

LM-79-08 TEST REPORT

for

GREEN CREATIVE LTD

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

LED Commercial Downlight

Model: 27CDLA8/830/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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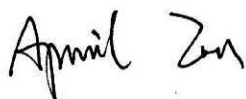
www.ledtestlab.com

Report No.: HZ19050024a

The test data of **High setting** in this report comes from report No. HZ15120046f dated Jan. 07, 2016.

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

Review by:



Engineer: April Zou
May 21, 2019

Approved by:



Manager: Jim Zhang
May 21, 2019

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: 27CDLA8/830/277V (High Setting)

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
77.9	2071.1	26.57	0.9903
CCT (K)	CRI	Stabilization Time (Light & Power)	
3048	83.1	60	

Sample Tested: 27CDLA8/830/277V (Med Setting)

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
105.9	1883.4	17.79	0.9448
CCT (K)	CRI	Stabilization Time (Light & Power)	
2995	82.7	60	

Sample Tested: 27CDLA8/830/277V (Low Setting)

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
115.1	1265.2	10.99	0.9667
CCT (K)	CRI	Stabilization Time (Light & Power)	
2985	83.1	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: May 20, 2019
Date of Test	: May 21, 2019
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 PHOTO

The power and light output can be adjusted by this dip switch.



Figure 1- Overview of the sample

Equipment Under Test(EUT)

Name	: LED Commercial Downlight
Model	: 27CDLA8/830/277V
Electrical Ratings	: 120-277Vac, 50/60Hz, 27W (Max)
Product Description	: 3000K, Non-dimmable, CRI80, No Off-State Power Field-Adjustable Light Output (3 settings: Low, Mid and High) Manufacturer of LED light source: Lextar Model of LED light source: PC35H11.V0
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 24.7 °C.

Test orientation was light down. 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.

This product has **Field-Adjustable Light Output function**, the tests were conducted at **High, Med** and **Low** settings separately adjusted by the **dip switch** on the back.

Parameter	Result						Special Color Rendering Indices of High Setting	
	High setting		Med setting		Low setting			
Test Voltage (V)	120.0	277.0	120.0	277.0	120.0	277.0	R1	82
Voltage frequency (Hz)	60	60	60	60	60	60	R2	92
Test Current (A)	0.224	0.105	0.157	0.079	0.095	0.056	R3	95
Power Factor	0.9903	0.9239	0.9448	0.8317	0.9667	0.7407	R4	80
Test Power (W)	26.57	26.96	17.79	18.13	10.99	11.54	R5	82
THD A%	11.03	18.77	13.13	17.99	8.53	19.63	R6	91
Luminous Efficacy (lm/W)	77.9	/	105.9	104.2	115.1	110.4	R7	82
Total Luminous Flux (lm)	2071.1	/	1883.4	1891.6	1265.2	1275.1	R8	59
Color Rendering Index (CRI)	83.1						R9	9
R9	9						R10	83
Correlated Color Temperature (CCT) (K)	3048						R11	79
Chromaticity (Chroma x, Chroma y)	(0.4344, 0.4046)						R12	72
Chromaticity (Chroma u, Chroma v)	(0.2487, 0.3475)						R13	84
Chromaticity (Chroma u', Chroma v')	(0.2487, 0.5212)						R14	98
Duv	0.0006							
Average Beam Angle (°)	106.1							
Center Beam Candle Power (cd)	810							
Spacing Criteria	1.22 (0 °-180 °)/ 1.22 (90 °-270 °)							
Zonal Lumens in the 0 °-60 °Zone	83.47%							
Zonal Lumens in the 60 °-90 °Zone	16.43%							
Zonal Lumens in the 90 °-120 °Zone	0.03%							
Zonal Lumens in the 120 °-180 °Zone	0.07%							

Table 2: Test data per Goniophotometer Method

Spectral Power Distribution- Goniophotometer Method of High Setting

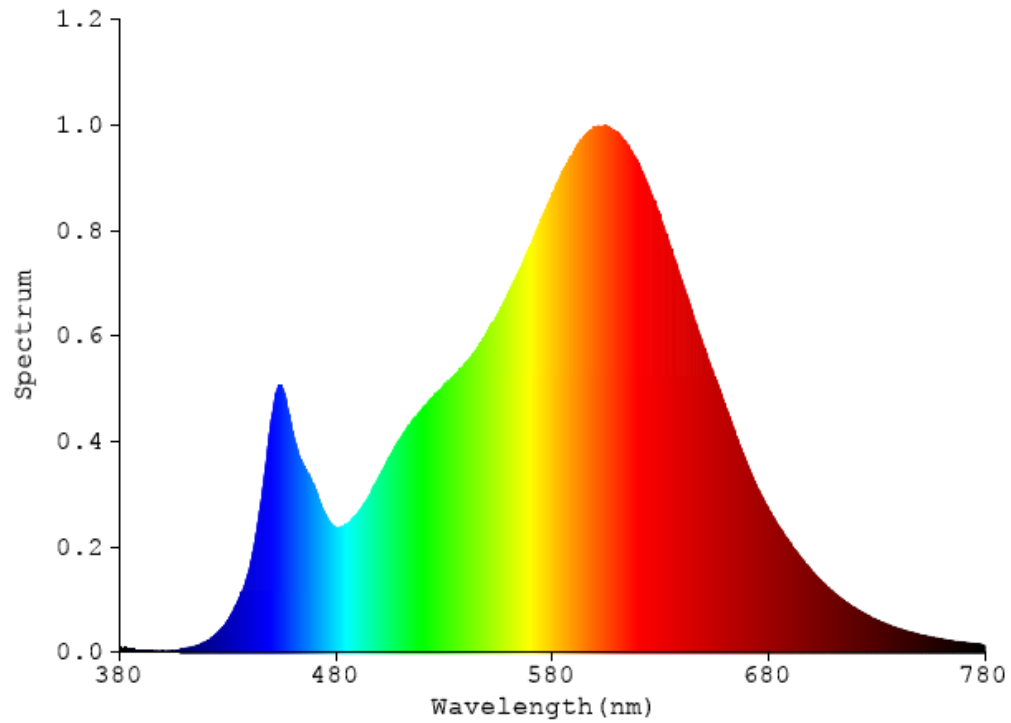


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation- Goniophotometer Method of High Setting

$\gamma(^{\circ})$	Lumens	% Total
0- 10	76.481	3.69%
10- 20	217.472	10.50%
20- 30	324.589	15.67%
30- 40	383.569	18.52%
40- 50	389.932	18.83%
50- 60	336.904	16.27%
60- 70	230.673	11.14%
70- 80	97.06	4.69%
80- 90	12.459	0.60%
90-100	0.118	0.01%
100-110	0.183	0.01%
110-120	0.227	0.01%
120-130	0.265	0.01%
130-140	0.314	0.02%
140-150	0.332	0.02%
150-160	0.292	0.01%
160-170	0.197	0.01%
170-180	0.072	0.00%
Total	2071.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1728.947	83.47%
60- 90	340.192	16.43%
0-90	2069.139	99.90%
90- 180	2	0.10%
0- 180	2071.1	100%

Table 3: Zonal Lumen Data

Illuminance Plots- Goniophotometer Method of High Setting

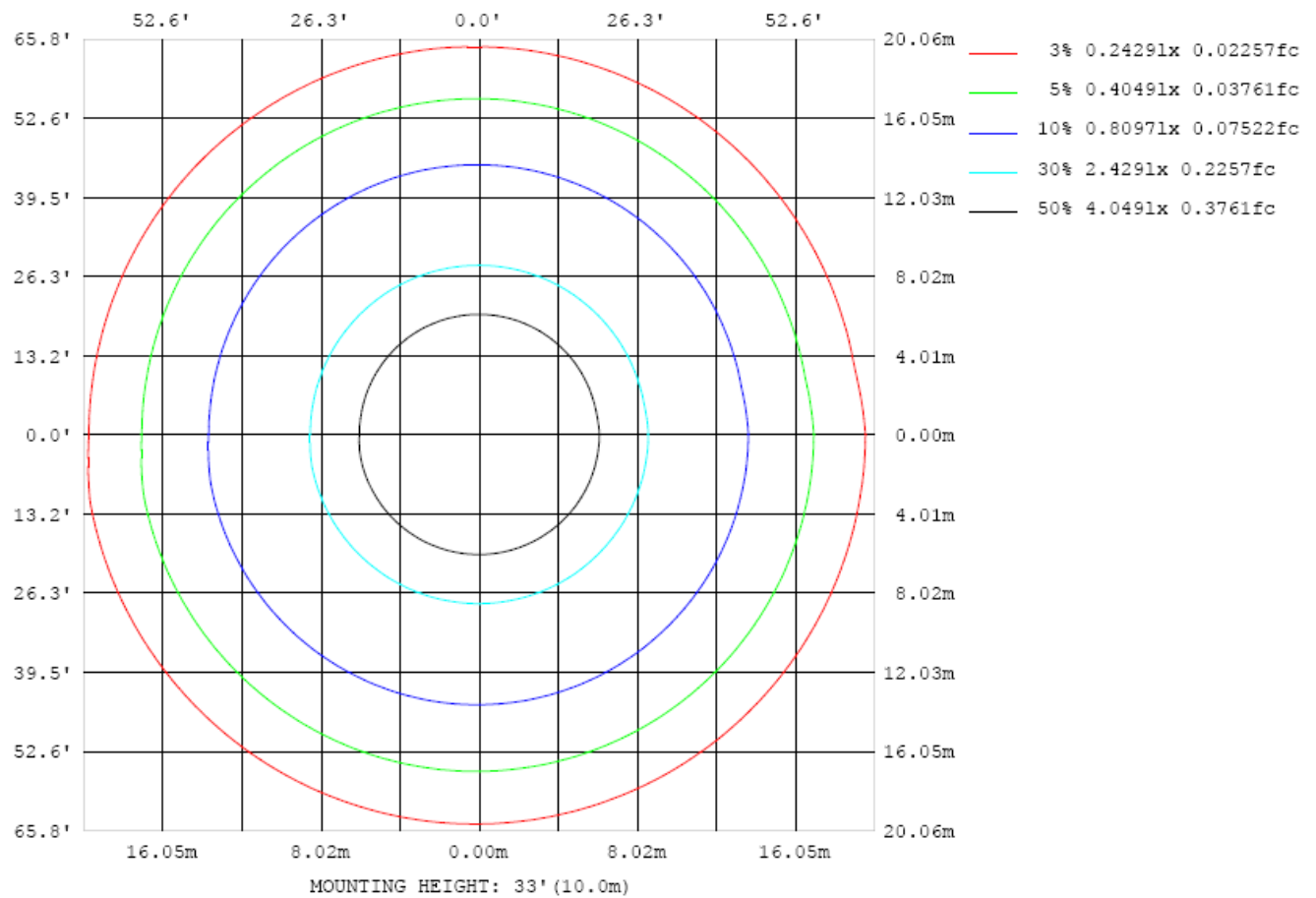


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots- Goniophotometer Method of High Setting

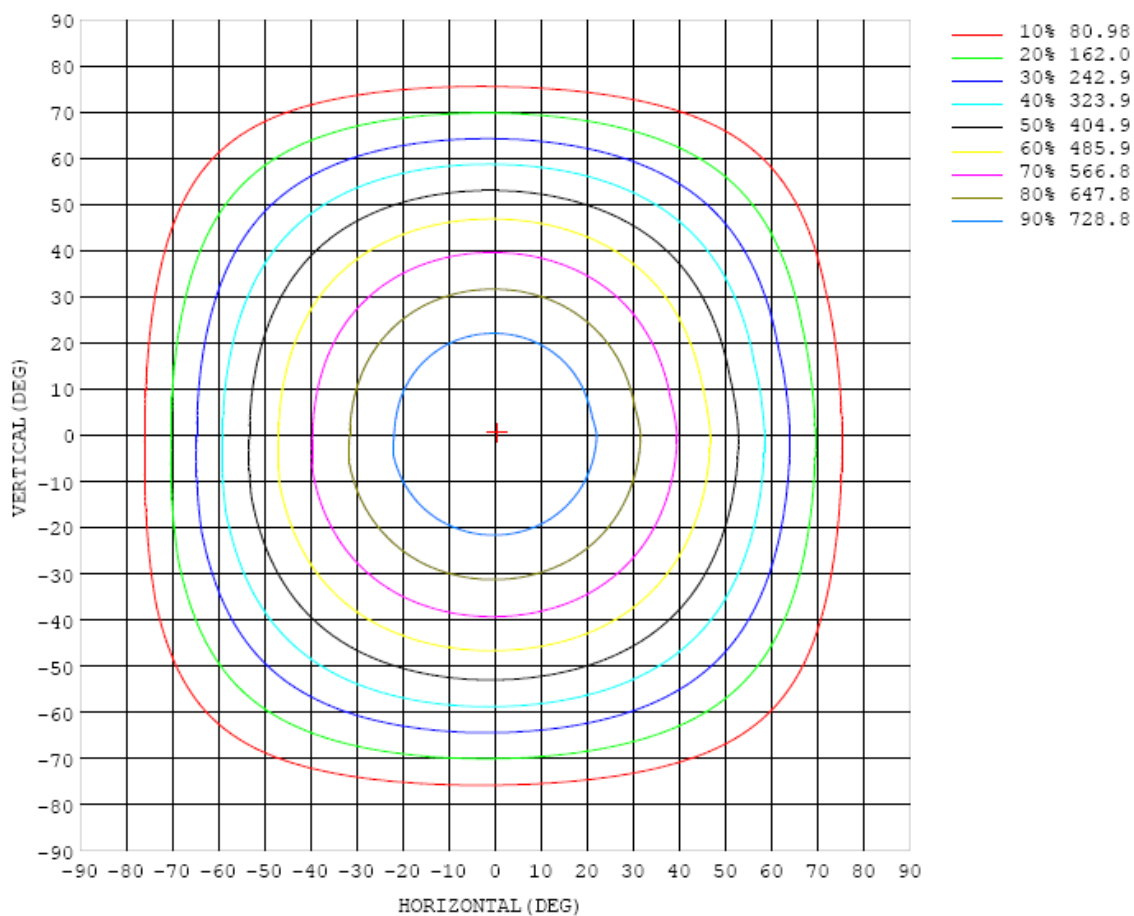


Chart 3: Isocandela Plot

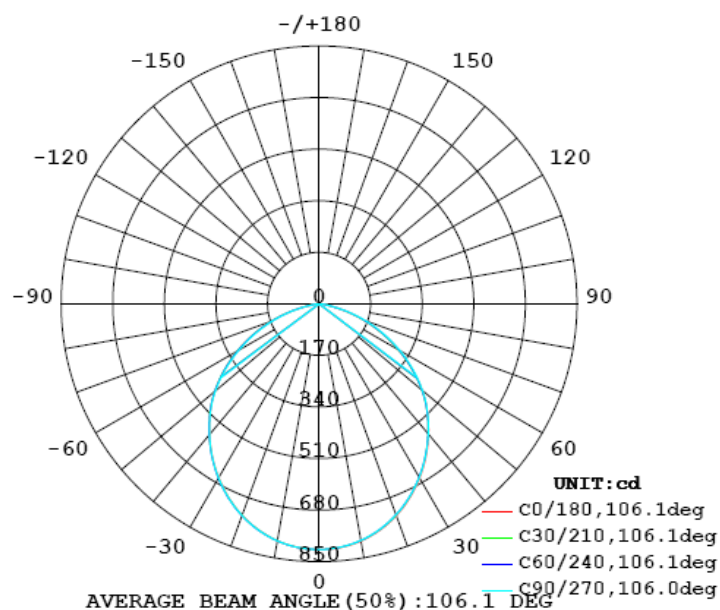


Chart 4: Polar Candela Distribution

Luminous Intensity Data- Goniophotometer Method of High Setting

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	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810
5	806	806	805	805	805	805	805	805	805	805	805	805	805	805	806	806	806	806	806
10	794	793	793	792	792	792	792	792	792	792	792	792	792	793	793	793	794	794	793
15	773	772	771	771	770	770	770	770	770	770	770	771	771	771	772	773	773	774	771
20	743	742	741	741	740	740	740	740	740	741	741	741	742	742	743	744	745	745	742
25	706	705	704	704	703	703	703	703	703	704	704	704	705	706	707	708	709	710	705
30	663	661	661	660	659	659	659	659	659	660	661	661	662	663	664	665	667	668	662
35	614	613	612	611	611	611	611	611	611	612	613	613	614	616	617	618	619	621	614
40	561	560	559	559	558	558	558	558	559	560	561	561	563	564	565	567	568	569	562
45	506	504	504	503	503	503	503	504	504	505	506	507	508	510	511	513	514	515	508
50	444	442	442	442	441	442	442	443	444	445	446	448	449	451	453	454	456	458	448
55	374	373	373	373	373	374	375	375	377	378	380	381	383	385	387	389	390	392	382
60	302	301	300	301	301	302	303	304	306	308	309	311	313	315	317	319	321	322	311
65	228	227	227	227	228	229	230	232	233	236	237	239	241	243	245	247	249	250	239
70	155	154	155	155	156	157	158	160	162	163	165	167	169	171	173	175	177	178	166
75	85.2	84.8	85.0	85.5	86.3	87.2	88.3	89.5	90.9	92.5	94.3	96.3	98.3	100	102	104	106	107	94.6
80	28.8	28.5	28.5	28.6	28.8	29.2	29.7	30.4	31.3	32.4	33.5	34.8	36.1	37.5	38.8	40.1	41.2	42.2	33.8
85	9.96	9.82	9.73	9.75	9.76	9.82	9.96	10.2	10.5	10.8	11.1	11.5	11.9	12.2	12.5	12.9	13.1	13.4	11.3
90	0.12	0.11	0.11	0.11	0.10	0.10	0.11	0.11	0.11	0.12	0.14	0.18	0.27	0.40	0.56	0.73	0.91	1.03	0.06
95	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.05
100	0.20	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.19	0.19	0.19	0.07
105	0.24	0.25	0.25	0.25	0.25	0.25	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.23	0.23	0.10
110	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.14
115	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.26	0.26	0.27	0.27	0.26	0.19
120	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.24
125	0.30	0.29	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.28	0.28	0.29
130	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.35
135	0.41	0.42	0.42	0.42	0.42	0.42	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.40	0.40	0.40	0.40
140	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.47	0.47	0.45
145	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.55	0.55	0.55	0.55	0.55	0.54	0.51
150	0.62	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.61	0.55
155	0.67	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.67	0.59
160	0.71	0.73	0.73	0.73	0.73	0.73	0.72	0.72	0.72	0.73	0.73	0.72	0.72	0.72	0.72	0.72	0.72	0.71	0.62
165	0.73	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.74	0.74	0.74	0.75	0.75	0.73	0.65
170	0.75	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.76	0.67
175	0.79	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	0.78	0.76
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

C (DEG) y (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810	810		
5	805	805	806	806	806	806	806	806	806	806	806	805	805	805	805	805	806		
10	792	792	793	793	793	794	793	793	793	794	793	793	792	792	792	791	792		
15	771	771	772	772	772	773	773	773	772	772	772	771	771	770	770	769	769		
20	741	742	743	743	743	743	743	744	743	743	742	742	741	740	740	739	739		
25	705	705	706	706	707	707	707	707	706	706	705	704	703	703	702	701	700		
30	662	662	663	663	664	664	664	663	663	663	662	661	660	659	658	656	656		
35	614	614	615	616	616	616	616	616	615	614	613	612	611	610	608	607	607		
40	562	563	564	564	564	564	564	563	562	562	560	559	558	557	555	554	553		
45	508	508	509	509	509	509	508	508	507	506	505	503	502	501	499	498	497		
50	448	449	449	449	449	449	448	447	446	444	443	441	440	438	436	434	433		
55	382	382	382	382	382	381	380	379	377	376	374	372	370	368	366	364	363		
60	311	312	312	312	311	310	309	307	305	303	301	299	297	295	292	291	290		
65	239	240	239	239	238	237	236	234	232	230	228	225	223	221	219	217	215		
70	167	167	167	166	166	164	163	161	159	157	155	152	150	148	145	143	142		
75	95.0	95.4	95.3	94.9	94.1	93.1	91.6	90.1	88.2	86.5	84.6	82.5	80.4	78.3	76.4	74.7	73.5		
80	34.4	34.7	34.7	34.6	34.1	33.5	32.6	31.4	30.4	29.3	28.0	26.8	25.7	24.7	23.8	23.1	22.5		
85	11.4	11.5	11.6	11.5	11.4	11.3	11.0	10.7	10.4	10.1	9.71	9.33	8.98	8.67	8.39	8.08	7.89		
90	0.08	0.08	0.07	0.06	0.04	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
95	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.06	0.06		
100	0.07	0.07	0.07	0.07	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		
105	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11		
110	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
115	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20		
120	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.25	0.25	0.25	0.25	0.25	0.25		
125	0.29	0.29	0.29	0.29	0.29	0.29	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.31	0.31	0.31	0.31		
130	0.35	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	0.36		
135	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41		
140	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.46	0.46	0.46	0.46		
145	0.50	0.50	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	0.52	0.52		
150	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56		
155	0.59	0.59	0.59	0.58	0.58	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59		
160	0.62	0.62	0.62	0.61	0.61	0.61	0.61	0.61	0.61	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62		
165	0.65	0.65	0.65	0.65	0.65	0.64	0.65	0.65	0.65	0.65	0.65	0.65	0.66	0.66	0.66	0.66	0.65		
170	0.67	0.68	0.68	0.68	0.67	0.68	0.67	0.67	0.67	0.68	0.68	0.67	0.68	0.68	0.68	0.68	0.67		
175	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.77	0.77	0.77	0.77	0.77	0.78	0.78	0.78		
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. 14, 2018	Aug. 13, 2019
Digital Power Meter	PF2010A	HZTE028-01	Sep. 12, 2018	Sep. 11, 2019
AC Power Supply	DPS1060	HZTE001-06	Aug. 09, 2018	Aug. 08, 2019
DC Power Supply	WY12010	HZTE004-03	Aug. 09, 2018	Aug. 08, 2019
Standard Source	D908	HZTE012-01	Aug. 14, 2018	Aug. 13, 2019
Standard source	SCL-1400	HZTE012-02	Aug. 16, 2018	Aug. 15, 2019
Temperature and humidity recorder	JR900	HZTE018-01	Aug. 09, 2018	Aug. 08, 2019
Temperature recorder	JM624U	HZTE018-08	Aug. 09, 2018	Aug. 08, 2019

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.

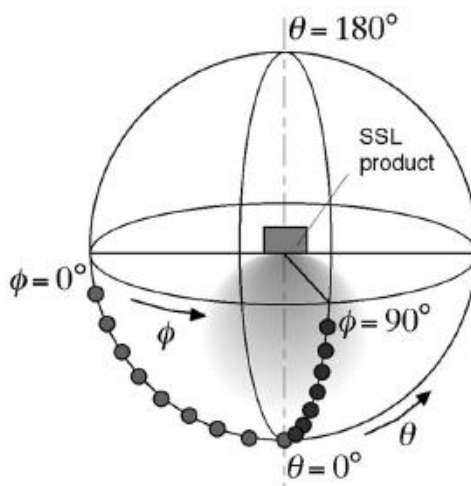
Color Characteristics Measurements

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° 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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