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/927/EXT

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ18030026g

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/927/EXT**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
83.2	2050.1	24.63	0.9909

CCT (K)	CRI	Stabilization Time (Light & Power)
2801	92.7	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	: 8” new construction Downlight
Model	: 24.5NCDRL8DIM/927/EXT
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℃.

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)	0.207
Power Factor	0.9909
Test Power (W)	24.63
THD A%	11.50
Luminous Efficacy (lm/W)	83.2
Total Luminous Flux (lm)	2050.1
Color Rendering Index (CRI)	92.7
R9	60
Correlated Color Temperature (CCT) (K)	2801
Chromaticity (Chroma x, Chroma y)	(0.4491, 0.4035)
Chromaticity (Chroma u, Chroma v)	(0.2587, 0.3487)
Chromaticity (Chroma u', Chroma v')	(0.2587, 0.5230)
Duv	0.0017
Average Beam Angle (°)	112.4
Center Beam Candle Power (cd)	713
Spacing Criteria	1.24 (0°-180°)/ 1.26 (90°-270°)
Zonal Lumens in the 0°-60°Zone	77.87%
Zonal Lumens in the 60°-90°Zone	22.01%
Zonal Lumens in the 90°-120°Zone	0.03%
Zonal Lumens in the 120°-180°Zone	0.09%

Special Color Rendering Indices	
R1	94
R2	99
R3	96
R4	92
R5	95
R6	96
R7	89
R8	80
R9	60
R10	98
R11	94
R12	84
R13	96
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

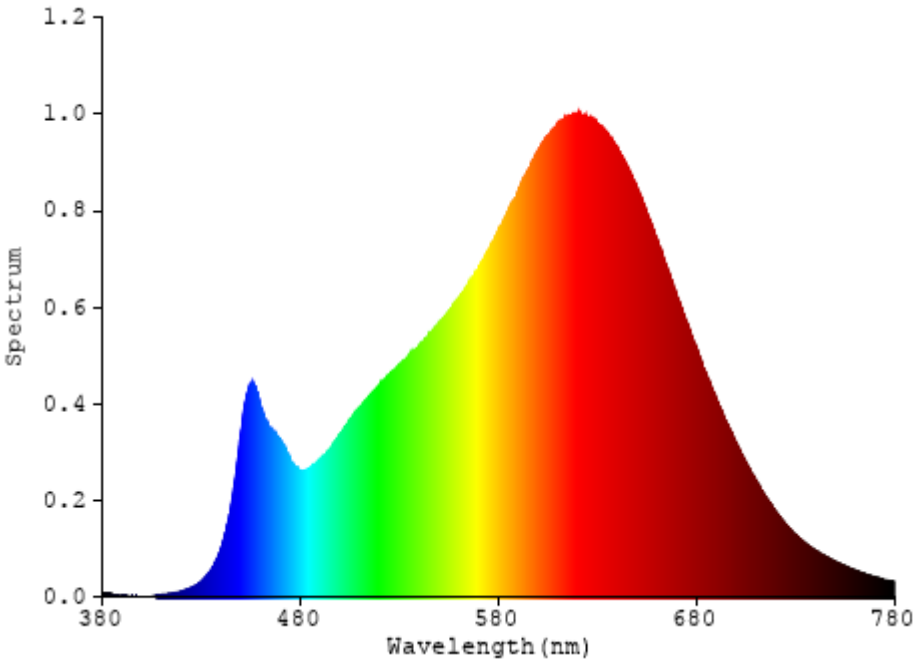


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	67.358	3.29%
10- 20	192.696	9.40%
20- 30	291.521	14.22%
30- 40	350.908	17.12%
40- 50	363.852	17.75%
50- 60	330.169	16.10%
60- 70	256.195	12.50%
70- 80	153.4	7.48%
80- 90	41.585	2.03%
90-100	0.101	0.00%
100-110	0.178	0.01%
110-120	0.269	0.01%
120-130	0.343	0.02%
130-140	0.416	0.02%
140-150	0.433	0.02%
150-160	0.363	0.02%
160-170	0.238	0.01%
170-180	0.081	0.00%
Total	2050.1	100%

γ(°)	Lumens	% Total
0- 60	1596.504	77.87%
60- 90	451.18	22.01%
0-90	2047.684	99.88%
90- 180	2.422	0.12%
0- 180	2050.1	100%

Table 3: Zonal Lumen Data

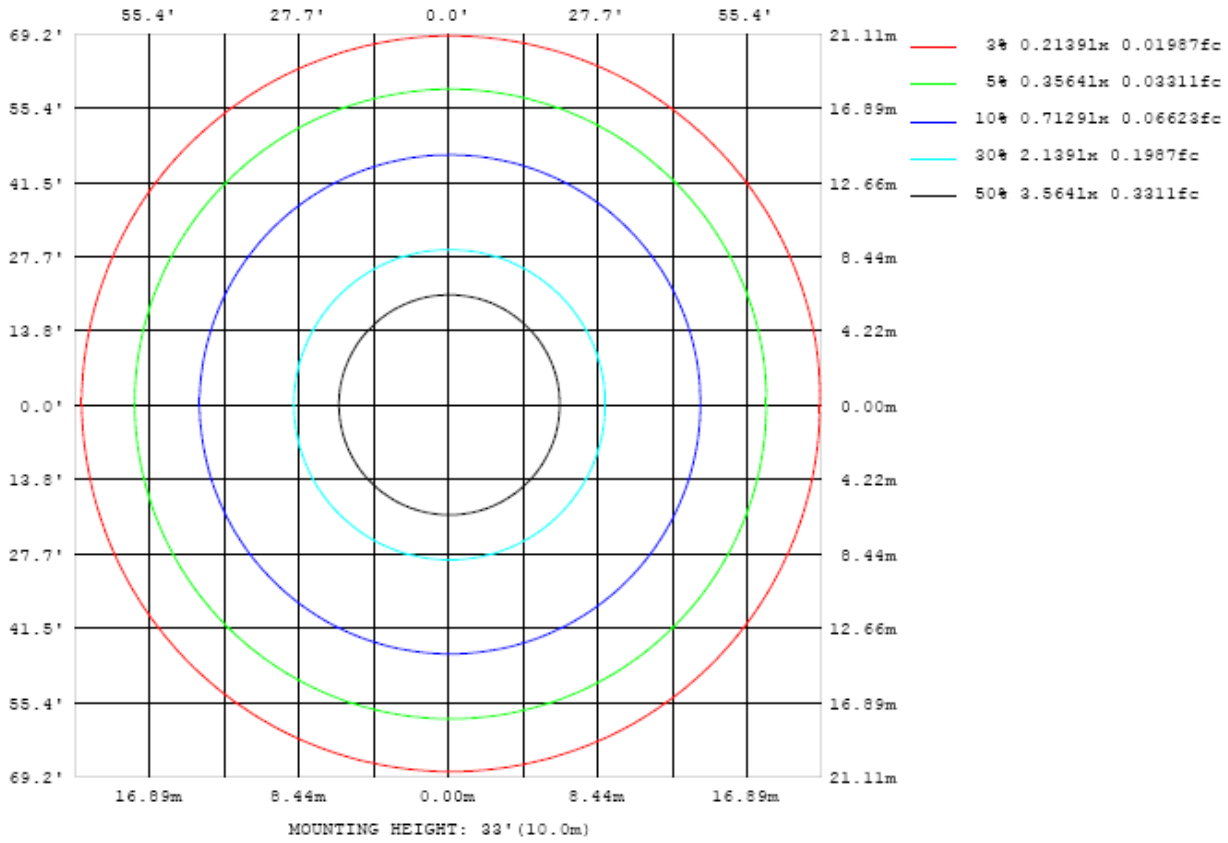


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

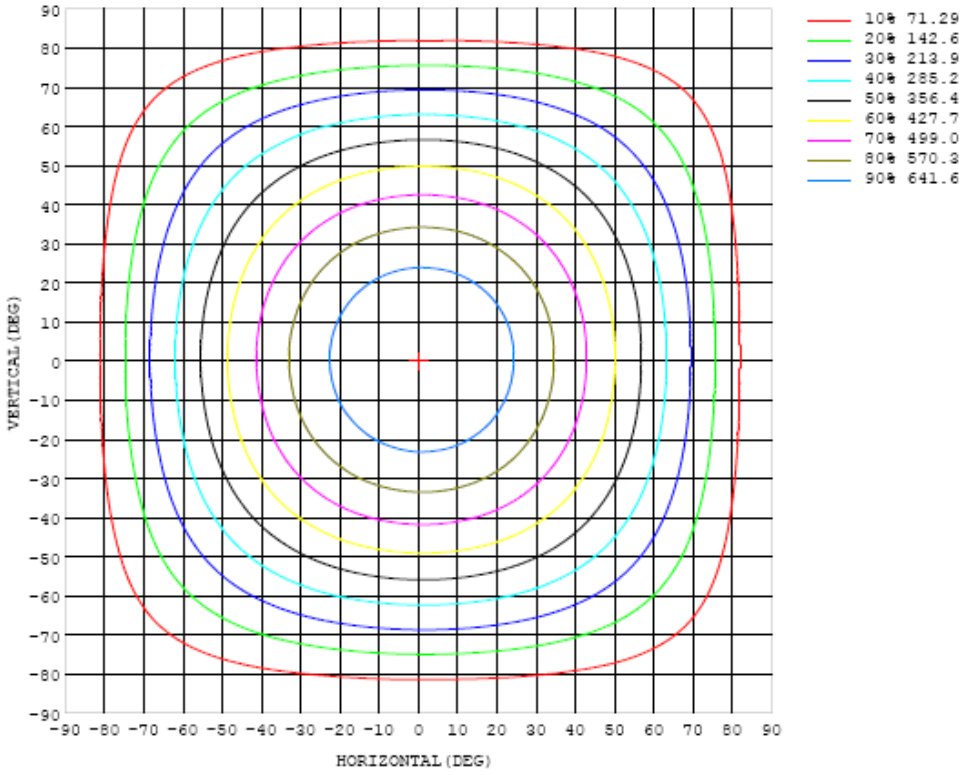


Chart 3: Isocandela Plot

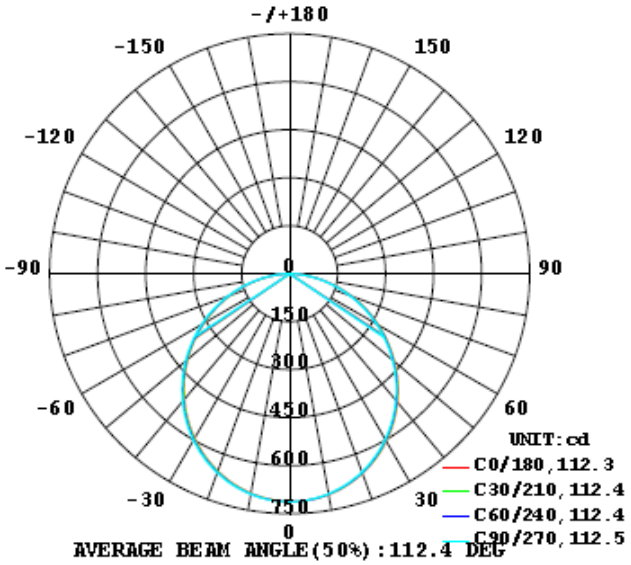


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713
5	710	710	710	709	709	709	709	709	709	708	708	708	708	708	708	708	708	708	708
10	701	701	701	700	700	700	700	699	698	698	698	697	697	697	697	696	696	697	697
15	685	686	685	685	684	684	683	682	682	682	681	680	680	680	679	680	679	679	679
20	664	664	664	663	662	662	662	660	659	659	658	657	657	657	656	656	656	656	656
25	637	637	636	635	635	634	633	632	631	630	629	628	628	627	627	627	627	627	628
30	604	604	603	602	601	601	600	599	597	597	595	595	594	593	593	593	593	592	594
35	566	566	565	564	564	563	562	560	559	558	557	556	555	554	554	554	553	553	555
40	524	524	523	522	521	520	519	518	516	515	514	513	512	511	511	510	510	510	512
45	478	477	476	476	474	474	472	471	469	469	467	466	465	464	464	463	464	464	465
50	428	427	427	425	424	423	422	421	419	418	417	416	415	414	414	413	413	413	415
55	375	375	374	373	372	371	370	368	367	366	365	363	363	362	361	361	361	361	363
60	321	320	319	318	317	316	315	314	312	311	310	309	309	307	307	306	306	306	308
65	264	264	263	262	261	260	259	258	256	255	254	253	253	252	251	251	251	251	253
70	207	206	206	205	204	203	202	200	199	198	197	197	196	195	195	194	194	194	197
75	149	149	148	147	146	145	144	143	142	141	141	140	139	139	138	138	138	138	141
80	92.6	92.0	91.4	90.7	90.1	89.2	88.4	87.7	86.7	86.0	85.1	84.6	84.1	83.7	83.4	83.1	83.1	83.0	85.5
85	38.4	37.9	37.4	36.6	36.4	36.0	35.7	35.0	34.2	33.6	32.9	32.5	32.1	31.7	31.5	30.8	30.4	30.5	32.3
90	1.95	0.73	1.56	0.70	0.27	0.17	0.17	0.39	0.00	0.02	0.01	0.03	0.06	0.00	0.09	0.01	0.02	0.04	0.07
95	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09
100	0.11	0.11	0.11	0.11	0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.11	0.12	0.12	0.12	0.12	0.12	0.13
105	0.15	0.15	0.15	0.17	0.17	0.16	0.15	0.15	0.15	0.15	0.16	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.17
110	0.20	0.20	0.20	0.24	0.22	0.21	0.20	0.20	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.22
115	0.26	0.27	0.26	0.32	0.29	0.27	0.26	0.26	0.25	0.26	0.26	0.26	0.26	0.26	0.27	0.26	0.26	0.26	0.26
120	0.32	0.32	0.32	0.33	0.33	0.32	0.32	0.31	0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.32	0.31	0.31	0.31
125	0.38	0.38	0.39	0.38	0.38	0.39	0.38	0.38	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.36	0.37
130	0.46	0.45	0.45	0.45	0.45	0.45	0.45	0.44	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.42	0.42	0.42	0.45
135	0.55	0.52	0.52	0.53	0.53	0.53	0.52	0.51	0.50	0.50	0.50	0.50	0.50	0.49	0.49	0.48	0.47	0.48	0.54
140	0.64	0.60	0.60	0.60	0.60	0.59	0.59	0.58	0.57	0.57	0.56	0.56	0.55	0.55	0.54	0.54	0.53	0.56	0.65
145	0.71	0.64	0.64	0.63	0.63	0.63	0.62	0.61	0.61	0.61	0.60	0.59	0.59	0.58	0.58	0.58	0.57	0.62	0.74
150	0.77	0.67	0.67	0.67	0.67	0.67	0.66	0.65	0.65	0.64	0.64	0.63	0.62	0.61	0.60	0.60	0.59	0.67	0.81
155	0.83	0.71	0.72	0.72	0.71	0.71	0.71	0.70	0.70	0.70	0.69	0.68	0.66	0.66	0.65	0.64	0.63	0.73	0.86
160	0.88	0.75	0.75	0.75	0.75	0.75	0.75	0.74	0.74	0.73	0.73	0.72	0.71	0.70	0.69	0.69	0.67	0.79	0.86
165	0.91	0.80	0.80	0.81	0.81	0.81	0.81	0.80	0.80	0.79	0.79	0.78	0.77	0.76	0.74	0.74	0.73	0.84	0.87
170	0.92	0.85	0.83	0.83	0.83	0.83	0.83	0.82	0.82	0.81	0.81	0.81	0.80	0.79	0.79	0.79	0.81	0.87	0.87
175	0.87	0.87	0.87	0.88	0.87	0.86	0.85	0.84	0.83	0.83	0.83	0.83	0.82	0.82	0.81	0.81	0.82	0.83	0.83
180	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713	713		
5	708	708	708	708	709	709	709	709	710	709	710	710	710	710	710	710	710		
10	697	698	698	698	699	699	699	700	700	701	701	701	702	702	702	702	701		
15	680	680	681	681	682	683	683	684	684	685	686	686	686	687	687	686	686		
20	657	657	658	659	660	661	661	662	663	663	665	664	665	665	666	666	665		
25	628	629	630	630	632	632	633	634	635	636	637	637	638	638	639	639	638		
30	594	595	596	597	598	599	600	601	602	603	605	605	605	606	606	606	606		
35	556	556	557	558	559	561	562	563	564	565	567	567	568	568	569	569	568		
40	513	513	514	515	516	518	519	521	522	523	524	525	525	526	526	527	526		
45	466	466	468	469	470	472	473	474	476	477	478	479	479	480	480	481	480		
50	416	416	418	419	420	422	423	424	425	427	428	429	430	430	431	431	430		
55	364	364	366	367	368	369	371	372	373	374	376	377	378	378	379	378	377		
60	309	310	311	312	313	315	317	318	320	320	322	323	323	323	324	324	324		
65	254	254	255	256	258	260	260	262	264	264	265	266	266	267	267	267	267		
70	198	198	199	200	201	203	204	205	206	207	208	209	209	211	210	210	210		
75	142	142	143	144	145	146	147	149	149	150	151	152	152	153	153	153	152		
80	85.7	86.6	87.2	88.3	89.4	90.3	91.1	92.4	93.3	93.8	94.9	95.4	95.5	96.0	96.0	96.2	96.0		
85	32.9	33.4	33.9	34.9	35.9	37.2	38.1	38.9	39.5	40.1	40.7	41.1	41.5	41.8	41.7	41.2	40.9		
90	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.05	0.08	0.07	0.04	0.03	0.03	0.06	0.09		
95	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09		
100	0.13	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13		
105	0.17	0.17	0.17	0.19	0.20	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18		
110	0.22	0.22	0.23	0.25	0.27	0.24	0.24	0.23	0.24	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23		
115	0.26	0.27	0.27	0.29	0.31	0.29	0.29	0.29	0.28	0.28	0.28	0.27	0.28	0.28	0.28	0.28	0.28		
120	0.31	0.31	0.32	0.33	0.35	0.34	0.34	0.34	0.33	0.33	0.33	0.32	0.33	0.33	0.33	0.33	0.34		
125	0.37	0.37	0.37	0.38	0.39	0.39	0.39	0.39	0.40	0.39	0.39	0.39	0.39	0.40	0.40	0.40	0.41		
130	0.45	0.44	0.44	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.47	0.48	0.48	0.48	0.49	0.49	0.50		
135	0.54	0.54	0.54	0.54	0.54	0.56	0.56	0.57	0.58	0.58	0.58	0.59	0.59	0.60	0.60	0.61	0.62		
140	0.64	0.64	0.64	0.64	0.65	0.68	0.67	0.67	0.68	0.69	0.69	0.70	0.70	0.71	0.72	0.73	0.74		
145	0.73	0.73	0.73	0.74	0.74	0.75	0.77	0.77	0.78	0.78	0.79	0.79	0.80	0.81	0.82	0.82	0.84		
150	0.80	0.80	0.80	0.81	0.81	0.82	0.85	0.84	0.85	0.85	0.86	0.86	0.87	0.87	0.88	0.88	0.90		
155	0.84	0.84	0.85	0.86	0.86	0.87	0.87	0.89	0.90	0.89	0.90	0.90	0.90	0.91	0.91	0.91	0.93		
160	0.86	0.86	0.86	0.87	0.87	0.88	0.88	0.90	0.91	0.91	0.91	0.91	0.91	0.92	0.92	0.93	0.94		
165	0.86	0.86	0.87	0.88	0.88	0.89	0.89	0.90	0.90	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.93		
170	0.87	0.86	0.87	0.87	0.88	0.88	0.88	0.89	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.91		
175	0.83	0.84	0.85	0.85	0.85	0.86	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.87	0.87	0.87		
180	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80		

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

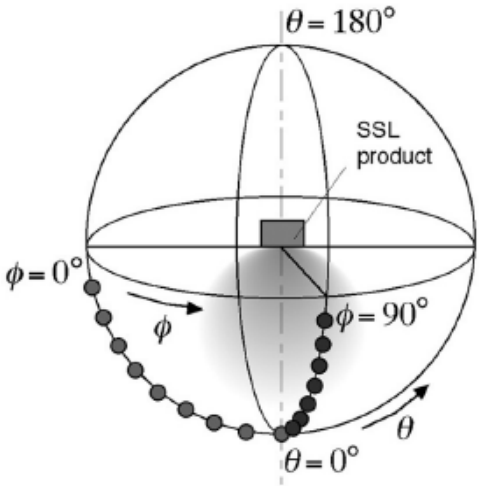
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured 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 expended 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°/180° and C=90°/270°) 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, Δu'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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