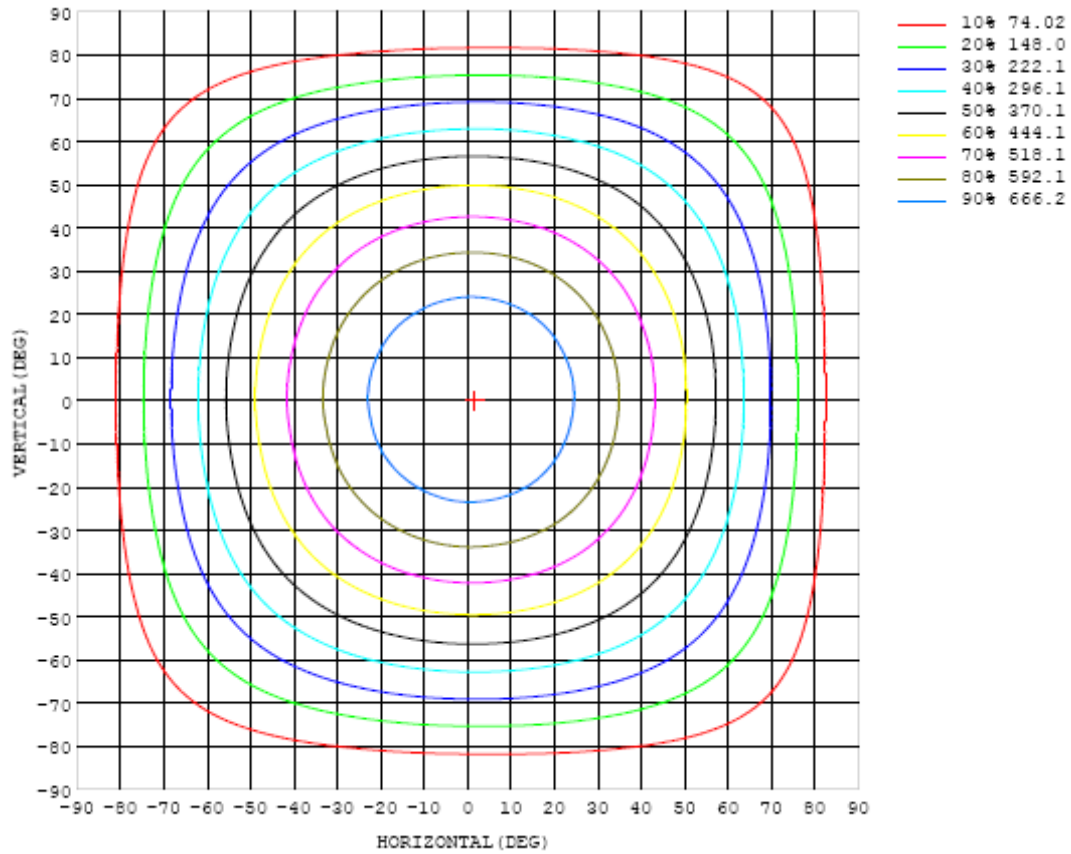


Chart 3: Isocandela Plot

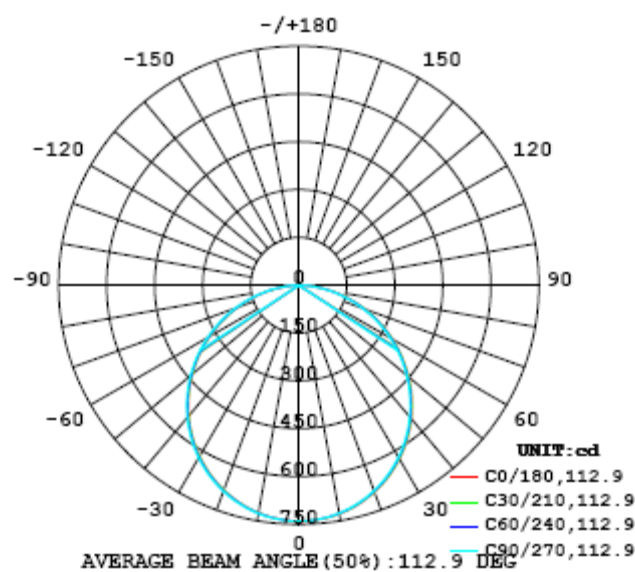


Chart 4: Polar Candela Distribution

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	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740
5	737	738	737	737	737	737	736	736	736	736	736	736	736	735	736	735	735	735	735
10	728	728	728	728	727	727	726	726	726	725	725	724	725	725	724	724	724	724	725
15	713	712	712	711	711	711	710	710	709	709	708	708	707	707	707	707	706	706	707
20	690	690	690	689	689	688	688	687	686	685	685	684	683	683	683	683	682	682	684
25	663	662	662	661	661	660	659	658	657	656	656	655	654	654	653	653	653	652	654
30	629	628	628	627	626	626	625	624	623	622	621	620	619	619	618	618	618	617	619
35	590	589	589	589	588	587	586	585	583	582	582	581	579	579	578	578	577	576	579
40	547	546	546	545	544	543	542	541	539	538	537	536	535	534	533	533	532	532	535
45	499	499	498	497	497	496	494	493	491	490	489	488	487	486	485	484	484	483	486
50	448	447	447	446	446	445	443	442	440	439	437	436	435	434	433	432	432	431	434
55	394	393	393	392	391	390	389	387	386	385	383	382	381	379	378	377	376	376	379
60	337	337	336	336	335	334	333	331	330	328	327	325	324	322	321	320	319	319	321
65	279	279	278	278	277	276	275	273	271	270	268	267	265	264	263	262	261	260	263
70	220	220	219	219	218	217	216	214	213	211	210	208	206	205	204	203	202	201	204
75	160	160	160	159	159	158	156	155	154	152	150	149	147	146	145	143	142	142	145
80	101	102	102	101	100	99.8	98.5	96.8	95.9	94.0	92.6	91.0	89.6	88.0	86.9	85.7	84.8	83.9	86.7
85	45.5	45.7	45.7	45.7	45.4	45.0	43.6	42.5	41.1	39.8	38.0	36.6	35.2	33.9	32.6	30.9	29.8	28.8	30.8
90	0.23	2.81	2.78	2.83	2.70	3.64	2.13	1.85	1.56	1.86	0.08	0.17	0.13	0.16	0.07	0.07	0.07	0.07	0.08
95	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.11
100	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.14
105	0.16	0.15	0.15	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.20
110	0.20	0.21	0.20	0.21	0.21	0.22	0.22	0.22	0.22	0.22	0.23	0.22	0.23	0.23	0.23	0.22	0.22	0.22	0.25
115	0.26	0.26	0.27	0.27	0.27	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.30	0.30	0.28	0.28	0.28	0.30
120	0.32	0.32	0.32	0.33	0.33	0.34	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.36	0.35	0.34	0.33	0.33	0.35
125	0.39	0.38	0.38	0.38	0.39	0.39	0.40	0.41	0.41	0.40	0.41	0.42	0.42	0.42	0.41	0.39	0.39	0.39	0.41
130	0.46	0.45	0.44	0.44	0.44	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.48	0.48	0.47	0.45	0.45	0.45	0.50
135	0.52	0.52	0.52	0.51	0.51	0.52	0.52	0.53	0.54	0.55	0.56	0.55	0.55	0.54	0.53	0.52	0.51	0.51	0.60
140	0.59	0.59	0.59	0.60	0.60	0.60	0.60	0.61	0.62	0.62	0.62	0.62	0.61	0.61	0.60	0.59	0.58	0.57	0.70
145	0.63	0.63	0.63	0.64	0.64	0.64	0.65	0.65	0.65	0.66	0.66	0.66	0.65	0.65	0.64	0.63	0.62	0.61	0.79
150	0.65	0.66	0.66	0.66	0.67	0.67	0.67	0.67	0.67	0.68	0.68	0.68	0.68	0.67	0.67	0.66	0.65	0.63	0.85
155	0.70	0.70	0.70	0.71	0.71	0.71	0.71	0.72	0.72	0.72	0.72	0.72	0.71	0.71	0.71	0.70	0.69	0.68	0.89
160	0.74	0.74	0.74	0.75	0.75	0.75	0.75	0.75	0.76	0.76	0.76	0.76	0.75	0.75	0.75	0.74	0.74	0.73	0.90
165	0.79	0.79	0.79	0.79	0.79	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.79	0.79	0.78	0.78	0.91
170	0.83	0.83	0.83	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.85	0.85	0.84	0.84	0.84	0.84	0.83	0.82	0.91
175	0.88	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.88	0.88	0.88	0.87	0.86	0.86	0.87
180	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87

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	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740	740		
5	736	735	736	736	736	736	736	737	737	737	737	737	737	738	738	737	737		
10	725	724	725	726	726	726	727	727	727	728	728	728	729	729	729	729	729		
15	707	708	708	709	710	709	710	710	711	712	712	713	713	713	713	713	713		
20	684	684	685	685	686	686	687	688	689	689	690	691	691	691	691	691	691		
25	654	654	655	656	657	657	658	659	660	661	662	662	663	664	664	663	664		
30	619	620	621	621	622	623	624	625	626	627	628	628	629	630	630	630	630		
35	579	580	580	581	582	583	585	585	587	588	589	590	590	591	592	591	592		
40	534	535	536	536	538	539	540	541	543	544	545	546	547	548	548	548	549		
45	486	486	487	488	489	491	492	493	494	496	497	498	499	500	501	500	501		
50	433	434	436	436	437	438	439	441	442	444	445	447	448	449	449	450	450		
55	379	379	380	380	383	383	385	386	388	390	390	393	394	394	395	396	395		
60	321	321	322	323	324	325	327	328	331	332	334	335	336	337	339	339	340		
65	263	263	263	265	266	267	268	270	271	273	275	276	278	279	280	281	281		
70	203	203	204	205	206	207	209	210	212	214	215	217	218	219	220	222	222		
75	145	145	145	146	147	148	149	151	152	154	155	157	159	160	161	162	163		
80	86.4	86.6	86.8	87.2	88.3	89.0	91.0	91.9	93.4	94.9	96.6	98.3	99.8	101	103	103	104		
85	30.5	30.8	31.0	31.7	32.9	33.7	34.7	36.1	37.5	39.0	40.6	42.1	43.6	45.0	45.9	46.6	47.1		
90	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.10	0.12	0.15	0.24	0.36		
95	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.10	0.09	0.09		
100	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.14	0.13	0.13		
105	0.20	0.20	0.20	0.20	0.19	0.19	0.18	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.18		
110	0.25	0.25	0.25	0.24	0.24	0.24	0.23	0.24	0.24	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.23		
115	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.28	0.29	0.28	0.27	0.27	0.27	0.28	0.29	0.29	0.28		
120	0.35	0.34	0.34	0.34	0.34	0.33	0.33	0.33	0.34	0.33	0.32	0.32	0.33	0.33	0.34	0.35	0.34		
125	0.41	0.41	0.41	0.40	0.40	0.40	0.40	0.40	0.40	0.39	0.39	0.38	0.39	0.40	0.41	0.41	0.41		
130	0.50	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.48	0.48	0.48	0.48	0.49	0.50	0.50	0.50		
135	0.60	0.60	0.60	0.60	0.60	0.59	0.59	0.59	0.60	0.59	0.58	0.58	0.59	0.60	0.60	0.61	0.61		
140	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.69	0.69	0.69	0.70	0.70	0.71	0.71	0.72		
145	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.80	0.80	0.81	0.81		
150	0.86	0.85	0.85	0.86	0.86	0.86	0.86	0.86	0.86	0.85	0.85	0.85	0.86	0.86	0.87	0.87	0.87		
155	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.90	0.89	0.89	0.90	0.90	0.91	0.91	0.91		
160	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.92		
165	0.91	0.91	0.90	0.90	0.90	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93		
170	0.92	0.91	0.91	0.91	0.91	0.91	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.93	0.93	0.93		
175	0.87	0.87	0.88	0.88	0.88	0.88	0.87	0.87	0.88	0.89	0.89	0.88	0.88	0.88	0.89	0.90	0.90		
180	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87		

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.

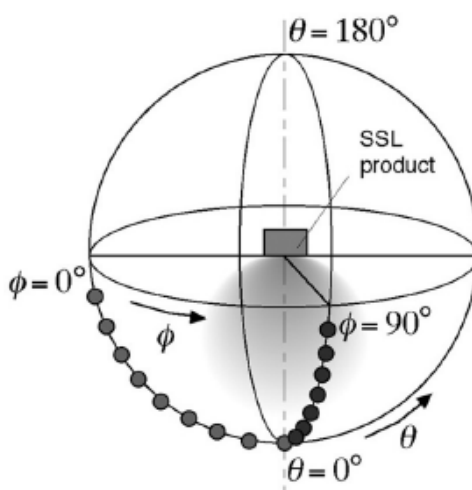
Color Characteristics Measurements

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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