

## LM-79-08 TEST REPORT

for

### GREEN CREATIVE LTD

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

### LED Downlight

**Model: 35133**

### 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](http://www.ledtestlab.com)

Report No.: HZ20010008e

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: 35133

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
83.3	2060.3	24.73	0.9948
CCT (K)	CRI	Stabilization Time (Light & Power)	
3085	83.6	60	

Table 1: Executive Data Summary

### Test specifications:

<b>Date of Receipt</b>	: Jan. 10, 2020
<b>Date of Test</b>	: Jan. 14, 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>	: 35133
<b>Electrical Ratings</b>	: 120-277V, 50/60Hz, 24W
<b>Product Description</b>	: 24CDL8DIM/830/277V
<b>Manufacturer</b>	: GREEN CREATIVE LTD
<b>Address</b>	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

## TEST RESULTS

Test ambient temperature was 25.0 °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	82
Voltage frequency (Hz)	60	60	R2	91
Test Current (A)	0.207	0.099	R3	97
Power Factor	0.9948	0.9019	R4	82
Test Power (W)	24.73	24.68	R5	82
THD A%	6.17	9.44	R6	89
Luminous Efficacy (lm/W)	83.3	83.4	R7	84
Total Luminous Flux (lm)	2060.3	2058.5	R8	61
Color Rendering Index (CRI)	83.6		R9	11
R9	11		R10	80
Correlated Color Temperature (CCT) (K)	3085		R11	82
Chromaticity (Chroma x, Chroma y)	(0.4301, 0.4000)		R12	73
Chromaticity (Chroma u, Chroma v)	(0.2479, 0.3458)		R13	84
Chromaticity (Chroma u', Chroma v')	(0.2479, 0.5187)		R14	99
Duv	-0.0007			
Average Beam Angle ( ° )	85.5			
Center Beam Candle Power (cd)	1111			
Spacing Criteria	1.16 (0 °-180 °)/ 1.18(90 °-270 °)			
Zonal Lumens in the 0 °-60 °Zone	93.19%			
Zonal Lumens in the 60 °-90 °Zone	6.69%			
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

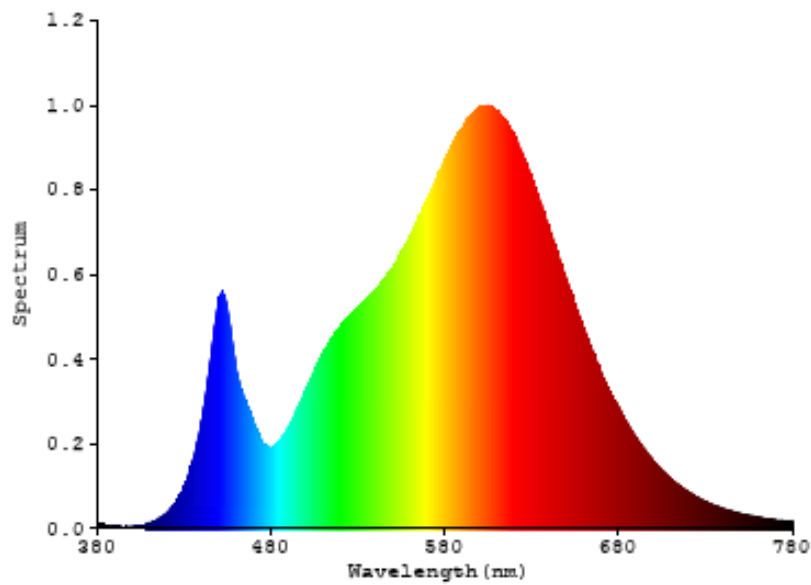


Chart 1: Spectral Power Distribution

### Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	104.758	5.08%
10- 20	298.871	14.51%
20- 30	447.19	21.71%
30- 40	479.137	23.26%
40- 50	376.855	18.29%
50- 60	213.123	10.34%
60- 70	90.421	4.39%
70- 80	39.647	1.92%
80- 90	7.814	0.38%
90-100	0.038	0.00%
100-110	0.078	0.00%
110-120	0.15	0.01%
120-130	0.271	0.01%
130-140	0.435	0.02%
140-150	0.537	0.03%
150-160	0.502	0.02%
160-170	0.346	0.02%
170-180	0.124	0.01%
Total	2060.3	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1919.934	93.19%
60- 90	137.882	6.69%
0-90	2057.816	99.88%
90- 180	2.481	0.12%
0- 180	2060.3	100%

Table 3: Zonal Lumen Data

## Illuminance Plots- Goniophotometer Method

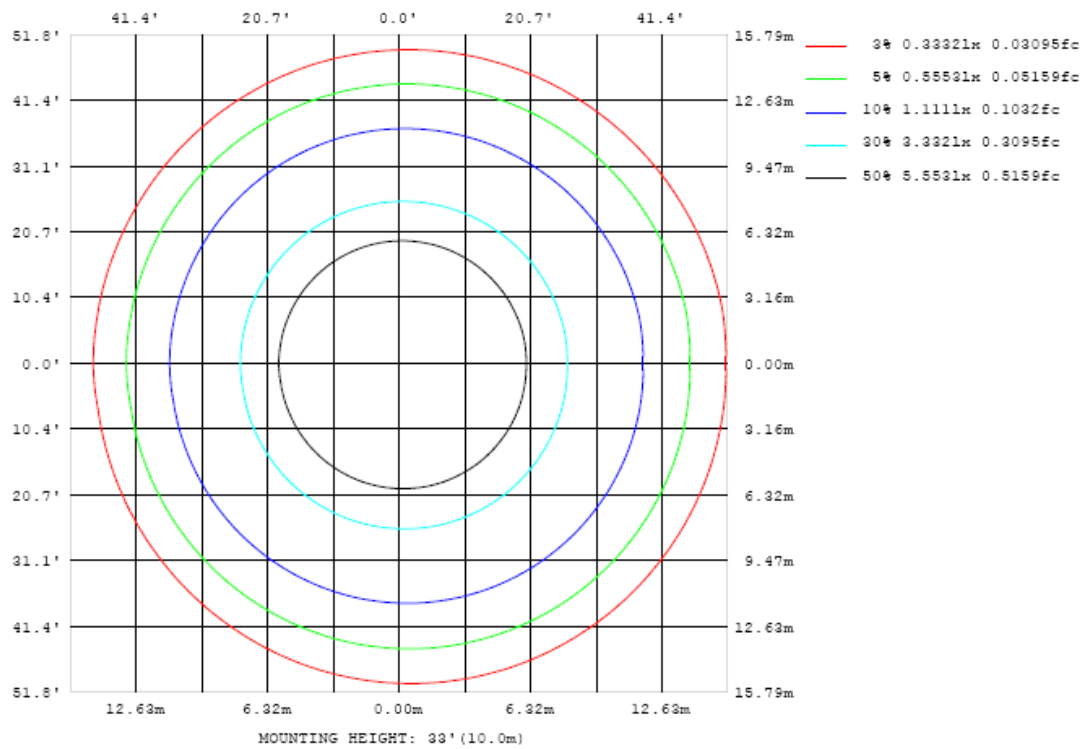


Chart 2: Illuminance Plot (Footcandles)



## Luminous Intensity Distribution Plots- Goniophotometer Method

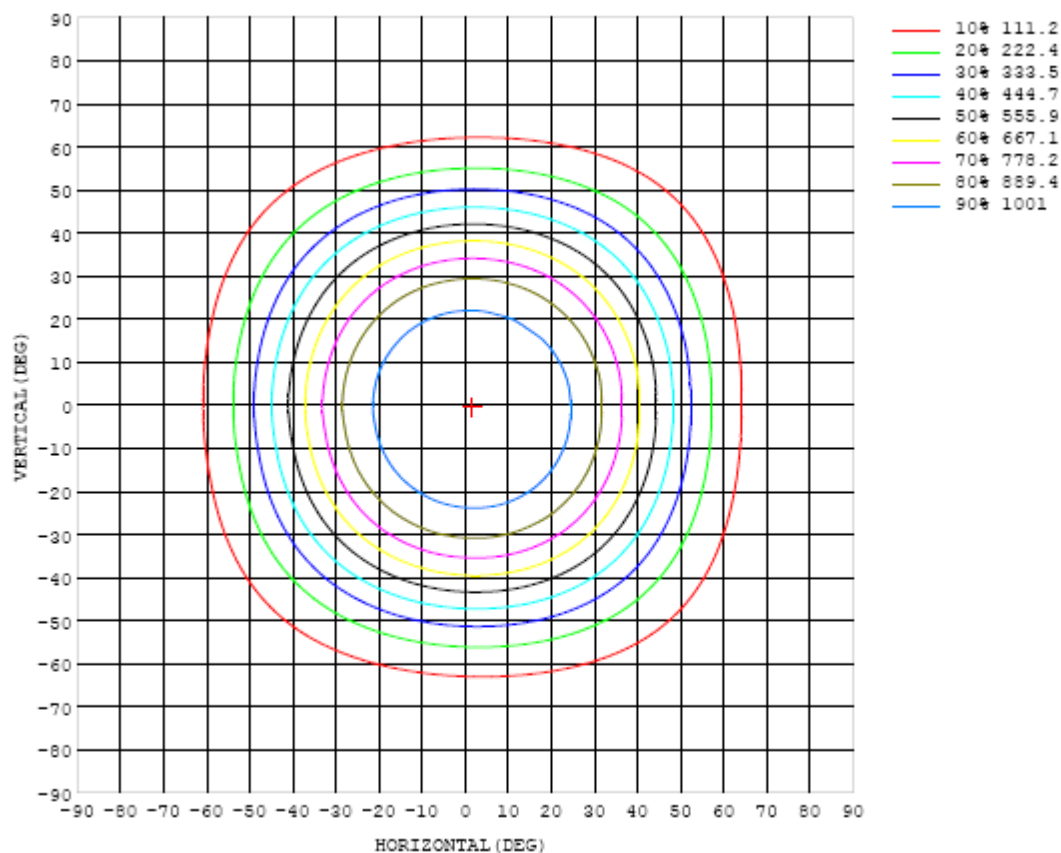


Chart 3: Isocandela Plot

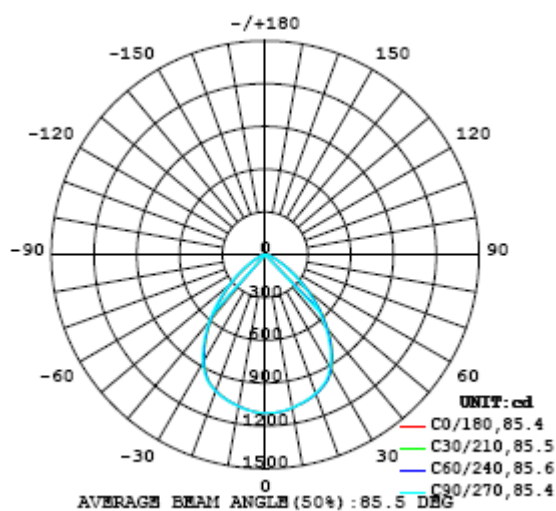


Chart 4: Polar Candela Distribution

## 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	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111
5	1108	1108	1109	1108	1108	1108	1108	1107	1106	1105	1105	1104	1103	1102	1101	1101	1100	1100	1100
10	1092	1092	1094	1093	1093	1092	1092	1091	1089	1088	1086	1085	1083	1082	1080	1079	1078	1077	1078
15	1067	1068	1069	1069	1066	1069	1068	1067	1065	1064	1062	1060	1057	1056	1055	1051	1051	1051	1051
20	1037	1039	1040	1040	1040	1040	1038	1037	1035	1032	1030	1027	1024	1022	1019	1017	1015	1013	1014
25	995	997	999	999	999	998	996	995	991	988	984	980	975	971	966	962	959	956	958
30	923	926	928	928	927	925	922	918	912	906	898	892	884	877	871	864	859	855	858
35	813	817	818	818	817	814	810	804	797	787	780	771	762	754	745	738	732	726	730
40	680	684	685	685	684	680	675	669	661	652	643	633	622	613	604	596	590	584	588
45	536	540	542	541	539	536	530	524	516	507	498	488	478	469	460	452	445	440	444
50	396	399	401	400	398	394	390	384	376	368	359	350	341	333	325	318	312	308	312
55	269	272	273	273	271	268	264	259	253	246	239	231	224	217	211	206	201	198	202
60	170	171	172	171	170	168	164	161	156	151	146	141	136	132	128	124	122	120	123
65	102	103	103	102	101	99.4	97.4	95.1	92.3	89.2	86.0	82.9	80.0	77.3	74.7	72.7	72.1	72.7	
70	64.2	64.2	63.9	63.4	62.6	61.8	60.8	59.7	58.4	57.0	55.6	54.2	52.8	51.6	50.6	49.7	49.2	48.8	49.6
75	44.1	44.0	43.7	43.1	42.4	41.6	40.6	39.6	38.4	37.2	36.0	34.7	33.6	32.5	31.6	30.9	30.4	30.1	30.9
80	25.4	25.3	25.1	24.7	24.1	23.5	22.7	21.9	20.9	19.9	18.9	17.9	17.0	16.2	15.5	14.9	14.5	14.2	14.8
85	9.55	9.62	9.54	9.34	9.05	8.66	8.15	7.56	6.98	6.38	5.65	4.93	4.33	3.67	3.18	2.72	2.36	2.08	2.41
90	0.06	0.08	0.08	0.07	0.05	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	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	0.03	0.04	0.03	0.03	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.07
105	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.10
110	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.14
115	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.14	0.19
120	0.16	0.16	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.19	0.20	0.20	0.26
125	0.23	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.25	0.25	0.25	0.26	0.26	0.27	0.27	0.27	0.28	0.37
130	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.33	0.33	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.36	0.37	0.52
135	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.45	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.70
140	0.54	0.54	0.54	0.54	0.54	0.54	0.55	0.55	0.55	0.56	0.57	0.57	0.58	0.58	0.59	0.59	0.59	0.60	0.89
145	0.65	0.65	0.65	0.65	0.65	0.65	0.66	0.66	0.67	0.67	0.68	0.68	0.69	0.69	0.70	0.70	0.71	0.71	1.07
150	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.77	0.77	0.78	0.78	0.79	0.79	0.80	0.80	0.81	0.81	0.81	1.21
155	0.88	0.88	0.87	0.88	0.88	0.88	0.88	0.89	0.89	0.89	0.90	0.90	0.91	0.91	0.92	0.92	0.92	0.92	1.30
160	0.98	0.98	0.98	0.98	0.98	0.98	0.99	0.99	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.02	1.37
165	1.05	1.05	1.05	1.05	1.05	1.06	1.06	1.06	1.06	1.07	1.07	1.07	1.07	1.08	1.08	1.08	1.08	1.08	1.38
170	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.15	1.15	1.15	1.15	1.15	1.16	1.16	1.16	1.16	1.16	1.37
175	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.29	1.29	1.29	1.29	1.30	1.30	1.30	1.30	1.30	1.36
180	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37

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	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111		
5	1099	1100	1099	1099	1100	1100	1101	1102	1102	1103	1104	1105	1106	1106	1108	1108	1108		
10	1077	1077	1077	1076	1077	1078	1079	1080	1081	1082	1084	1085	1087	1089	1090	1092	1093		
15	1050	1050	1050	1050	1050	1051	1052	1053	1054	1055	1056	1058	1060	1062	1064	1066	1067		
20	1013	1014	1013	1013	1014	1015	1016	1017	1018	1020	1022	1024	1027	1029	1032	1034	1037		
25	957	957	957	957	959	961	963	966	969	971	974	977	981	984	988	991	995		
30	856	855	856	857	860	863	867	871	876	882	887	894	900	906	913	919	924		
35	728	728	728	730	733	738	743	748	754	761	768	775	784	792	800	808	815		
40	586	585	586	588	592	597	602	608	615	622	629	638	647	656	665	674	681		
45	442	442	443	445	449	454	460	466	472	478	486	494	503	512	522	531	538		
50	310	309	311	313	317	321	326	332	338	344	351	358	366	374	382	391	397		
55	200	200	201	203	206	209	213	218	223	228	234	240	246	253	260	266	272		
60	122	122	123	124	126	129	132	135	139	142	146	150	154	159	164	169	172		
65	72.5	72.6	73.1	74.0	75.5	77.2	79.2	81.4	83.7	86.0	88.3	90.8	93.4	96.1	99.0	102	104		
70	49.6	49.9	50.3	50.9	51.8	52.9	54.1	55.4	56.7	57.9	58.9	59.9	60.9	61.9	63.0	64.0	64.8		
75	30.9	31.1	31.4	31.9	32.6	33.6	34.7	36.0	37.3	38.6	39.8	41.0	42.0	43.0	43.8	44.5	45.0		
80	14.8	14.9	15.1	15.4	15.9	16.6	17.4	18.4	19.5	20.6	21.7	22.7	23.7	24.6	25.3	25.9	26.2		
85	2.29	2.28	2.37	2.52	2.75	3.11	3.59	4.14	4.82	5.55	6.36	7.19	7.98	8.65	9.23	9.70	10.1		
90	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.06	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	0.03	0.03	0.03	0.03	0.03		
100	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05		
105	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.07	0.07		
110	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11		
115	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.16	0.16	0.15	0.15	0.15		
120	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.25	0.25	0.25	0.24	0.24	0.23	0.23	0.22	0.22	0.22		
125	0.37	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.35	0.35	0.34	0.34	0.33	0.33	0.32	0.32	0.32		
130	0.52	0.52	0.52	0.52	0.52	0.52	0.51	0.51	0.50	0.50	0.49	0.48	0.48	0.47	0.47	0.47	0.46		
135	0.71	0.71	0.71	0.71	0.71	0.70	0.70	0.70	0.69	0.68	0.68	0.67	0.66	0.66	0.65	0.65	0.65		
140	0.90	0.90	0.90	0.90	0.90	0.89	0.89	0.88	0.88	0.87	0.87	0.86	0.85	0.85	0.84	0.84	0.84		
145	1.08	1.08	1.08	1.08	1.08	1.07	1.07	1.06	1.06	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.02		
150	1.21	1.22	1.22	1.22	1.21	1.21	1.21	1.20	1.20	1.19	1.19	1.18	1.18	1.17	1.17	1.17	1.16		
155	1.31	1.31	1.31	1.31	1.31	1.30	1.30	1.30	1.30	1.29	1.29	1.28	1.28	1.27	1.27	1.27	1.27		
160	1.37	1.38	1.38	1.38	1.37	1.37	1.37	1.37	1.37	1.37	1.36	1.36	1.36	1.36	1.35	1.35	1.35		
165	1.39	1.39	1.39	1.39	1.39	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38		
170	1.37	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38		
175	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37		
180	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37		

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.

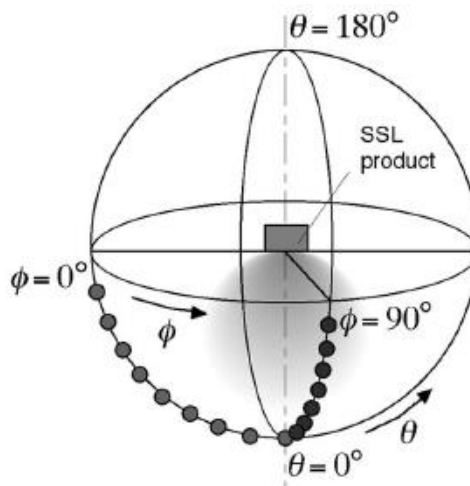
## Color Characteristics Measurements

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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