LM-79-08 TEST REPORT

for

GREEN CREATIVE LTD

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

LED Downlight

Model: 35138

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.: HZ20010008g

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

Review by: April Zou

Engineer: April Zou
Jan. 16, 2020

Approved by: Jim Zhang

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: **35138**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
94.9	2862.6	30.15	0.9927

CCT (K)	CRI	Stabilization Time (Light & Power)
3139	81.8	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jan. 10, 2020
Date of Test	: Jan. 13, 2020
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

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)	
Name	: LED Downlight
Model	: 35138
Electrical Ratings	: 120-277V, 50/60Hz, 30W
Product Description	: 30CDL9.5DIM/830/277V
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 24.8 ℃.

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	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.253	0.119
Power Factor	0.9927	0.9060
Test Power (W)	30.15	29.88
THD A%	9.81	8.45
Luminous Efficacy (lm/W)	94.9	95.6
Total Luminous Flux (lm)	2862.6	2856.8
Color Rendering Index (CRI)	81.8	
R9	2	
Correlated Color Temperature (CCT) (K)	3139	
Chromaticity (Chroma x, Chroma y)	(0.4297, 0.4058)	
Chromaticity (Chroma u, Chroma v)	(0.2452, 0.3473)	
Chromaticity (Chroma u', Chroma v')	(0.2452, 0.5210)	
Duv	0.0018	
Average Beam Angle (°)	91.0	
Center Beam Candle Power (cd)	1440	
Spacing Criteria	1.24 (0 °-180 °)/ 1.22(90 °-270 °)	
Zonal Lumens in the 0 °-60 °Zone	94.09%	
Zonal Lumens in the 60 °-90 °Zone	5.79%	
Zonal Lumens in the 90 °-120 °Zone	0.01%	
Zonal Lumens in the 120 °-180 °Zone	0.10%	

Special Color Rendering Indices	
R1	80
R2	90
R3	97
R4	80
R5	80
R6	87
R7	83
R8	58
R9	2
R10	77
R11	79
R12	68
R13	82
R14	99

Table 2: Test data per Goniophotometer Method

Spectral Power Distribution- Goniophotometer Method

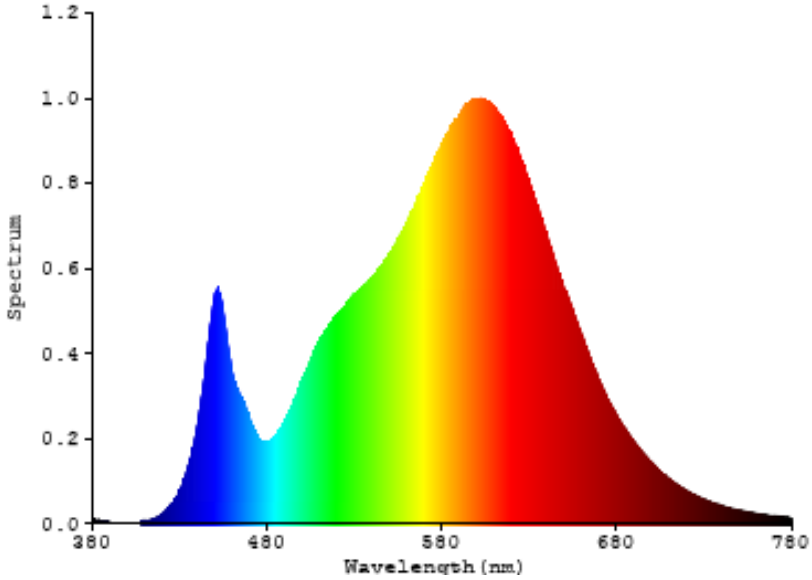


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation- Goniophotometer Method

γ(°)	Lumens	% Total
0- 10	136.318	4.76%
10- 20	393.148	13.73%
20- 30	601.815	21.02%
30- 40	677.442	23.67%
40- 50	568.114	19.85%
50- 60	316.708	11.06%
60- 70	113.628	3.97%
70- 80	45.431	1.59%
80- 90	6.596	0.23%
90-100	0.054	0.00%
100-110	0.114	0.00%
110-120	0.222	0.01%
120-130	0.389	0.01%
130-140	0.604	0.02%
140-150	0.729	0.03%
150-160	0.667	0.02%
160-170	0.452	0.02%
170-180	0.162	0.01%
Total	2862.6	100%

γ(°)	Lumens	% Total
0- 60	2693.545	94.09%
60- 90	165.655	5.79%
0-90	2859.2	99.88%
90- 180	3.393	0.12%
0- 180	2862.6	100%

Table 3: Zonal Lumen Data

Illuminance Plots- Goniophotometer Method

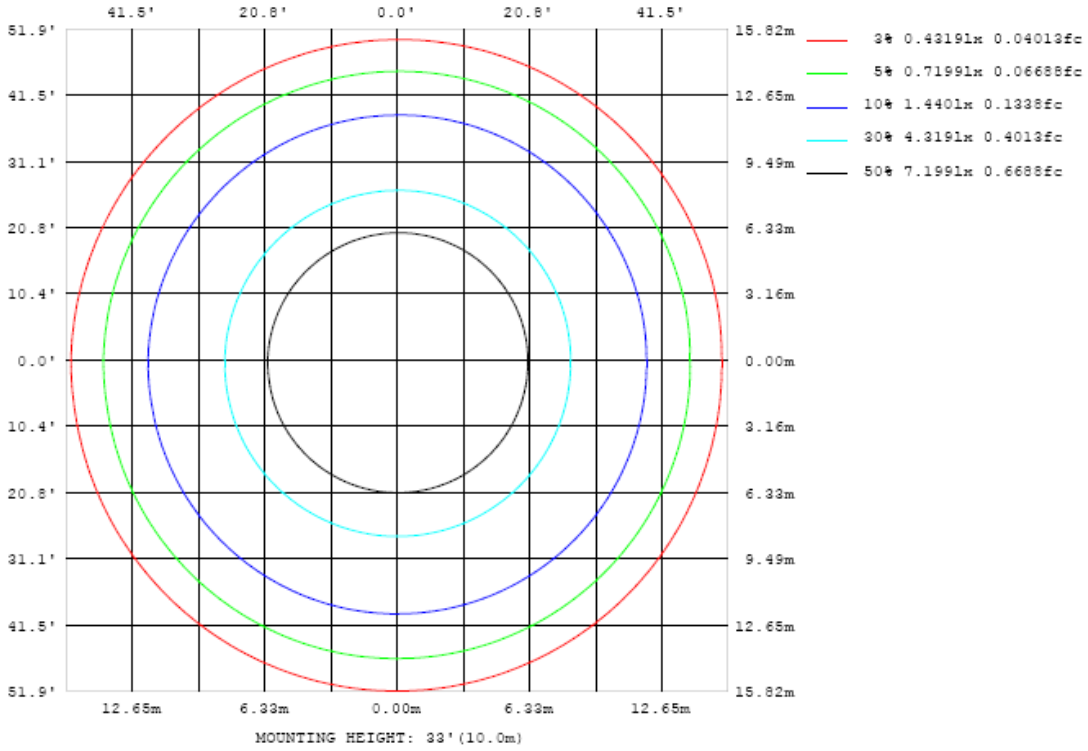


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method

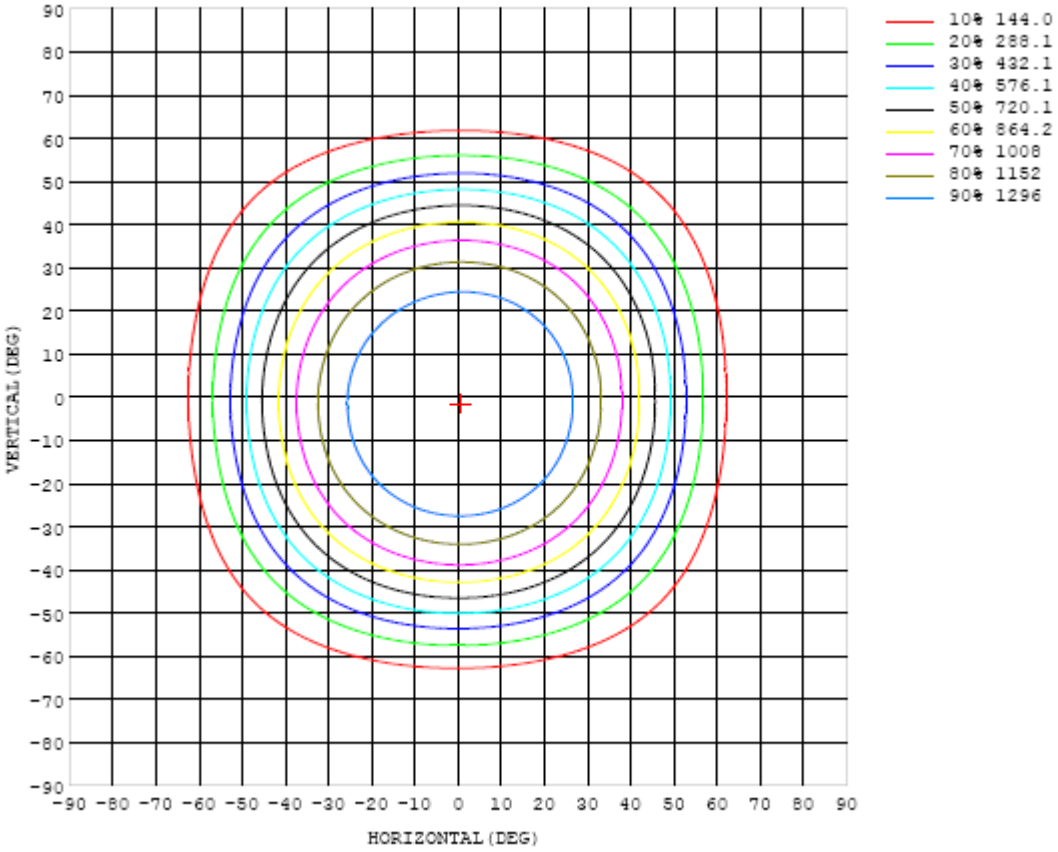


Chart 3: Isocandela Plot

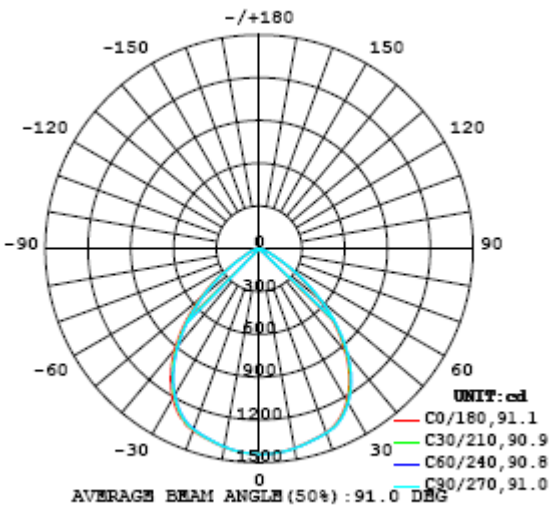


Chart 4: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440
5	1435	1436	1436	1437	1437	1437	1437	1437	1437	1437	1437	1436	1436	1436	1435	1435	1434	1433	1432
10	1418	1419	1420	1422	1422	1422	1420	1422	1422	1422	1422	1421	1420	1420	1419	1418	1416	1415	1414
15	1394	1396	1396	1398	1398	1398	1399	1398	1398	1398	1398	1397	1396	1394	1394	1392	1390	1389	1386
20	1369	1371	1372	1374	1374	1375	1375	1376	1375	1375	1374	1373	1372	1370	1369	1366	1364	1361	1358
25	1320	1324	1327	1330	1332	1333	1334	1335	1335	1334	1333	1331	1329	1326	1324	1319	1315	1311	1306
30	1227	1232	1236	1239	1243	1246	1248	1249	1249	1249	1247	1245	1242	1238	1234	1229	1224	1217	1213
35	1099	1105	1109	1114	1118	1122	1125	1127	1128	1127	1124	1122	1118	1114	1110	1105	1098	1090	1085
40	936	942	947	953	958	963	966	969	970	969	967	964	960	956	951	946	938	930	924
45	745	752	757	764	769	774	778	781	782	782	780	778	774	770	765	759	752	743	739
50	543	550	556	561	566	570	573	577	578	578	578	577	573	569	565	559	552	545	543
55	348	354	358	363	368	371	374	376	378	378	378	378	375	372	369	364	360	354	354
60	191	194	196	199	202	205	207	209	211	211	211	210	210	208	207	204	202	199	199
65	101	101	102	103	104	105	105	106	107	107	108	108	108	108	108	108	108	108	109
70	66.3	66.3	66.2	66.4	66.6	66.9	67.2	67.5	67.9	68.3	68.8	69.4	69.2	69.7	70.5	71.0	71.5	72.5	73.8
75	39.1	39.2	39.2	39.4	39.7	40.0	40.2	40.5	40.7	40.9	41.1	41.4	41.7	41.9	42.2	42.7	43.3	43.9	45.0
80	18.1	18.2	18.5	18.9	19.2	19.4	19.7	19.8	20.0	20.0	20.0	19.9	20.0	20.0	20.2	20.4	20.6	20.9	21.7
85	3.22	3.71	3.98	4.28	4.56	4.96	5.10	5.17	5.18	5.13	5.10	4.96	4.63	4.60	4.62	4.53	4.45	4.33	4.27
90	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
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	0.04	0.05
100	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.08
105	0.09	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	0.13
110	0.12	0.12	0.12	0.12	0.12	0.11	0.11	0.12	0.11	0.11	0.12	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.18
115	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.26
120	0.26	0.26	0.26	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.26	0.36
125	0.37	0.36	0.36	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.36	0.36	0.36	0.50
130	0.48	0.48	0.48	0.47	0.47	0.47	0.47	0.47	0.46	0.47	0.47	0.47	0.47	0.47	0.48	0.48	0.48	0.49	0.69
135	0.63	0.63	0.62	0.62	0.62	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.62	0.62	0.62	0.63	0.63	0.64	0.94
140	0.78	0.78	0.77	0.77	0.77	0.77	0.76	0.76	0.76	0.76	0.77	0.77	0.77	0.77	0.78	0.78	0.79	0.79	1.18
145	0.93	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.93	0.93	1.42
150	1.05	1.05	1.05	1.05	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.05	1.05	1.05	1.06	1.06	1.59
155	1.19	1.19	1.18	1.19	1.18	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	1.70
160	1.31	1.31	1.30	1.31	1.31	1.30	1.30	1.30	1.30	1.30	1.31	1.30	1.31	1.31	1.31	1.31	1.32	1.32	1.78
165	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.40	1.40	1.40	1.80
170	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.51	1.51	1.51	1.51	1.78
175	1.69	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.69	1.69	1.69	1.70	1.70	1.78
180	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78

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	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440	1440
5	1433	1432	1432	1432	1431	1431	1431	1431	1432	1431	1432	1432	1433	1433	1434	1435	1435
10	1413	1412	1411	1410	1409	1409	1409	1409	1410	1410	1411	1412	1413	1415	1416	1417	1418
15	1385	1383	1382	1380	1379	1378	1378	1379	1380	1381	1383	1384	1386	1388	1390	1392	1393
20	1355	1352	1350	1347	1345	1344	1344	1345	1347	1349	1351	1354	1357	1360	1363	1366	1368
25	1303	1298	1293	1288	1285	1284	1284	1284	1287	1289	1293	1298	1301	1306	1311	1315	1319
30	1206	1199	1193	1187	1184	1182	1181	1182	1185	1188	1192	1198	1203	1209	1215	1221	1226
35	1076	1068	1061	1054	1049	1047	1047	1048	1051	1054	1059	1065	1071	1078	1085	1092	1098
40	915	905	897	890	885	883	882	883	886	889	894	900	907	914	922	929	935
45	729	720	712	705	699	697	695	696	700	703	707	713	719	725	732	739	745
50	534	526	518	511	506	503	501	502	506	508	512	517	522	526	532	537	543
55	347	341	334	328	324	321	320	320	322	325	328	331	334	338	341	345	349
60	195	192	189	184	182	182	181	181	182	182	183	185	186	188	190	193	194
65	108	107	106	105	104	103	104	104	104	104	104	104	104	103	103	103	103
70	74.0	74.0	73.8	73.4	72.9	72.6	72.3	72.1	72.0	71.6	71.1	70.6	69.8	69.1	68.3	67.8	67.2
75	45.5	45.7	45.7	45.4	45.0	44.7	44.4	44.1	43.8	43.4	43.0	42.6	42.0	41.3	40.8	40.2	40.0
80	21.9	21.9	21.9	21.5	21.0	20.6	20.3	20.3	20.2	20.0	19.9	19.8	19.7	19.4	19.2	18.9	18.7
85	4.08	3.82	3.60	3.36	3.04	2.79	2.76	2.79	2.83	2.88	2.98	3.09	3.19	3.25	3.36	3.44	3.46
90	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
95	0.05	0.05	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
100	0.08	0.08	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
105	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.13	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13
110	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.20	0.19	0.19	0.19	0.19	0.19	0.19	0.19
115	0.26	0.26	0.26	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.26	0.26
120	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.36	0.36
125	0.50	0.50	0.50	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.50	0.50	0.49
130	0.70	0.70	0.70	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.70	0.70	0.70	0.69
135	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.95	0.95	0.94	0.94	0.93
140	1.19	1.20	1.20	1.20	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18
145	1.42	1.43	1.43	1.43	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.43	1.43	1.43	1.42	1.42	1.41
150	1.60	1.60	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.60	1.60	1.60	1.59	1.59
155	1.71	1.71	1.72	1.72	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.72	1.72	1.72	1.72	1.71	1.71
160	1.79	1.79	1.80	1.80	1.80	1.81	1.81	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.79	1.79
165	1.80	1.80	1.80	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.80	1.80
170	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.80	1.79	1.80	1.79	1.79	1.79	1.79	1.79	1.79	1.79
175	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.77	1.79	1.80	1.79	1.79	1.78	1.77
180	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78

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

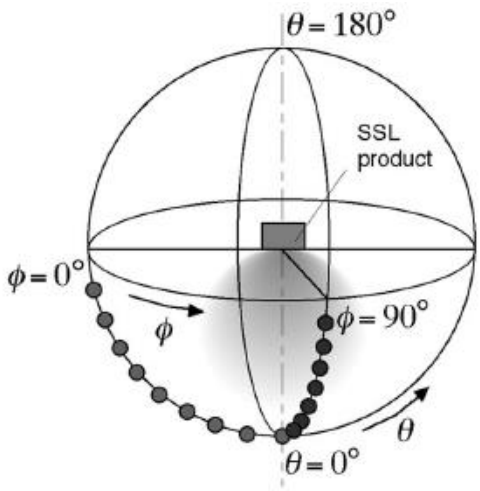
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured 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 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 ***