



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

LED commercial downlight

Model: 27CDLA8/840/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15120046h

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

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Jan. 07, 2016

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Jim Zhang

Manager: Jim Zhang
Jan. 07, 2016

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: 27CDLA8/840/277V

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
83.3	2170.9	26.05	0.9903
CCT (K)	CRI	Stabilization Time (Light & Power)	
3926	83.5	60	

Table 1 Executive Data Summary

Test specifications:

Date of Receipt	: Dec. 30, 2015
Date of Test	: Jan. 06, 2016
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 UL1598C Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits.

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Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: LED commercial downlight
Model	: 27CDLA8/840/277V
Electrical Ratings	: 120-277Vac, 60Hz, 27W
Product Description	: 4000K, Non-dimmable, CRI80, No Off-State Power 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 24.1°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 10.0°horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.219	0.104
Power Factor	0.9903	0.9213
Test Power (W)	26.05	26.46
THD A%	11.02	19.44
Luminous Efficacy (lm/W)	83.3	
Total Luminous Flux (lm)	2170.9	
Color Rendering Index (CRI)	83.5	
R9	10	
Correlated Color Temperature (CCT) (K)	3926	
Chromaticity (Chroma x, Chroma y)	(0.3869, 0.3898)	
Chromaticity (Chroma u, Chroma v)	(0.2242, 0.3388)	
Chromaticity (Chroma u', Chroma v')	(0.2242, 0.5082)	
Duv	0.0042	
Average Beam Angle (°)	106.1	
Center Beam Candle Power (cd)	848	
Spacing Criteria	1.22 (0°-180°)/ 1.23 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	83.55%	
Zonal Lumens in the 60°-90°Zone	16.35%	
Zonal Lumens in the 90°-120°Zone	0.03%	
Zonal Lumens in the 120°-180°Zone	0.07%	

Special Color Rendering Indices	
R1	81
R2	89
R3	96
R4	82
R5	81
R6	86
R7	87
R8	65
R9	10
R10	75
R11	81
R12	63
R13	83
R14	98

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

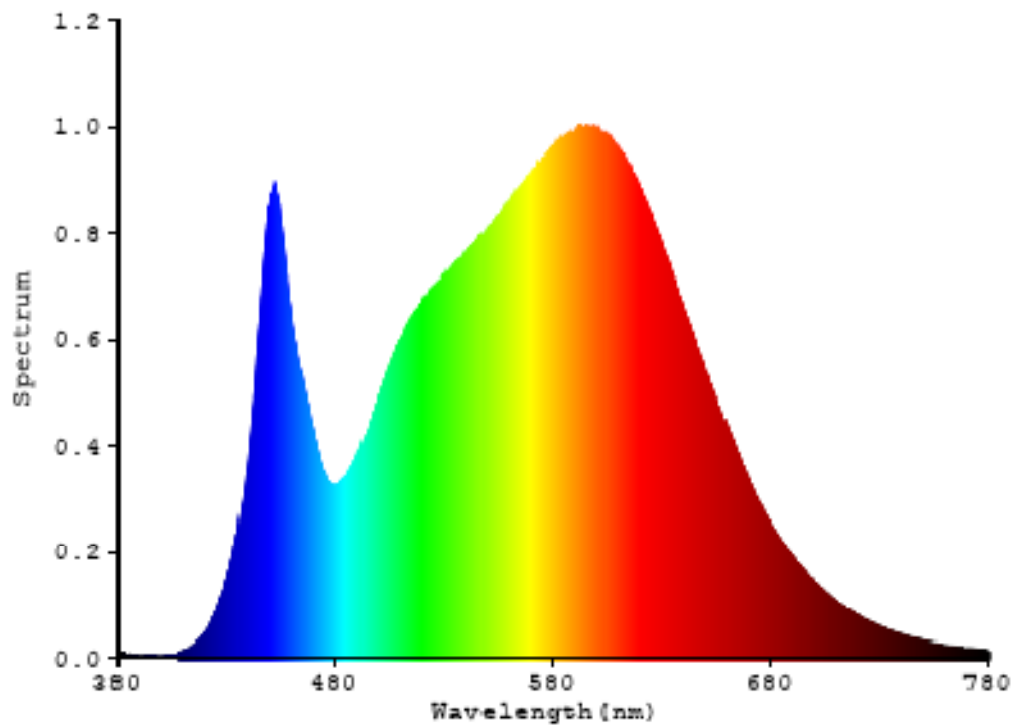


Chart 1: Spectral Power Distribution

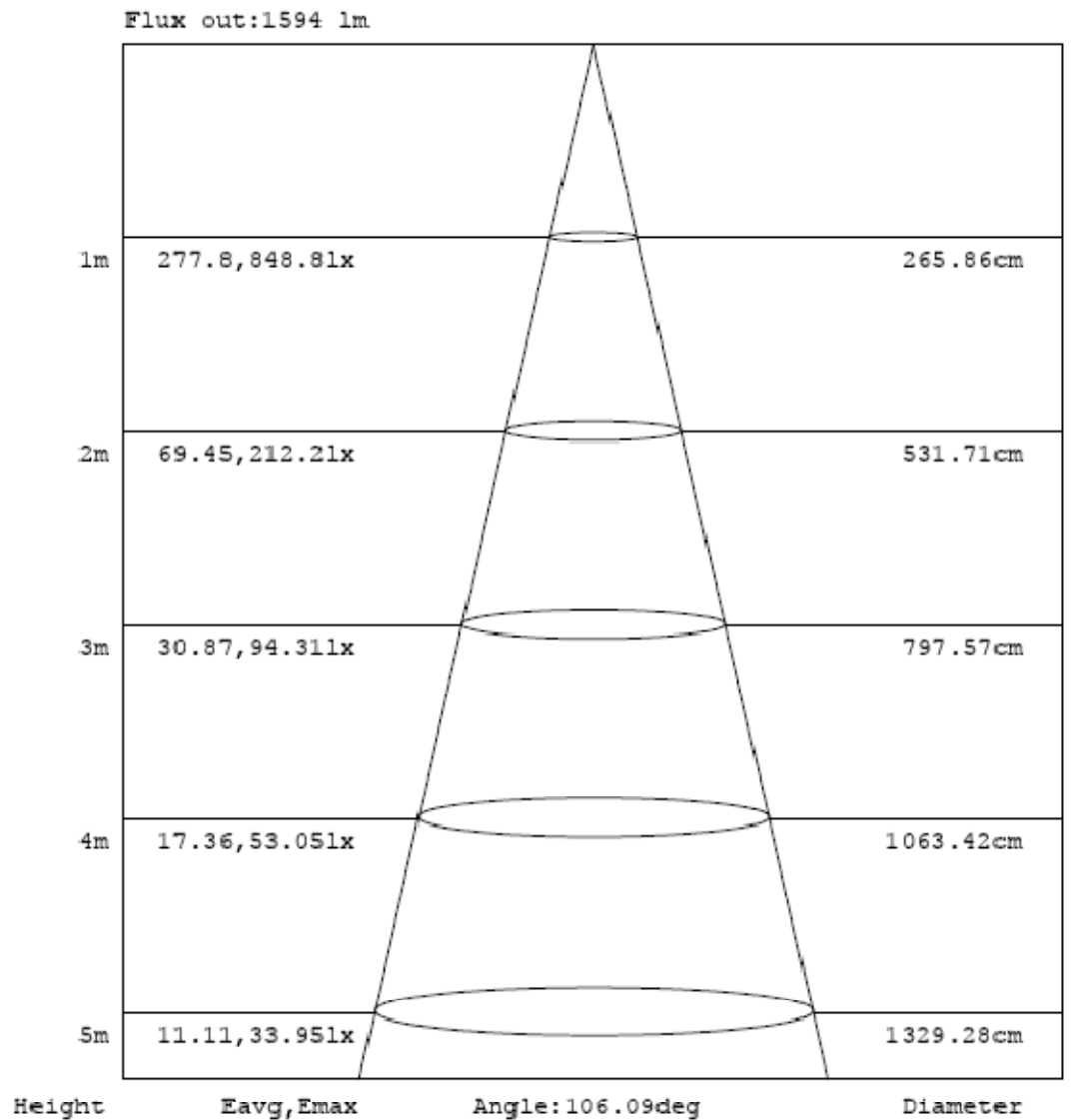
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	80.144	3.69%
10- 20	227.948	10.50%
20- 30	340.425	15.68%
30- 40	402.54	18.54%
40- 50	409.41	18.86%
50- 60	353.386	16.28%
60- 70	241.687	11.13%
70- 80	100.555	4.63%
80- 90	12.714	0.59%
90-100	0.12	0.01%
100-110	0.189	0.01%
110-120	0.236	0.01%
120-130	0.277	0.01%
130-140	0.328	0.02%
140-150	0.347	0.02%
150-160	0.305	0.01%
160-170	0.207	0.01%
170-180	0.076	0.00%
Total	2170.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1813.853	83.55%
60- 90	354.956	16.35%
0-90	2168.809	99.90%
90- 180	2.085	0.10%
0- 180	2170.9	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

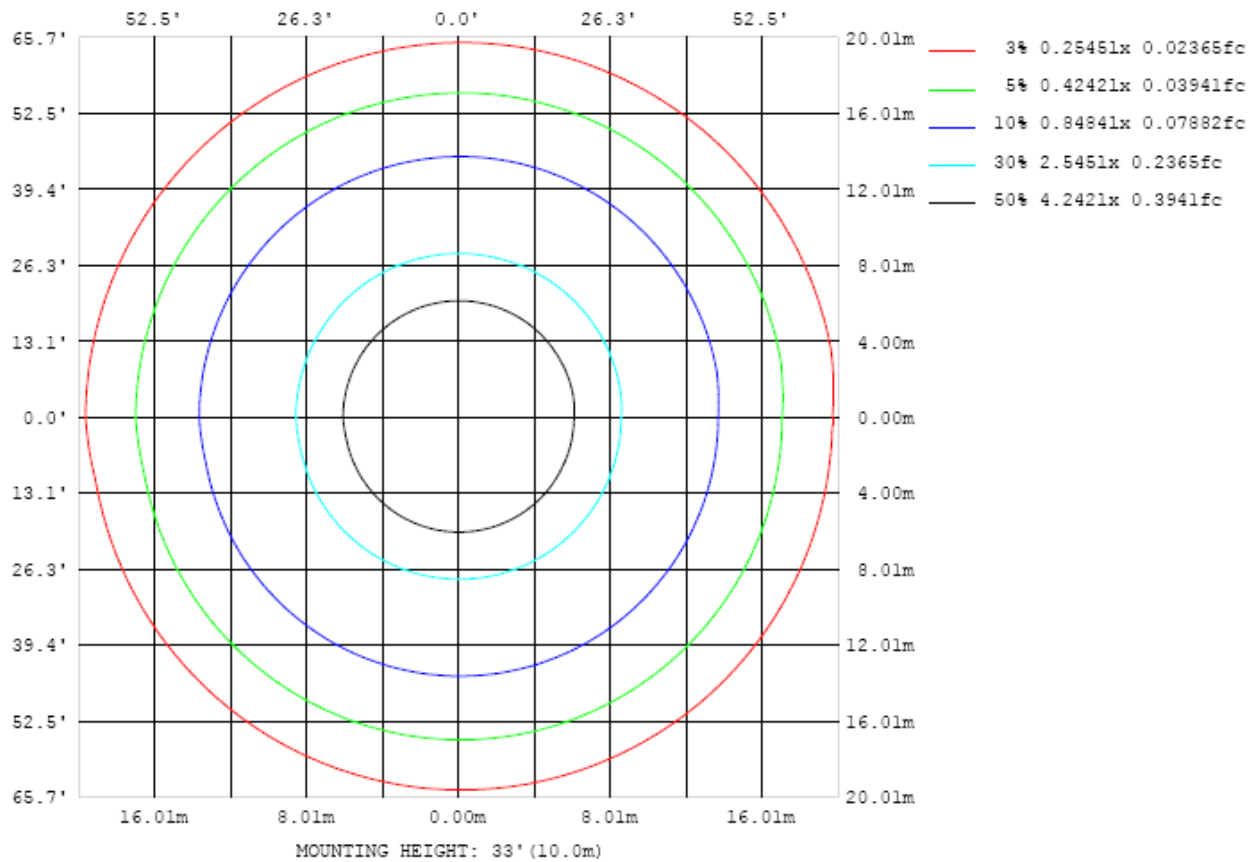


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

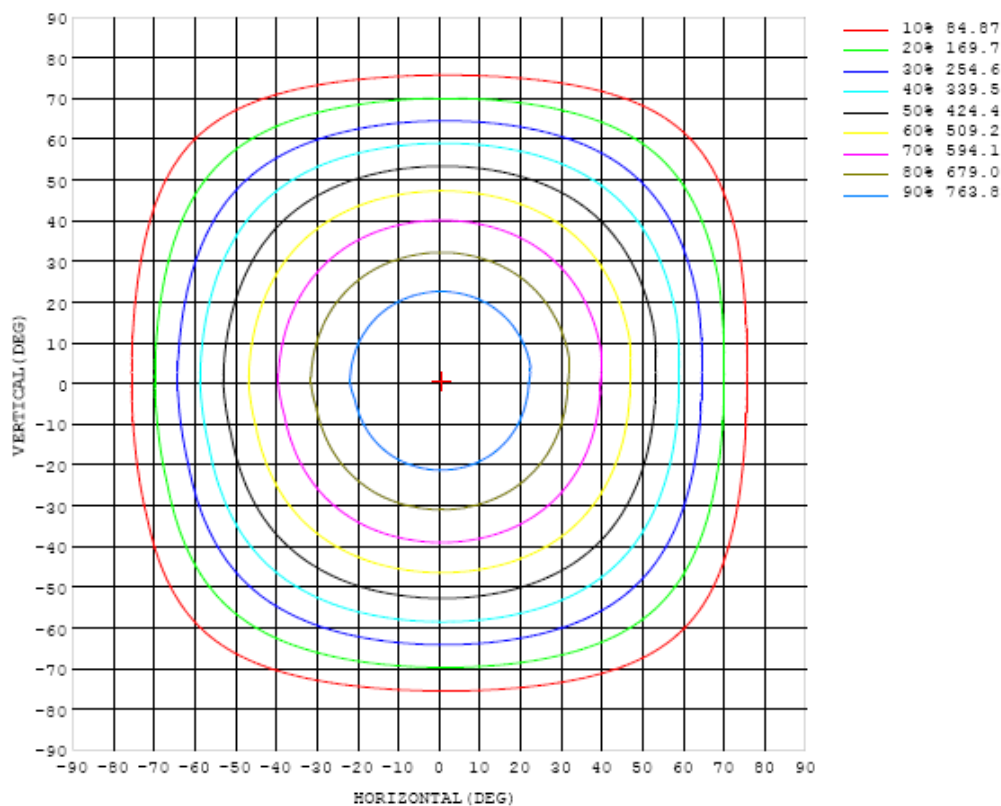


Chart 4: Isocandla Plot

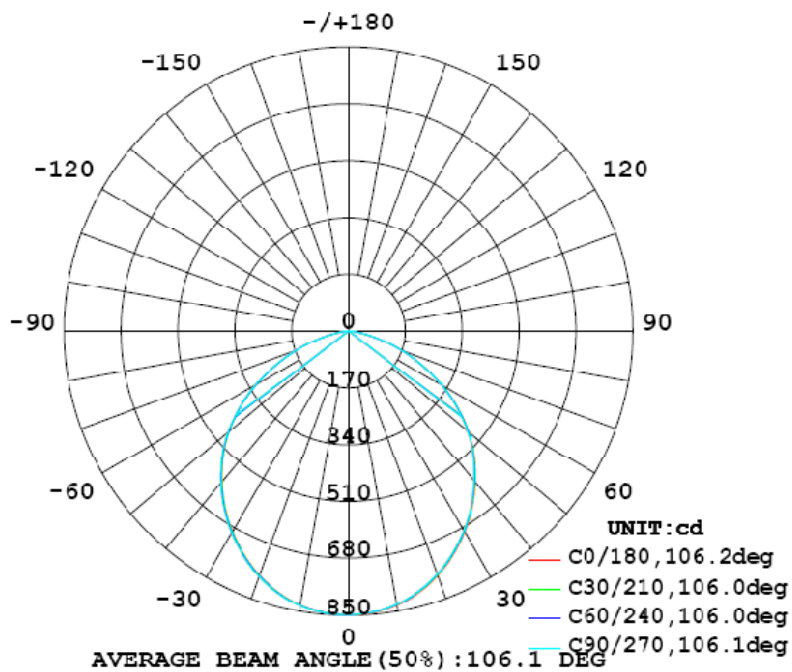


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DGG) γ (DGG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848
5	845	844	844	843	843	843	843	843	843	843	842	842	842	842	842	842	842	843	844
10	831	830	830	829	829	829	829	828	828	828	828	828	828	827	827	827	827	829	831
15	809	808	807	807	807	806	805	805	805	805	804	804	804	804	803	804	804	805	809
20	778	777	777	776	776	775	774	774	774	773	773	772	772	772	772	771	771	772	778
25	740	738	738	737	737	736	736	735	735	734	733	733	733	732	732	732	731	732	739
30	695	694	693	692	692	691	690	690	689	689	688	687	687	686	686	686	685	686	694
35	644	643	642	642	641	641	640	639	639	638	637	637	636	635	635	635	634	635	644
40	590	588	588	588	587	586	586	585	584	584	582	582	581	580	580	580	579	580	589
45	532	531	531	530	530	529	528	528	527	526	525	525	524	523	522	522	521	522	531
50	468	468	467	467	466	466	465	464	464	463	461	461	459	458	457	457	456	456	467
55	397	397	397	396	396	395	395	394	393	392	390	389	388	387	386	385	384	384	396
60	323	323	323	322	322	321	321	320	319	318	316	315	314	312	311	310	309	308	321
65	246	246	247	246	246	246	245	244	243	242	240	239	238	236	235	233	232	231	244
70	169	169	170	170	170	169	169	168	167	166	164	163	162	160	159	158	156	155	168
75	92.8	93.6	94.1	94.4	94.7	94.5	94.1	93.5	92.8	91.7	90.5	89.4	88.3	86.9	85.4	84.1	82.6	81.7	94.4
80	31.3	31.9	32.4	32.6	32.8	32.7	32.6	32.2	31.9	31.2	30.7	29.9	29.1	28.2	27.4	26.6	25.9	25.3	32.2
85	11.0	11.2	11.3	11.5	11.5	11.6	11.5	11.4	11.3	11.0	10.8	10.5	10.3	10.0	9.78	9.51	9.30	9.11	11.2
90	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.15
95	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	0.06	0.06	0.06	0.16
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	0.08	0.08	0.08	0.08	0.21
105	0.11	0.11	0.11	0.11	0.11	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	0.25
110	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.27
115	0.20	0.20	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.21	0.20	0.21	0.28
120	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	0.26	0.26	0.26	0.29
125	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.32	0.31
130	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	0.37	0.38	0.37	0.37	0.38	0.35
135	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
140	0.48	0.48	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.50
145	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.58
150	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.65
155	0.61	0.62	0.62	0.61	0.61	0.61	0.61	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.70
160	0.65	0.65	0.65	0.65	0.65	0.64	0.64	0.64	0.64	0.64	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.64	0.74
165	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.68	0.76
170	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.70	0.79
175	0.81	0.81	0.81	0.81	0.81	0.81	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.81	0.81	0.81	0.81	0.82
180	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848	848		
5	844	844	844	844	845	845	845	845	846	846	845	846	846	846	846	846	846		
10	831	831	832	832	832	833	833	833	834	834	834	834	834	834	834	834	834		
15	809	809	810	810	811	811	812	812	813	813	813	813	813	813	813	813	813		
20	778	778	779	779	780	781	781	782	783	783	783	784	784	784	784	784	784		
25	739	740	740	741	742	742	743	744	745	745	746	746	747	747	747	747	747		
30	694	695	695	696	697	697	698	699	700	701	701	702	702	702	702	703	703		
35	644	644	645	646	646	647	648	649	650	651	651	652	652	652	653	653	653		
40	589	589	590	590	591	592	593	594	595	596	596	597	598	598	598	599	599		
45	531	532	532	533	533	534	535	536	537	538	539	540	540	541	541	542	542		
50	467	467	467	468	468	469	470	471	473	474	475	476	477	478	478	479	480		
55	395	395	395	395	396	396	397	398	400	402	403	404	406	407	408	409	410		
60	320	319	319	319	319	320	321	322	324	326	327	329	331	332	333	334	335		
65	243	243	242	242	242	243	244	245	247	248	250	252	254	255	257	258	259		
70	167	167	166	166	166	166	167	168	170	171	173	175	176	178	179	181	182		
75	93.4	92.6	92.4	92.0	92.1	92.4	93.1	93.7	94.9	96.1	97.4	99.1	100	102	103	105	106		
80	31.7	31.3	31.0	30.9	30.8	31.0	31.2	31.6	32.2	33.0	33.7	34.6	35.6	36.6	37.6	38.5	39.4		
85	11.1	10.9	10.9	10.8	10.8	10.8	10.8	10.9	11.0	11.2	11.4	11.8	12.0	12.3	12.6	12.8	13.1		
90	0.14	0.14	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.18	0.21	0.26	0.29	0.34		
95	0.16	0.16	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15		
100	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.20		
105	0.26	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	0.25	0.24		
110	0.28	0.28	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	0.26		
115	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27		
120	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28		
125	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30		
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	0.35	0.35	0.35	0.35	0.34		
135	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.42	0.42	0.42	0.42		
140	0.51	0.51	0.51	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		
145	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.57		
150	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.64		
155	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.70		
160	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.75		
165	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	0.77		
170	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.80		
175	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.82		
180	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard Source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2015	Oct. 20, 2016

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 China.

The uncertainty of goniophotometer system reported in this document is expanded uncertainty is 1.94% with a coverage factor $k=2$.

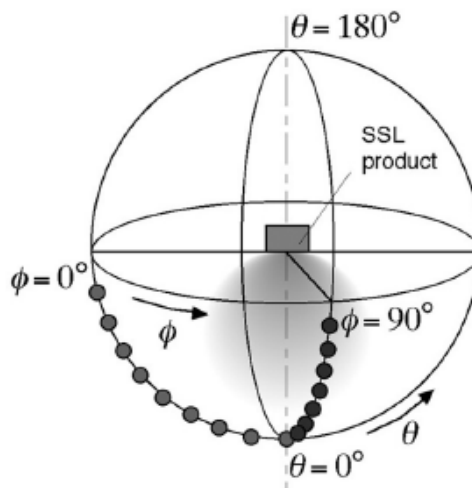
Color Characteristics Measurements

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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