



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

Commercial downlight

Model: 32CDL8G4DIM/835/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15060018e/R1

This report is replaced the old report No. HZ15060018e dated Jun. 23, 2015.

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

Review by:

Engineer: April Zou
Jun. 25, 2015

Approved by:



Manager: Jim Zhang
Jun. 25, 2015

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: 32CDL8G4DIM/835/277V

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
80.3	2528.7	31.50	0.9918
CCT (K)	CRI	Stabilization Time (Light & Power)	
3458	84.4	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jun. 05, 2015
Date of Test	: Jun. 11, 2015
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 Photos

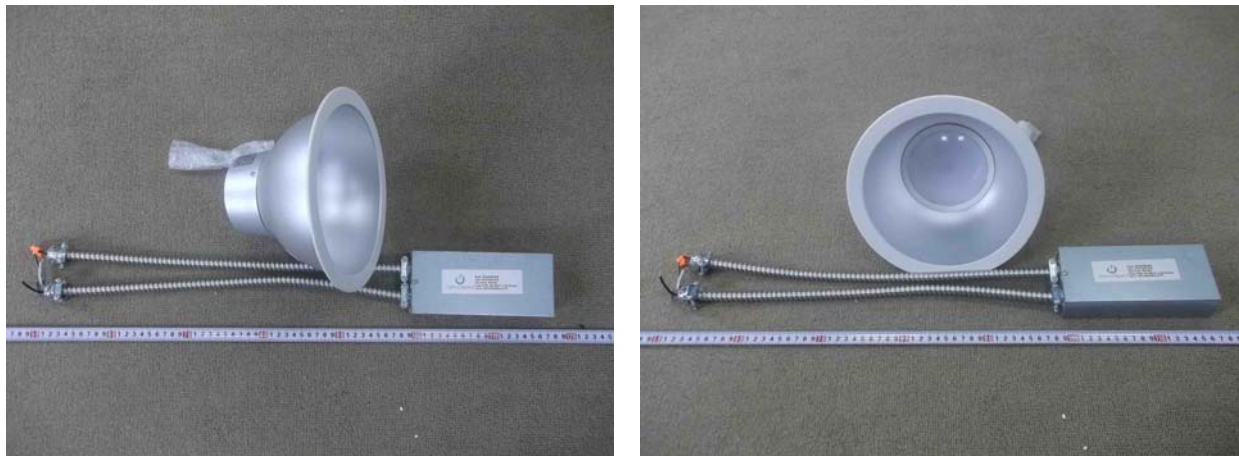


Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: Commercial downlight
Model	: 32CDL8G4DIM/835/277V
Brand Name	: GREEN CREATIVE
Electrical Ratings	: AC120~277V, 60 Hz, 32W
Product Description	: 3500K, Frosted Plastic Cover, metal housing Nominal Flux:2300 lm SKU: 97697
Manufacturer	: GREEN CREATIVE LTD
Address	: 756 North Zhongshan Rd., Unit B301 Zhabei District, Shanghai

TEST RESULTS

Test ambient temperature was 24.3°C.

Sample orientation was light down. Test was conducted without a dimmer in the circuit.

The stabilization time of the sample was 60 minutes, and the total operating time including stabilization was 95 minutes.

The photometric distance of Goniophotometer is 2.475m.

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)	0.265	0.123
Power Factor	0.9918	0.9428
Test Power (W)	31.50	32.05
Off-State Power (W)	0	0
THD A%	8.04	19.88
Luminous Efficacy (lm/W)	80.3	
Total Luminous Flux (lm)	2528.7	
Color Rendering Index (CRI)	84.4	
R9	25	
Correlated Color Temperature (CCT) (K)	3458	
Chromaticity (Chroma x, Chroma y)	(0.4087, 0.3947)	
Chromaticity (Chroma u, Chroma v)	(0.2363, 0.3423)	
Chromaticity (Chroma u', Chroma v')	(0.2363, 0.5134)	
Duv	0.0010	
Average Beam Angle (°)	77.2	
Center Beam Candle Power (cd)	1771	
Spacing Criteria	1.04 (0°-180°)/ 1.02 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	97.04%	
Zonal Lumens in the 60°-90°Zone	2.89%	
Zonal Lumens in the 90°-120°Zone	0.01%	
Zonal Lumens in the 120°-180°Zone	0.06%	

Special Rendering Indices	Color
R1	83
R2	89
R3	94
R4	83
R5	82
R6	85
R7	88
R8	69
R9	25
R10	74
R11	82
R12	66
R13	84
R14	97

Table 2 Test data per Goniophotometer Method

Note: According to CIE 1976 (u', v') diagram, $u' = u = 4x/(-2x+12y+3)$, $v' = 3v/2 = 9y/(-2x+12y+3)$.

Spectral Power Distribution

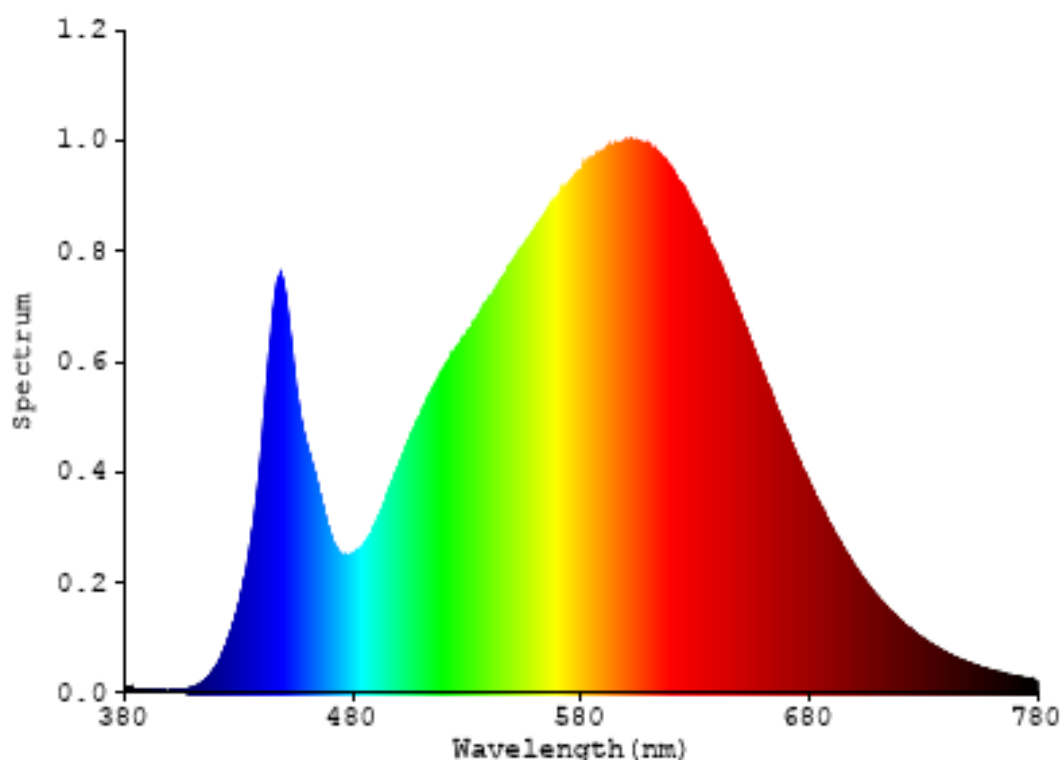


Chart 1: Spectral Power Distribution

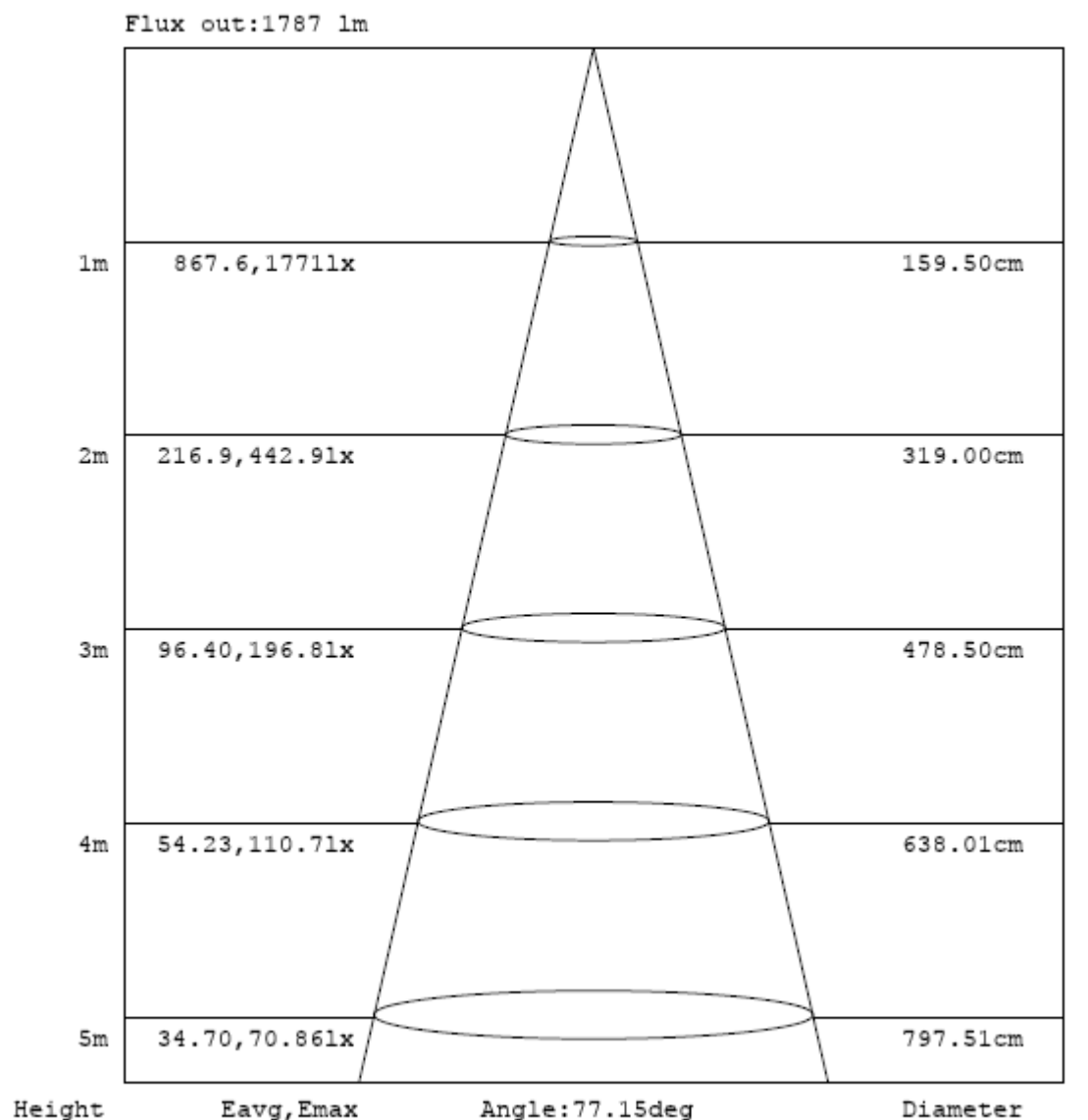
Zonal Lumen Tabulation- Goniophotometer Method

$\gamma(^{\circ})$	Lumens	% Total
0- 10	165.037	6.53%
10- 20	444.986	17.60%
20- 30	604.193	23.89%
30- 40	632.275	25.00%
40- 50	447.575	17.70%
50- 60	159.735	6.32%
60- 70	46.778	1.85%
70- 80	20.915	0.83%
80- 90	5.419	0.21%
90-100	0.045	0.00%
100-110	0.071	0.00%
110-120	0.115	0.00%
120-130	0.185	0.01%
130-140	0.291	0.01%
140-150	0.379	0.01%
150-160	0.373	0.01%
160-170	0.264	0.01%
170-180	0.095	0.00%
Total	2528.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2453.801	97.04%
60- 90	73.112	2.89%
0-90	2526.913	99.93%
90- 180	1.818	0.07%
0- 180	2528.7	100%

Table 3: Zonal Lumen Data

Illuminance Plots



Note: The Curves indicate the illuminated area and the average illumination when the luminaire is at different distance.

Chart 2: Beam angle

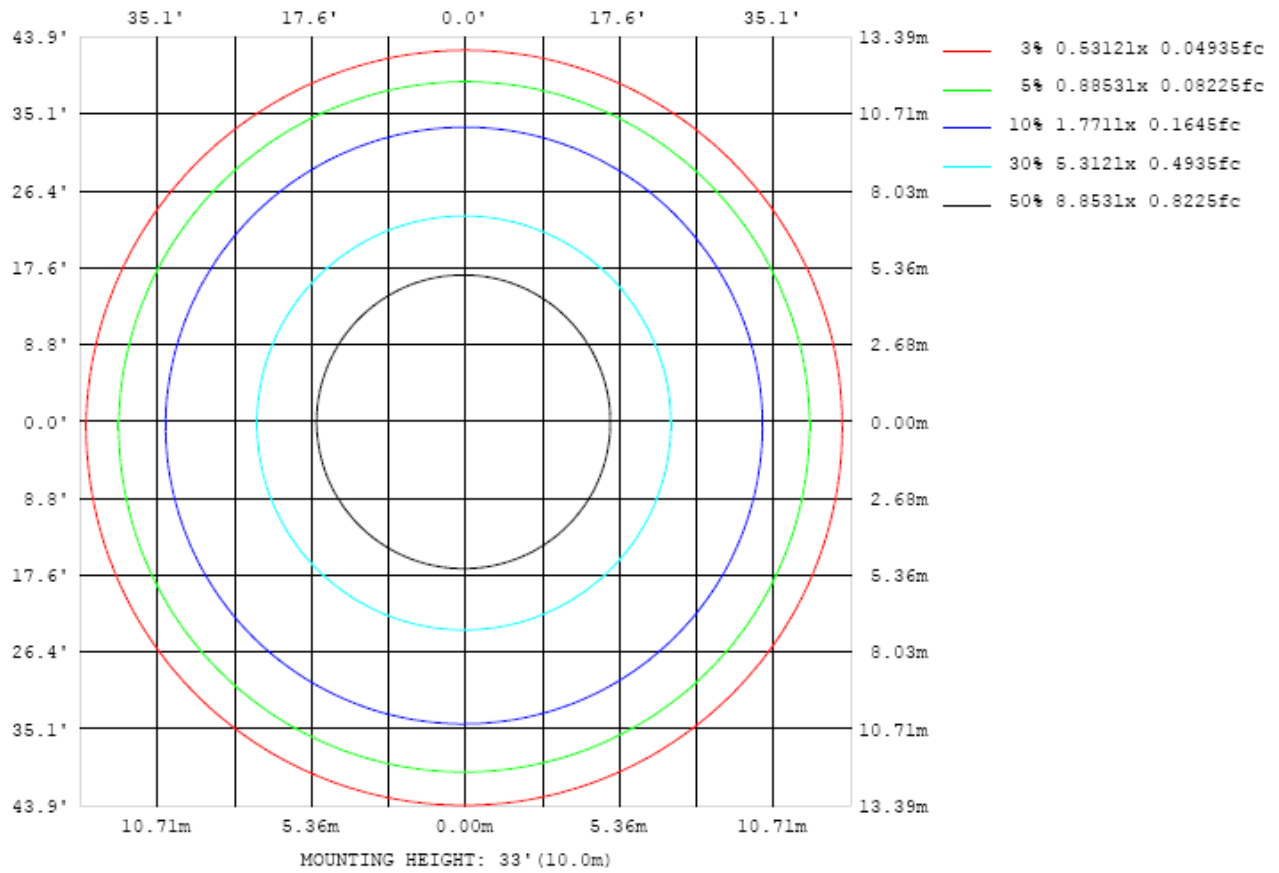


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

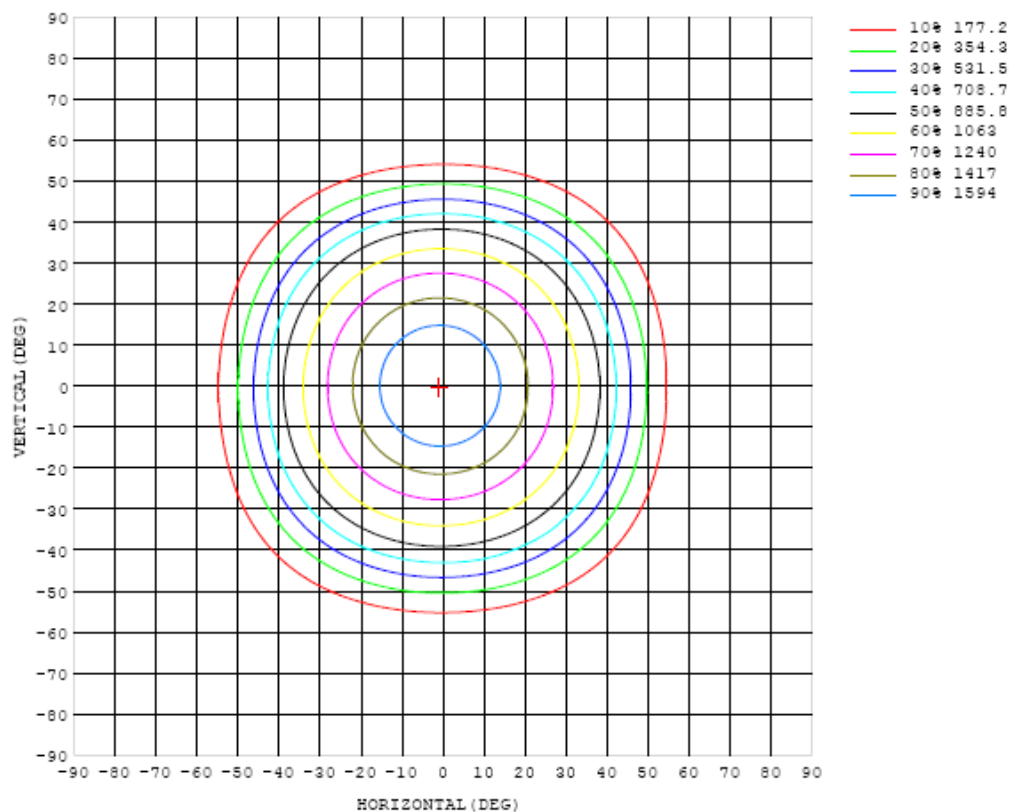


Chart 4: Isocandla Plot

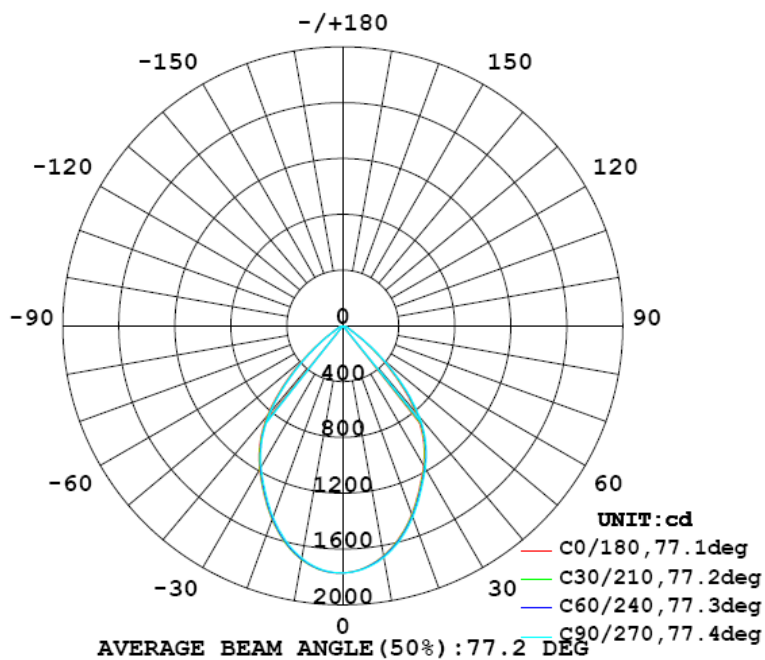


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771
5	1742	1742	1742	1743	1744	1744	1745	1746	1747	1748	1750	1751	1752	1753	1755	1756	1756	1757	1757
10	1673	1673	1674	1676	1677	1678	1679	1682	1684	1686	1688	1691	1693	1695	1698	1699	1700	1700	1701
15	1568	1569	1571	1573	1575	1576	1580	1582	1585	1588	1591	1593	1596	1599	1601	1603	1605	1605	1605
20	1437	1438	1440	1443	1446	1448	1451	1454	1458	1460	1463	1467	1470	1473	1475	1477	1478	1477	1478
25	1291	1292	1296	1299	1302	1304	1307	1310	1313	1316	1320	1323	1327	1329	1330	1332	1332	1332	1333
30	1154	1156	1160	1164	1167	1169	1172	1175	1177	1180	1183	1187	1189	1192	1193	1193	1192	1191	1191
35	1003	1006	1011	1016	1020	1023	1027	1030	1033	1036	1038	1041	1042	1043	1043	1042	1040	1037	1035
40	809	814	821	827	833	837	842	846	849	851	854	856	856	857	855	851	848	842	839
45	570	576	583	591	596	603	607	614	617	618	617	619	619	618	616	611	607	599	594
50	339	344	350	356	361	365	370	374	376	378	380	380	379	378	375	370	365	359	354
55	163	166	169	172	176	178	181	184	185	187	188	188	187	186	183	180	176	172	171
60	74.4	75.4	76.3	77.2	77.7	78.3	78.9	79.7	80.2	80.6	80.9	80.8	80.3	79.5	78.0	76.3	74.3	72.0	70.9
65	49.2	49.5	49.6	49.7	49.6	49.7	49.9	50.0	50.3	50.3	50.4	50.2	49.8	49.3	48.6	47.8	46.8	45.6	44.5
70	33.2	33.2	33.1	33.0	32.9	32.8	32.9	33.0	33.2	33.2	33.2	33.1	32.8	32.4	32.0	31.5	31.0	30.4	29.8
75	21.3	21.2	21.0	20.9	20.8	20.7	20.7	20.8	20.8	20.8	20.8	20.7	20.5	20.3	20.2	20.0	19.8	19.6	19.3
80	12.3	12.2	12.1	12.0	11.9	11.8	11.8	11.8	11.8	11.8	11.8	11.7	11.6	11.5	11.5	11.5	11.5	11.5	11.4
85	5.15	5.14	5.13	5.11	5.13	5.15	5.15	5.19	5.21	5.21	5.18	5.15	5.08	5.05	5.04	5.08	5.12	5.18	5.21
90	0.02	0.02	0.03	0.04	0.05	0.08	0.10	0.14	0.17	0.19	0.21	0.23	0.22	0.20	0.16	0.12	0.08	0.06	0.07
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05
100	0.03	0.03	0.02	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	0.07
105	0.04	0.04	0.04	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.10
110	0.06	0.06	0.06	0.06	0.06	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	0.12
115	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	0.14
120	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.16
125	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.20	0.22	0.21	0.20	0.20	0.21	0.21	0.21	0.21	0.20
130	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.28	0.29	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.26
135	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.36
140	0.50	0.50	0.50	0.50	0.50	0.49	0.49	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.47
145	0.60	0.60	0.60	0.64	0.70	0.75	0.59	0.59	0.59	0.59	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.59
150	0.70	0.70	0.69	0.75	0.95	0.90	0.68	0.69	0.69	0.69	0.69	0.69	0.68	0.68	0.68	0.68	0.68	0.68	0.71
155	0.78	0.78	0.77	0.81	0.92	0.77	0.77	0.77	0.78	0.77	0.78	0.77	0.77	0.76	0.77	0.77	0.77	0.77	0.82
160	0.84	0.84	0.84	0.85	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.83	0.83	0.84	0.84	0.83	0.83	0.90
165	0.88	0.88	0.89	0.92	0.91	0.89	0.89	0.89	0.88	0.88	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.87	0.95
170	0.90	0.90	0.91	0.95	0.97	0.96	0.94	0.92	0.91	0.91	0.91	0.91	0.90	0.89	0.89	0.90	0.90	0.89	0.96
175	0.99	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.96	0.96	0.96	0.96	0.95	0.95	0.95	0.96	0.96	0.97	0.97
180	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06

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	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771	1771		
5	1757	1758	1757	1757	1756	1755	1754	1753	1751	1750	1749	1747	1746	1745	1743	1742	1743		
10	1701	1701	1701	1700	1698	1696	1694	1691	1689	1686	1683	1681	1679	1676	1674	1674	1673		
15	1604	1604	1604	1602	1599	1597	1594	1591	1588	1584	1580	1576	1574	1571	1569	1568	1567		
20	1477	1476	1475	1473	1470	1467	1464	1461	1458	1453	1448	1445	1441	1439	1437	1436	1437		
25	1332	1330	1328	1326	1323	1321	1318	1314	1310	1306	1302	1298	1295	1292	1290	1290	1290		
30	1189	1187	1185	1182	1179	1177	1174	1171	1168	1166	1162	1158	1156	1153	1152	1152	1153		
35	1031	1028	1024	1021	1018	1016	1013	1011	1009	1006	1003	1000	998	997	997	998	1000		
40	834	829	823	818	814	811	808	806	804	802	800	797	796	796	797	801	805		
45	587	580	573	568	563	560	558	556	555	554	553	552	552	553	556	561	565		
50	347	340	335	329	325	322	321	321	321	320	320	321	321	323	326	331	336		
55	166	161	157	153	150	149	148	148	148	149	150	150	152	154	157	160	164		
60	68.5	66.4	64.4	62.9	61.8	61.4	61.7	62.4	63.6	64.7	65.8	66.8	68.0	69.4	70.9	72.6	74.1		
65	43.1	41.8	40.6	39.8	39.2	38.9	39.1	39.5	40.1	41.0	41.9	43.0	44.2	45.4	46.7	47.9	48.8		
70	28.9	28.1	27.2	26.6	26.0	25.7	25.6	25.7	26.1	26.7	27.5	28.4	29.5	30.6	31.6	32.5	33.1		
75	18.9	18.3	17.7	17.2	16.7	16.4	16.2	16.1	16.3	16.7	17.3	18.1	18.9	19.7	20.5	21.0	21.3		
80	11.2	10.9	10.5	10.1	9.74	9.45	9.22	9.09	9.15	9.39	9.76	10.3	10.9	11.4	11.8	12.2	12.3		
85	5.10	4.92	4.70	4.49	4.27	4.07	3.87	3.72	3.65	3.67	3.82	4.05	4.31	4.59	4.83	5.03	5.15		
90	0.05	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	0.05	0.05	0.05	0.06	0.06	0.05	0.06	0.06	0.06	0.05	0.06	0.05	0.05	0.05		
100	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07		
105	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10		
110	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12		
115	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14		
120	0.16	0.16	0.16	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.16	0.17	0.16		
125	0.21	0.20	0.20	0.22	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20		
130	0.26	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		
135	0.36	0.36	0.36	0.37	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.38	0.37	0.37	0.37	0.37	0.37		
140	0.47	0.47	0.48	0.48	0.48	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.48		
145	0.59	0.60	0.60	0.60	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61		
150	0.72	0.72	0.73	0.73	0.73	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.73		
155	0.83	0.83	0.83	0.83	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.83		
160	0.93	0.93	0.93	0.93	0.93	0.93	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.92		
165	1.00	0.99	1.00	1.00	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97		
170	1.05	1.04	1.04	1.04	1.03	1.04	1.03	1.03	1.03	1.03	1.04	1.04	1.04	1.04	1.03	1.04	0.97		
175	1.05	1.06	1.06	1.06	1.06	1.06	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.00		
180	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Sep. 18, 2014	Sep. 17, 2015
Digital Power Meter	PF2010A	HZTE028-01	Sep. 18, 2014	Sep. 17, 2015
AC Power Supply	PCR 500L	HZTE001-08	Sep. 18, 2014	Sep. 17, 2015
DC Power Supply	WY12010	HZTE004-03	Sep. 18, 2014	Sep. 17, 2015
Temperature Meter	TES1310	HZTE017-01	Sep. 18, 2014	Sep. 17, 2015
Standard Source	D908	HZTE012-01	Sep. 18, 2014	Sep. 17, 2015
Standard source	SCL-1400	HZTE012-02	Sep. 18, 2014	Sep. 17, 2015

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 1.94% with a coverage factor $k=2$.

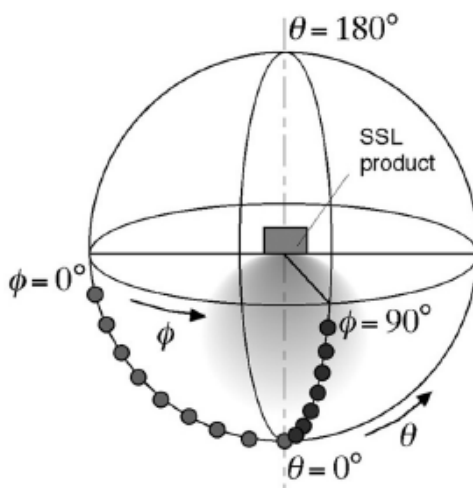
Color Characteristics Measurements

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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