

## LM-79-08 TEST REPORT

for

### GREEN CREATIVE LTD

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

### LED Downlight

Model: 35140

### Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ20010008h

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: **35140**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
96.6	2976.9	30.83	0.9928
CCT (K)	CRI	Stabilization Time (Light & Power)	
3952	83.0	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

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## SAMPLE PHOTO



Figure 1- Overview of the sample

### Equipment Under Test(EUT)

<b>Name</b>	: LED Downlight
<b>Model</b>	: 35140
<b>Electrical Ratings</b>	: 120-277V, 50/60Hz, 30W
<b>Product Description</b>	: 30CDL9.5DIM/840/277V
<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	81
Voltage frequency (Hz)	60	60	R2	89
Test Current (A)	0.259	0.121	R3	95
Power Factor	0.9928	0.9108	R4	82
Test Power (W)	30.83	30.49	R5	81
THD A%	10.12	8.48	R6	85
Luminous Efficacy (lm/W)	96.6	97.4	R7	86
Total Luminous Flux (lm)	2976.9	2970.8	R8	64
Color Rendering Index (CRI)	83.0		R9	8
R9	8		R10	75
Correlated Color Temperature (CCT) (K)	3952		R11	81
Chromaticity (Chroma x, Chroma y)	(0.3830, 0.3794)		R12	63
Chromaticity (Chroma u, Chroma v)	(0.2257, 0.3354)		R13	83
Chromaticity (Chroma u', Chroma v')	(0.2257, 0.5031)		R14	98
Duv	0.0005			
Average Beam Angle (°)	91.1			
Center Beam Candle Power (cd)	1501			
Spacing Criteria	1.26 (0°-180°)/ 1.27(90°-270°)			
Zonal Lumens in the 0°-60° Zone	94.92%			
Zonal Lumens in the 60°-90° Zone	4.96%			
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

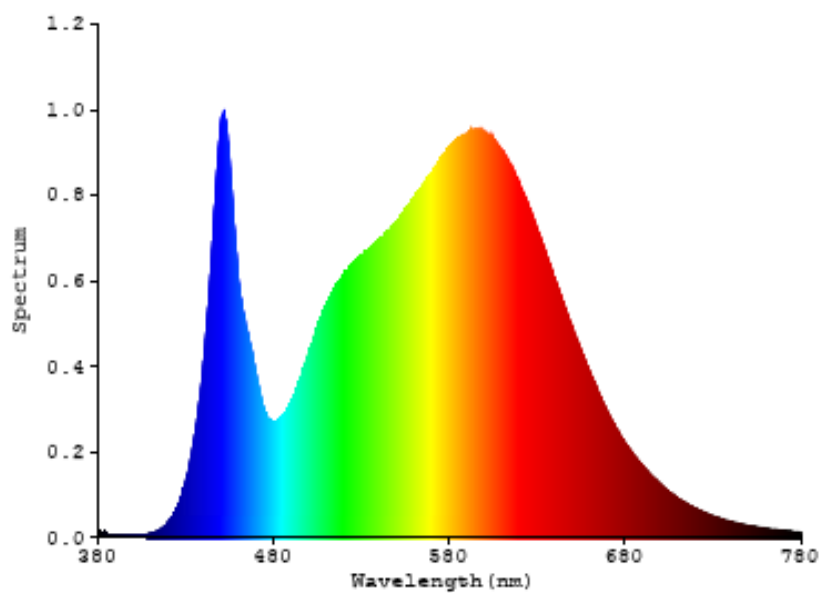


Chart 1: Spectral Power Distribution

### Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	142.442	4.78%
10- 20	413.494	13.89%
20- 30	637.4	21.41%
30- 40	717.984	24.12%
40- 50	594.848	19.98%
50- 60	319.397	10.73%
60- 70	103.394	3.47%
70- 80	38.769	1.30%
80- 90	5.631	0.19%
90-100	0.047	0.00%
100-110	0.108	0.00%
110-120	0.22	0.01%
120-130	0.399	0.01%
130-140	0.628	0.02%
140-150	0.762	0.03%
150-160	0.7	0.02%
160-170	0.475	0.02%
170-180	0.171	0.01%
Total	2976.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2825.565	94.92%
60- 90	147.794	4.96%
0-90	2973.359	99.88%
90- 180	3.51	0.12%
0- 180	2976.9	100%

Table 3: Zonal Lumen Data

## Illuminance Plots- Goniophotometer Method

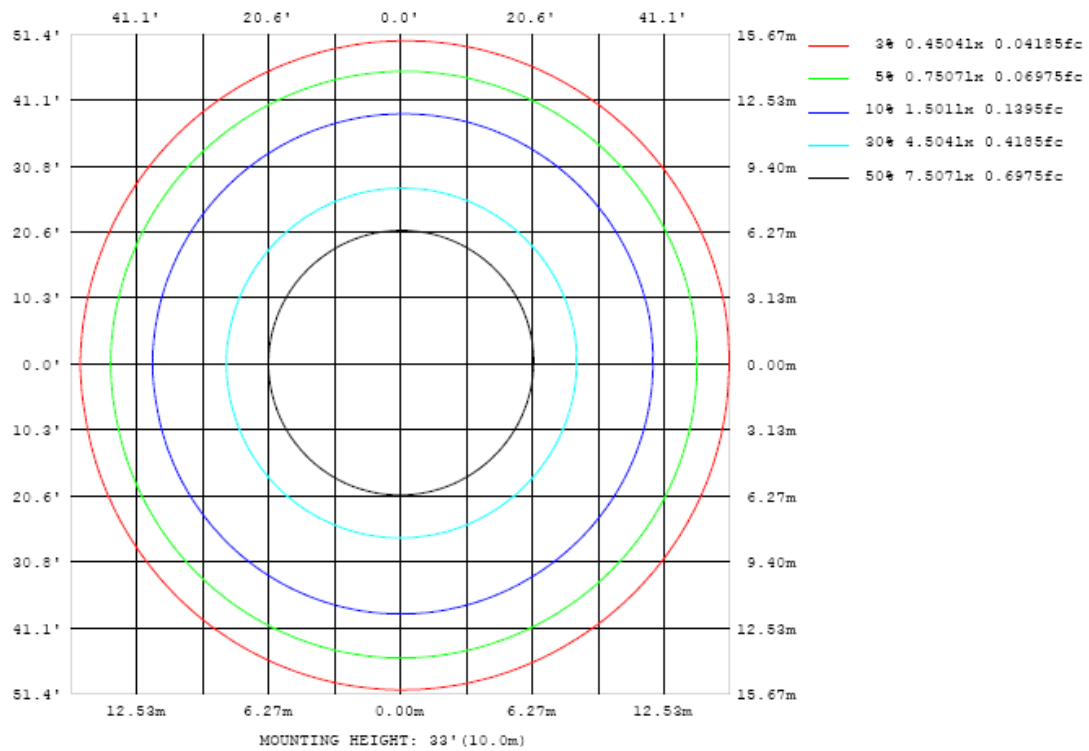


Chart 2: Illuminance Plot (Footcandles)



### Luminous Intensity Distribution Plots- Goniophotometer Method

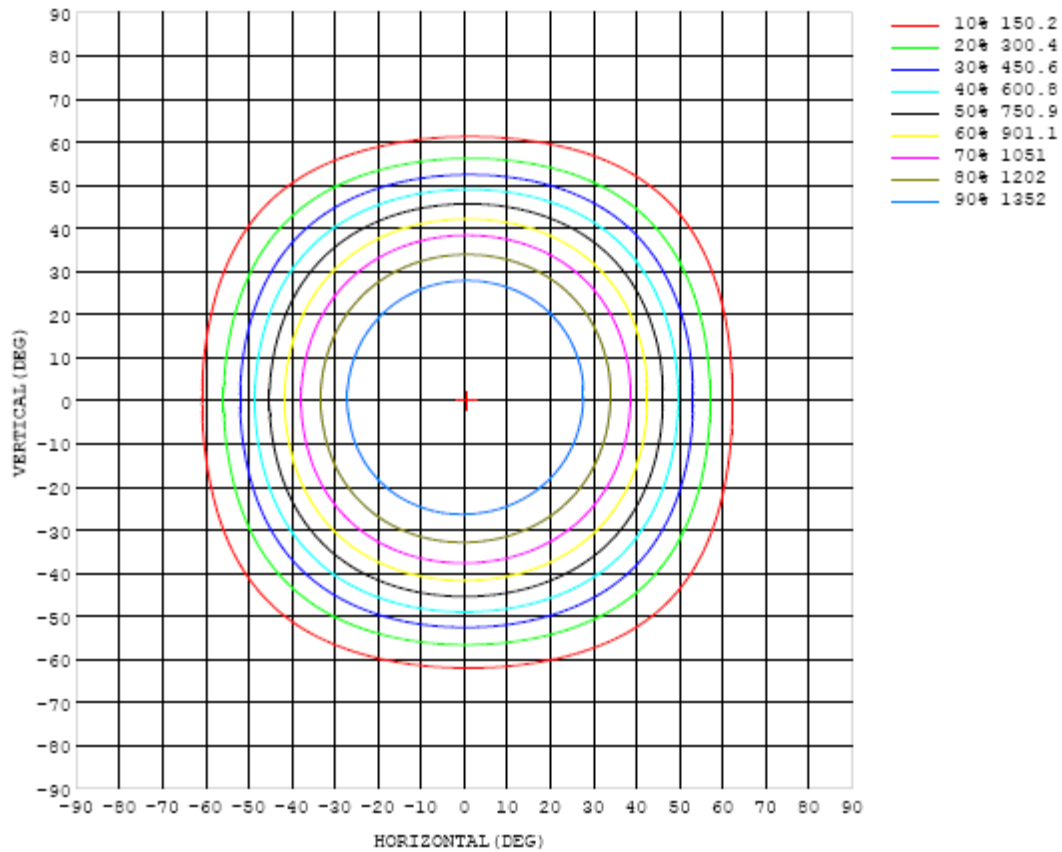


Chart 3: Isocandela Plot

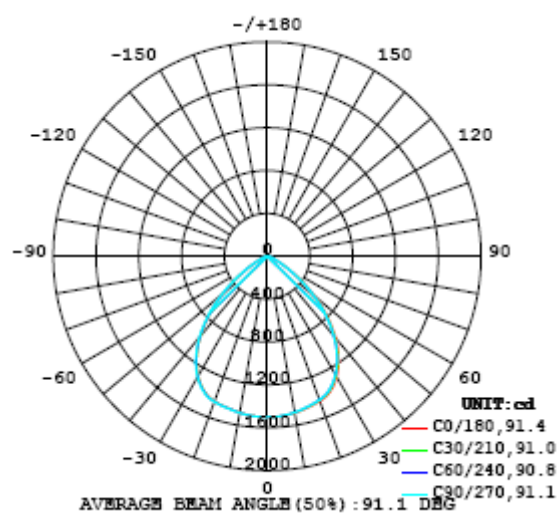


Chart 4: Polar Candela Distribution

## 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	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501
5	1498	1498	1498	1498	1497	1496	1496	1496	1496	1495	1495	1495	1495	1495	1495	1495	1495	1495	1496
10	1485	1484	1483	1482	1481	1481	1480	1480	1480	1479	1479	1479	1479	1480	1480	1480	1480	1481	1481
15	1464	1462	1460	1458	1456	1455	1454	1453	1453	1454	1454	1455	1456	1457	1458	1459	1460	1460	1461
20	1440	1437	1434	1431	1428	1426	1425	1425	1425	1426	1427	1429	1430	1431	1435	1437	1438	1439	1440
25	1395	1391	1387	1383	1379	1376	1374	1374	1373	1374	1376	1378	1380	1383	1384	1386	1387	1388	1391
30	1301	1296	1291	1285	1281	1277	1275	1274	1274	1275	1277	1279	1281	1283	1285	1286	1288	1288	1293
35	1168	1163	1156	1150	1144	1141	1137	1137	1137	1138	1140	1141	1142	1144	1146	1147	1148	1149	1154
40	998	992	986	979	974	969	966	966	965	966	967	968	968	968	969	970	970	970	974
45	797	793	787	782	776	772	769	767	767	767	767	766	765	765	764	763	761	760	765
50	582	579	576	571	567	562	559	557	557	557	556	554	553	550	547	544	541	538	543
55	375	374	373	370	366	363	360	358	357	356	355	353	349	346	342	338	334	331	335
60	205	206	205	204	202	200	199	198	197	196	194	191	187	183	179	176	173	170	174
65	102	104	105	105	105	104	104	104	103	102	101	98.3	95.3	92.3	89.5	87.0	85.1	83.6	84.2
70	66.1	68.0	69.7	69.9	70.6	70.9	71.1	70.9	70.2	69.3	67.0	64.5	61.5	58.7	56.3	54.2	52.8	51.7	51.6
75	40.0	41.7	43.0	44.2	45.2	45.6	45.7	45.4	44.4	42.8	40.6	38.3	35.9	33.9	32.1	30.8	30.0	29.4	29.5
80	19.6	20.5	21.4	22.4	23.3	23.6	23.7	23.3	22.3	21.0	19.3	17.6	16.1	15.0	14.3	13.9	13.5	13.2	13.5
85	4.11	4.25	4.80	5.08	5.47	5.74	5.88	5.36	4.90	4.26	3.96	2.96	2.54	2.31	2.17	2.11	2.06	2.00	2.17
90	0.03	0.03	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	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	0.04	0.04	0.04	0.05
100	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.08
105	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.13
110	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.19
115	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	0.18	0.18	0.19	0.19	0.27
120	0.26	0.25	0.25	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.26	0.26	0.27	0.27	0.27	0.27	0.27	0.27	0.38
125	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.38	0.52
130	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.50	0.50	0.50	0.51	0.51	0.51	0.51	0.51	0.51	0.73
135	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.66	0.66	0.66	0.67	0.67	0.67	0.67	0.67	0.67	0.99
140	0.81	0.81	0.81	0.82	0.82	0.81	0.82	0.82	0.82	0.82	0.82	0.82	0.83	0.83	0.83	0.84	0.84	0.83	1.24
145	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.99	0.99	0.98	1.49
150	1.11	1.11	1.10	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.67
155	1.25	1.25	1.25	1.25	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.79
160	1.38	1.38	1.38	1.38	1.38	1.38	1.39	1.39	1.38	1.39	1.38	1.39	1.39	1.39	1.39	1.39	1.39	1.38	1.87
165	1.46	1.46	1.46	1.47	1.46	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.88
170	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.59	1.58	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.87
175	1.78	1.77	1.77	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	1.87
180	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88

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	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501	1501		
5	1496	1496	1497	1497	1497	1497	1497	1498	1498	1498	1499	1499	1499	1499	1499	1499	1499		
10	1481	1482	1482	1482	1483	1483	1484	1485	1485	1486	1486	1487	1487	1487	1487	1487	1487		
15	1461	1461	1462	1463	1464	1464	1465	1465	1466	1466	1467	1467	1467	1467	1468	1468	1467		
20	1441	1441	1442	1443	1444	1444	1445	1446	1447	1447	1448	1448	1447	1447	1446	1445	1444		
25	1391	1392	1393	1393	1395	1396	1398	1400	1401	1402	1404	1404	1405	1404	1403	1402	1400		
30	1293	1293	1294	1295	1297	1299	1302	1304	1306	1308	1309	1310	1311	1312	1311	1310	1308		
35	1153	1153	1153	1154	1157	1159	1163	1166	1169	1171	1174	1175	1177	1178	1179	1178	1176		
40	973	972	972	973	976	979	984	988	991	994	997	1000	1003	1005	1007	1007	1006		
45	763	762	763	763	766	768	772	777	781	785	790	794	797	801	804	805	805		
50	541	541	540	541	543	545	549	552	558	562	568	573	577	582	584	587	588		
55	333	332	332	332	333	335	338	342	347	351	356	361	366	370	374	377	380		
60	173	172	172	172	172	174	176	180	183	185	188	192	196	197	201	205	208		
65	83.4	82.8	82.4	82.4	82.8	83.5	84.6	85.9	87.5	89.1	90.8	92.4	94.0	96.0	98.3	101	103		
70	51.1	50.7	50.4	50.5	50.8	51.5	52.3	53.4	54.4	55.6	56.7	57.6	58.6	59.7	61.0	62.7	64.8		
75	29.2	28.9	28.8	28.8	29.1	29.5	30.2	31.0	31.8	32.7	33.5	34.2	34.8	35.5	36.4	37.6	39.1		
80	13.3	13.0	12.9	12.9	12.9	13.2	13.6	14.2	15.0	15.7	16.3	16.9	17.3	17.7	18.2	18.7	19.4		
85	2.12	2.06	2.01	1.97	1.95	1.96	2.10	2.37	2.68	2.96	3.23	3.49	3.71	3.85	3.98	4.05	4.09		
90	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		
95	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04		
100	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	0.07	0.07	0.07		
105	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12		
110	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	0.17		
115	0.27	0.27	0.27	0.27	0.26	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.25	0.25		
120	0.38	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.36	0.36		
125	0.52	0.52	0.52	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.50	0.51	0.50	0.50		
130	0.73	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.71	0.71	0.71	0.71	0.71	0.71	0.71		
135	0.99	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
140	1.24	1.24	1.24	1.24	1.24	1.23	1.23	1.24	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23		
145	1.49	1.49	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.47		
150	1.67	1.67	1.67	1.67	1.67	1.67	1.66	1.66	1.66	1.66	1.66	1.66	1.67	1.66	1.66	1.66	1.66		
155	1.79	1.79	1.80	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79		
160	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88		
165	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.90	1.89	1.89	1.89	1.89	1.89	1.89	1.90	1.89	1.89		
170	1.87	1.88	1.88	1.88	1.89	1.89	1.89	1.89	1.89	1.88	1.89	1.89	1.89	1.89	1.89	1.89	1.88		
175	1.87	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.89	1.89	1.89	1.88	1.88	1.88	1.88	1.88		
180	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88		

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.

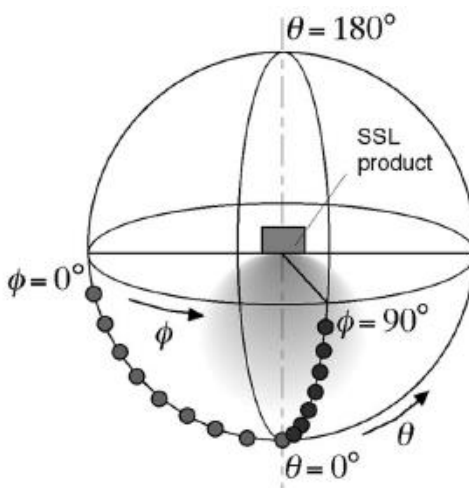
## Color Characteristics Measurements

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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