

## LM-79-08 TEST REPORT

for

### GREEN CREATIVE LTD

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

### LED Downlight

Model: 35134

### Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, YuhangDist,  
Hangzhou, Zhejiang Province, China 311100

Tel: +86571 86376106

www.ledtestlab.com

Report No.: HZ20010008f

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

Review by:



Engineer: April Zou  
Jan. 16, 2020

Approved by:



Manager: Jim Zhang  
Jan. 16, 2020

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: 35134

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
86.8	2185.5	25.19	0.9947
CCT (K)	CRI	Stabilization Time (Light & Power)	
3466	84.2	60	

Table 1: Executive Data Summary

### Test specifications:

<b>Date of Receipt</b>	: Jan. 10, 2020
<b>Date of Test</b>	: Jan. 13, 2020
<b>Test item</b>	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
<b>Reference Standard</b>	: IESNA LM-79-2008 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products

## TABLE OF CONTENT

LM-79-08 TEST REPORT .....	1
TEST SUMMARY .....	2
SAMPLE PHOTO .....	4
TEST RESULTS .....	5
Spectral Power Distribution- Goniophotometer Method.....	6
Zonal Lumen Tabulation- Goniophotometer Method .....	7
Illuminance Plots- Goniophotometer Method .....	8
Luminous Intensity Distribution Plots- Goniophotometer Method.....	9
Luminous Intensity Data- Goniophotometer Method .....	10
EQUIPMENT LIST .....	12
TEST METHODS .....	12
Seasoning of SSL Product.....	12
Goniophotometer Method .....	12
Photometric and Electrical Measurements .....	12
Color Characteristics Measurements.....	13
Color Spatial Uniformity .....	13

## SAMPLE PHOTO



Figure 1- Overview of the sample

### Equipment Under Test(EUT)

<b>Name</b>	: LED Downlight
<b>Model</b>	: 35134
<b>Electrical Ratings</b>	: 120-277V, 50/60Hz, 24W
<b>Product Description</b>	: 24CDL8DIM/835/277V
<b>Manufacturer</b>	: GREEN CREATIVE LTD
<b>Address</b>	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

## TEST RESULTS

Test ambient temperature was 24.9 °C.

Test orientation was base up. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 70 minutes, and the total operating time including stabilization was 90 minutes.

The photometric distance is 2.47 m.

Luminous data was taken at 0.5 ° vertical intervals and 10 ° horizontal intervals.

Parameter	Result		Special Color Rendering Indices	
Test Voltage (V)	120.0	277.0	R1	83
Voltage frequency (Hz)	60	60	R2	92
Test Current (A)	0.211	0.100	R3	96
Power Factor	0.9947	0.9060	R4	81
Test Power (W)	25.19	25.10	R5	83
THD A%	6.59	9.66	R6	89
Luminous Efficacy (lm/W)	86.8	87.0	R7	84
Total Luminous Flux (lm)	2185.5	2182.5	R8	64
Color Rendering Index (CRI)	84.2		R9	14
R9	14		R10	82
Correlated Color Temperature (CCT) (K)	3466		R11	80
Chromaticity (Chroma x, Chroma y)	(0.4061, 0.3888)		R12	68
Chromaticity (Chroma u, Chroma v)	(0.2370, 0.3404)		R13	86
Chromaticity (Chroma u', Chroma v')	(0.2370, 0.5106)		R14	99
Duv	-0.0010			
Average Beam Angle ( ° )	88.3			
Center Beam Candle Power (cd)	1114			
Spacing Criteria	1.22 (0 °-180 °)/ 1.21(90 °-270 °)			
Zonal Lumens in the 0 °-60 °Zone	92.64%			
Zonal Lumens in the 60 °-90 °Zone	7.24%			
Zonal Lumens in the 90 °-120 °Zone	0.01%			
Zonal Lumens in the 120 °-180 °Zone	0.11%			

Table 2: Test data per Goniophotometer Method

### Spectral Power Distribution- Goniophotometer Method

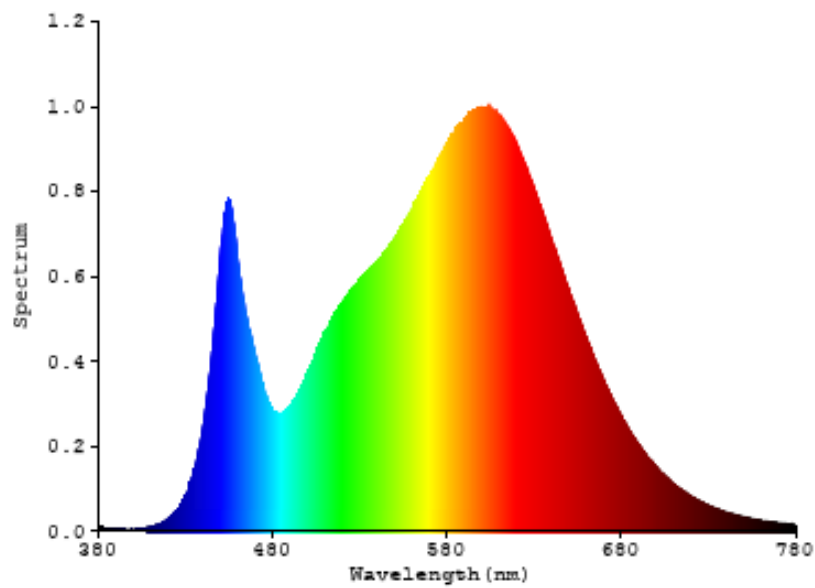


Chart 1: Spectral Power Distribution

### Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	105.355	4.82%
10- 20	302.96	13.86%
20- 30	459.785	21.04%
30- 40	505.509	23.13%
40- 50	410.734	18.79%
50- 60	240.408	11.00%
60- 70	101.676	4.65%
70- 80	44.636	2.04%
80- 90	11.85	0.54%
90-100	0.04	0.00%
100-110	0.083	0.00%
110-120	0.161	0.01%
120-130	0.291	0.01%
130-140	0.461	0.02%
140-150	0.563	0.03%
150-160	0.524	0.02%
160-170	0.362	0.02%
170-180	0.128	0.01%
Total	2185.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2024.751	92.64%
60- 90	158.162	7.24%
0-90	2182.913	99.88%
90- 180	2.613	0.12%
0- 180	2185.5	100%

Table 3: Zonal Lumen Data

## Illuminance Plots- Goniophotometer Method

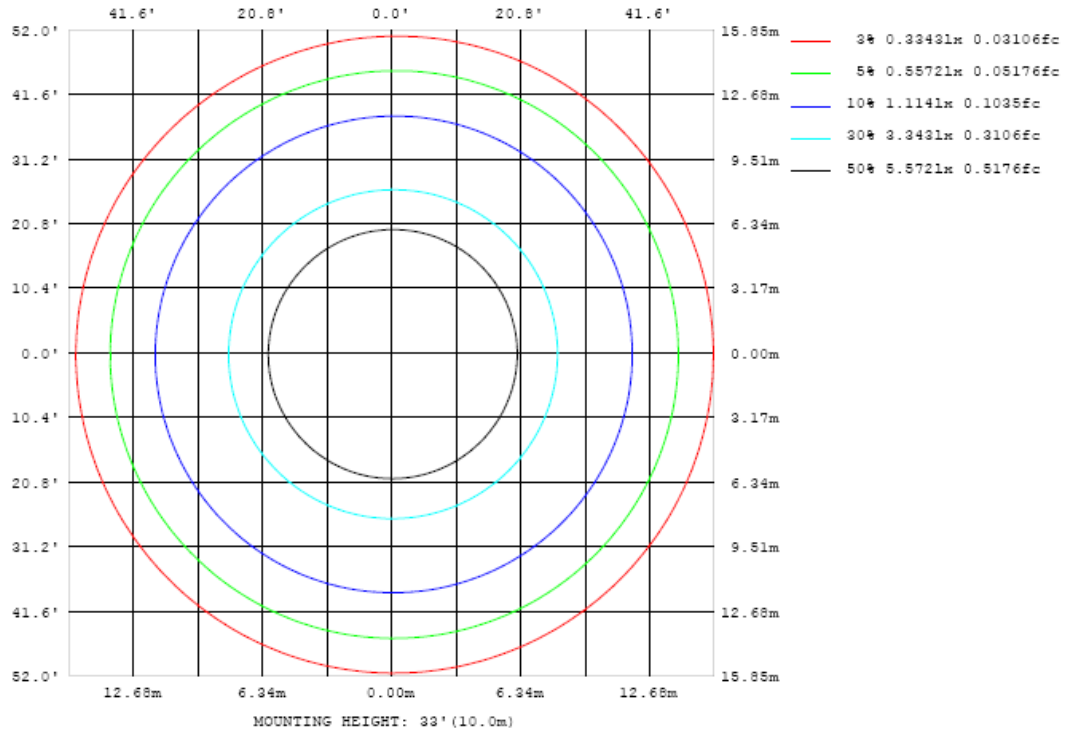


Chart 2: Illuminance Plot (Footcandles)



### Luminous Intensity Distribution Plots- Goniophotometer Method

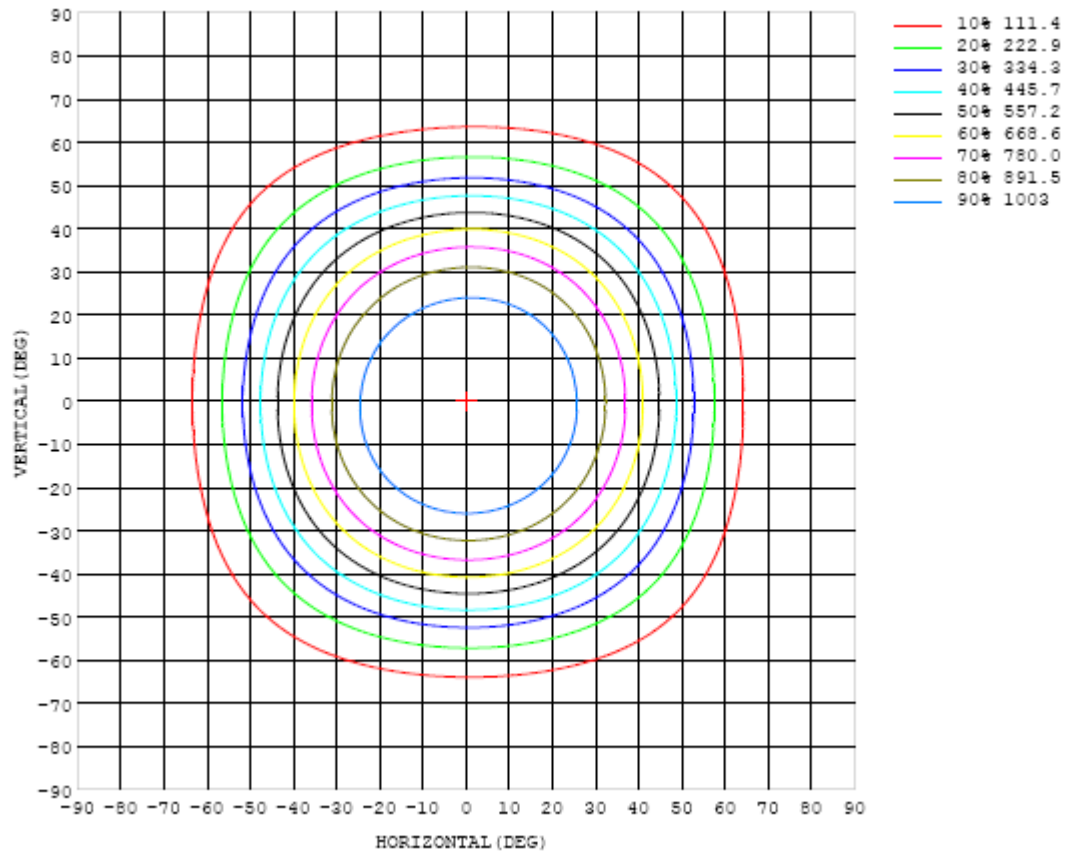


Chart 3: Isocandela Plot

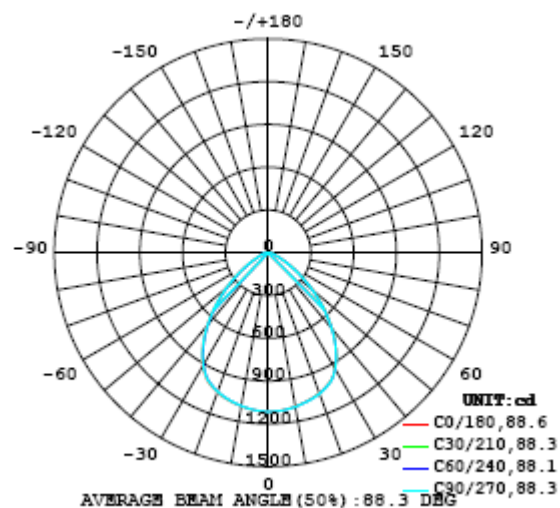


Chart 4: Polar Candela Distribution

## Luminous Intensity Data- Goniophotometer Method

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	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114
5	1109	1109	1110	1110	1110	1110	1110	1110	1111	1111	1110	1110	1110	1110	1110	1110	1109	1109	1108
10	1094	1096	1095	1096	1096	1096	1097	1097	1097	1097	1097	1097	1097	1096	1096	1096	1095	1094	1093
15	1073	1075	1075	1075	1076	1077	1077	1077	1078	1078	1078	1078	1077	1077	1076	1075	1075	1073	1072
20	1047	1048	1049	1050	1050	1051	1051	1051	1052	1052	1052	1051	1051	1050	1049	1047	1046	1044	1042
25	1009	1010	1011	1012	1012	1012	1013	1013	1013	1013	1013	1012	1010	1009	1007	1005	1003	1001	999
30	938	939	940	939	940	940	940	939	939	939	937	936	933	931	928	926	923	920	917
35	829	830	831	831	830	829	829	828	827	826	824	822	820	817	814	811	808	805	802
40	696	697	698	697	696	695	694	693	692	691	689	687	684	681	678	675	672	669	666
45	551	552	552	552	551	549	548	547	546	544	542	540	538	535	533	530	527	524	522
50	408	409	409	408	407	406	404	403	401	400	398	397	394	392	390	387	385	383	382
55	279	280	280	279	278	277	275	274	273	271	270	268	266	265	263	261	260	258	257
60	175	175	176	175	174	173	172	171	170	169	168	166	165	164	162	161	160	160	161
65	103	104	104	104	103	102	101	101	99.8	98.9	98.2	97.4	96.5	95.8	95.2	94.6	94.3	94.3	94.8
70	62.1	61.8	61.6	61.3	61.6	60.7	59.9	59.6	59.5	59.6	59.7	59.7	59.6	59.5	59.4	59.4	59.7	60.0	60.4
75	42.4	42.5	42.3	42.1	41.7	41.3	41.0	40.8	40.7	40.7	40.8	40.8	40.7	40.6	40.6	40.6	40.7	41.0	41.5
80	25.9	26.0	25.9	25.7	25.5	25.2	24.9	24.7	24.6	24.5	24.4	24.3	24.2	24.1	24.0	23.9	23.8	24.0	24.2
85	11.5	11.5	11.5	11.4	11.3	11.1	11.0	10.8	10.6	10.4	10.2	9.99	9.81	9.62	9.44	9.26	9.10	9.02	8.96
90	0.12	0.13	0.13	0.14	0.13	0.11	0.11	0.09	0.08	0.07	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.03
95	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
100	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06
105	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.09
110	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.13
115	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.19
120	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.27
125	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.28	0.39
130	0.35	0.35	0.34	0.35	0.34	0.34	0.35	0.35	0.35	0.35	0.36	0.36	0.37	0.37	0.38	0.38	0.38	0.38	0.56
135	0.46	0.46	0.46	0.45	0.46	0.46	0.46	0.46	0.46	0.47	0.47	0.48	0.48	0.49	0.49	0.49	0.50	0.49	0.75
140	0.57	0.58	0.57	0.58	0.57	0.57	0.58	0.58	0.58	0.59	0.59	0.60	0.60	0.61	0.62	0.62	0.62	0.61	0.93
145	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.71	0.71	0.71	0.72	0.72	0.73	0.73	0.73	0.74	0.72	1.08
150	0.80	0.81	0.81	0.81	0.81	0.81	0.81	0.82	0.82	0.82	0.83	0.83	0.84	0.84	0.85	0.85	0.86	0.84	1.20
155	0.92	0.93	0.93	0.92	0.93	0.93	0.93	0.93	0.94	0.94	0.95	0.96	0.96	0.97	0.98	0.98	0.99	0.97	1.28
160	1.04	1.05	1.05	1.05	1.05	1.05	1.05	1.06	1.06	1.06	1.07	1.07	1.07	1.08	1.08	1.08	1.08	1.06	1.34
165	1.11	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.13	1.13	1.14	1.14	1.14	1.15	1.15	1.15	1.13	1.34
170	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.19	1.19	1.19	1.20	1.20	1.20	1.21	1.21	1.21	1.21	1.29
175	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.26	1.27	1.28	1.29	1.31	1.33	1.34	1.35	1.37	1.38	1.39	1.40
180	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114	1114		
5	1108	1108	1108	1108	1107	1107	1107	1107	1107	1107	1108	1108	1108	1108	1109	1109	1109		
10	1092	1092	1091	1091	1090	1090	1090	1090	1090	1090	1091	1091	1092	1092	1093	1093	1094		
15	1071	1070	1069	1068	1067	1067	1067	1066	1067	1068	1069	1069	1070	1071	1071	1072	1073		
20	1040	1039	1038	1036	1035	1035	1035	1035	1036	1037	1039	1040	1042	1043	1044	1045	1046		
25	996	994	992	990	989	989	990	991	993	995	997	999	1001	1003	1005	1006	1008		
30	914	911	909	906	906	907	908	910	913	916	920	923	927	929	932	934	936		
35	799	796	794	792	791	791	793	795	799	802	806	811	815	818	822	824	827		
40	663	661	658	656	655	656	657	660	664	668	672	677	681	685	688	691	694		
45	520	517	515	513	512	512	514	516	520	524	528	533	537	540	544	547	549		
50	379	378	376	374	373	373	375	377	381	384	388	392	396	399	402	404	406		
55	256	254	253	251	251	251	252	254	257	260	264	267	270	272	274	276	278		
60	160	159	158	157	156	156	157	159	162	164	167	169	170	171	172	174	175		
65	94.7	94.4	93.9	93.5	93.2	93.4	93.9	95.2	96.6	97.9	99.2	100	101	101	102	102	103		
70	60.9	61.1	61.2	61.1	60.9	60.9	61.1	61.4	61.9	62.3	62.5	62.3	62.0	61.6	61.4	61.3	61.3		
75	41.9	42.4	42.7	42.9	42.9	43.1	43.2	43.4	43.7	43.7	43.7	43.5	43.1	42.7	42.5	42.3	42.3		
80	24.5	24.9	25.2	25.4	25.6	25.7	25.9	26.0	26.2	26.3	26.3	26.2	26.0	25.9	25.9	25.8	25.9		
85	9.01	9.12	9.28	9.41	9.57	9.73	9.90	10.1	10.3	10.5	10.6	10.8	10.9	11.0	11.1	11.2	11.3		
90	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.04	0.05	0.04	0.06	0.08	0.09		
95	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
100	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06		
105	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		
110	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13		
115	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18		
120	0.28	0.28	0.28	0.28	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.25	0.25	0.25	0.25	0.25		
125	0.40	0.40	0.40	0.40	0.40	0.39	0.39	0.38	0.38	0.37	0.37	0.36	0.35	0.35	0.35	0.34	0.34		
130	0.58	0.57	0.57	0.57	0.57	0.56	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.50	0.49	0.48	0.47		
135	0.77	0.77	0.77	0.77	0.76	0.76	0.75	0.74	0.73	0.72	0.71	0.70	0.69	0.68	0.67	0.67	0.65		
140	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.94	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.87	0.84		
145	1.13	1.13	1.13	1.13	1.13	1.12	1.12	1.11	1.11	1.10	1.09	1.08	1.08	1.07	1.06	1.06	1.02		
150	1.27	1.26	1.26	1.26	1.26	1.26	1.25	1.25	1.25	1.24	1.24	1.23	1.23	1.22	1.22	1.23	1.16		
155	1.36	1.35	1.35	1.35	1.35	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.33	1.33	1.33	1.34	1.27		
160	1.43	1.43	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.41	1.41	1.41	1.41	1.40	1.42	1.33		
165	1.46	1.45	1.45	1.45	1.45	1.45	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.45	1.45	1.47	1.36		
170	1.44	1.43	1.43	1.43	1.42	1.42	1.42	1.43	1.43	1.44	1.44	1.44	1.45	1.45	1.45	1.47	1.32		
175	1.42	1.43	1.43	1.43	1.42	1.42	1.42	1.42	1.43	1.43	1.42	1.42	1.42	1.42	1.44	1.39	1.26		
180	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42		

Table 5: Luminous Intensity Data

## EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Aug. 02, 2019	Aug. 01, 2020
Digital Power Meter	PF2010A	HZTE028-01	Aug. 02, 2019	Aug. 01, 2020
AC Power Supply	DPS1060	HZTE001-06	Aug. 02, 2019	Aug. 01, 2020
DC Power Supply	WY12010	HZTE004-03	Aug. 02, 2019	Aug. 01, 2020
Standard Source	D908	HZTE012-01	Aug. 02, 2019	Aug. 01, 2020
Standard source	SCL-1400	HZTE012-02	Aug. 02, 2019	Aug. 01, 2020
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 02, 2019	Aug. 01, 2020
Temperature recorder	JM624U	HZTE018-08	Aug. 02, 2019	Aug. 01, 2020

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.

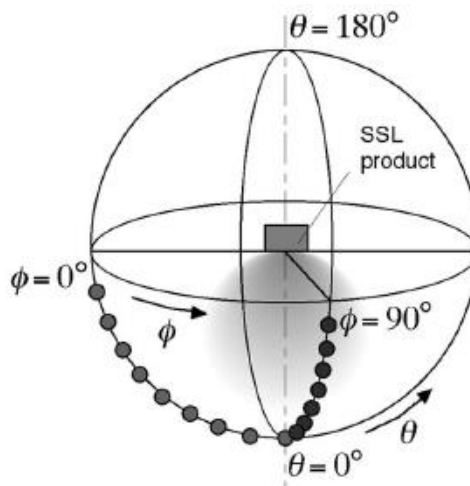
## Color Characteristics Measurements

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  $10^\circ$  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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