



LM-79-08 Test Report

for

GREEN CREATIVE LTD

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

LED commercial downlight

Model: 27CDLA8/835/277V

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15120046g

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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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: 27CDLA8/835/277V

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
81.1	2136.2	26.35	0.9900
CCT (K)	CRI	Stabilization Time (Light & Power)	
3470	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	: 27CDLA8/835/277V
Electrical Ratings	: 120-277Vac, 60Hz, 27W
Product Description	: 3500K, 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 24.2°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)	0.222	0.105
Power Factor	0.9900	0.9233
Test Power (W)	26.35	26.80
THD A%	10.93	18.40
Luminous Efficacy (lm/W)	81.1	
Total Luminous Flux (lm)	2136.2	
Color Rendering Index (CRI)	83.5	
R9	10	
Correlated Color Temperature (CCT) (K)	3470	
Chromaticity (Chroma x, Chroma y)	(0.4090, 0.3968)	
Chromaticity (Chroma u, Chroma v)	(0.2356, 0.3429)	
Chromaticity (Chroma u', Chroma v')	(0.2356, 0.5143)	
Duv	0.0018	
Average Beam Angle (°)	107.0	
Center Beam Candle Power (cd)	827	
Spacing Criteria	1.23 (0°-180°)/ 1.23 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	83.31%	
Zonal Lumens in the 60°-90°Zone	16.59%	
Zonal Lumens in the 90°-120°Zone	0.03%	
Zonal Lumens in the 120°-180°Zone	0.07%	

Special Color Rendering Indices	
R1	82
R2	90
R3	97
R4	82
R5	82
R6	88
R7	85
R8	63
R9	10
R10	77
R11	81
R12	68
R13	84
R14	99

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

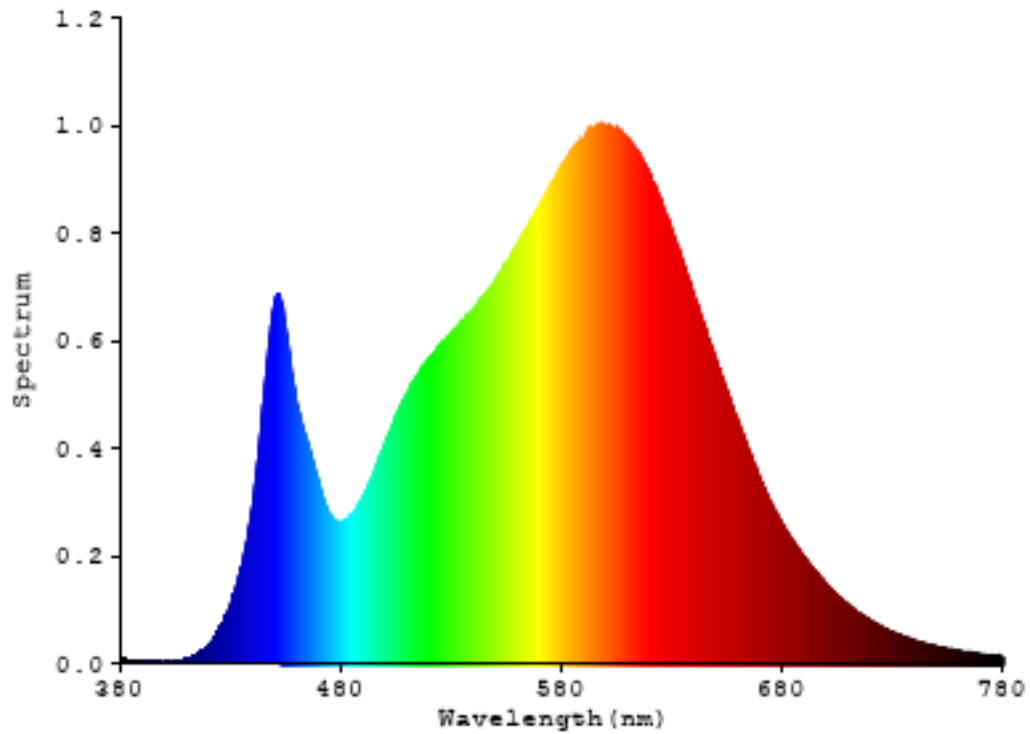


Chart 1: Spectral Power Distribution

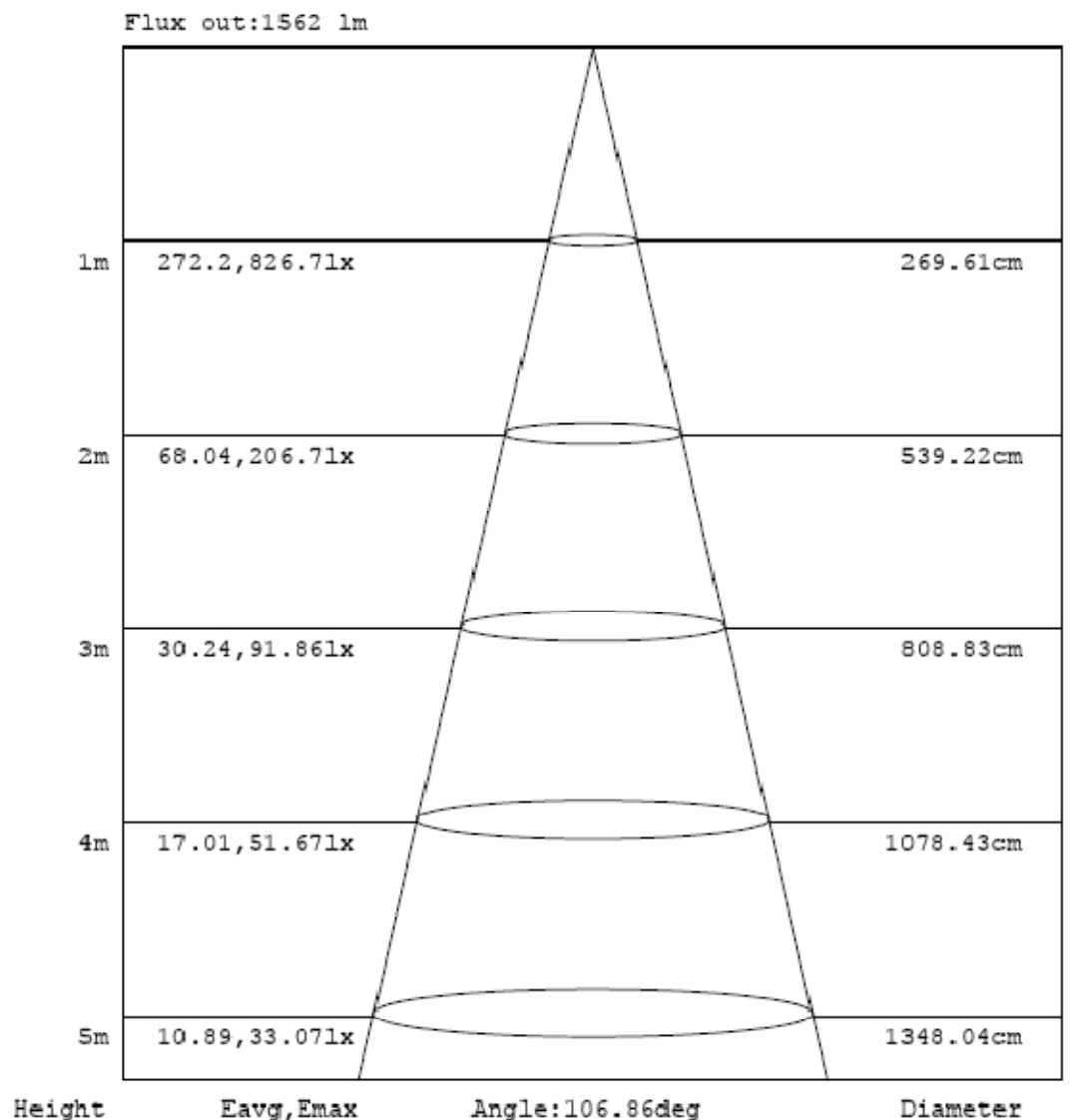
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	78.089	3.66%
10- 20	222.26	10.40%
20- 30	332.492	15.56%
30- 40	394.325	18.46%
40- 50	402.738	18.85%
50- 60	349.783	16.37%
60- 70	241.14	11.29%
70- 80	100.838	4.72%
80- 90	12.487	0.58%
90-100	0.118	0.01%
100-110	0.187	0.01%
110-120	0.233	0.01%
120-130	0.272	0.01%
130-140	0.322	0.02%
140-150	0.339	0.02%
150-160	0.298	0.01%
160-170	0.201	0.01%
170-180	0.074	0.00%
Total	2136.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1779.687	83.31%
60- 90	354.465	16.59%
0-90	2134.152	99.90%
90- 180	2.044	0.10%
0- 180	2136.2	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

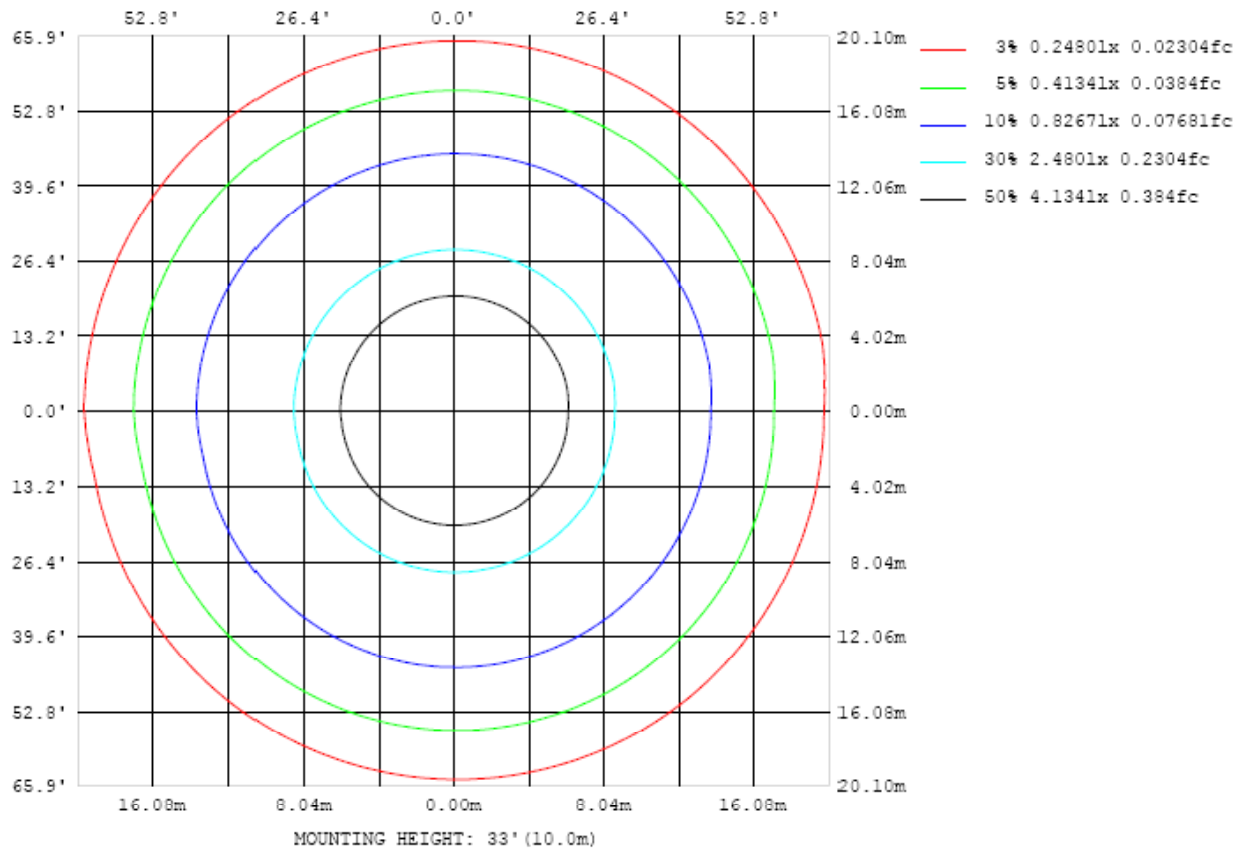


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

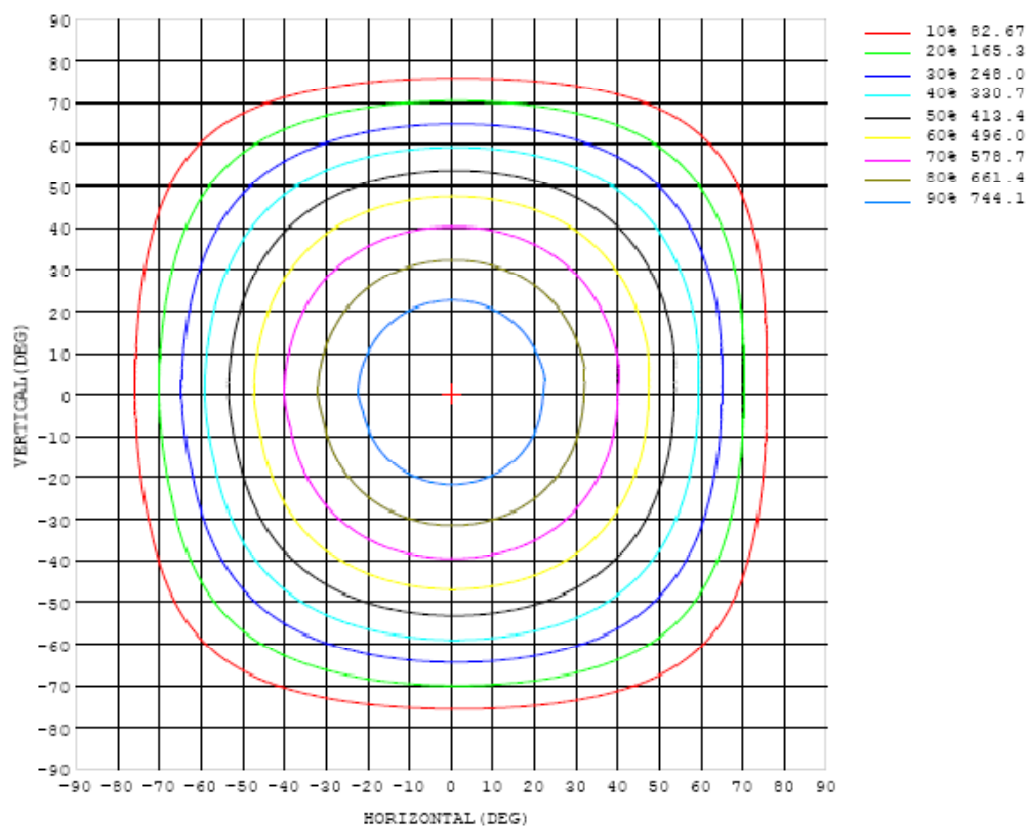


Chart 4: Isocandla Plot

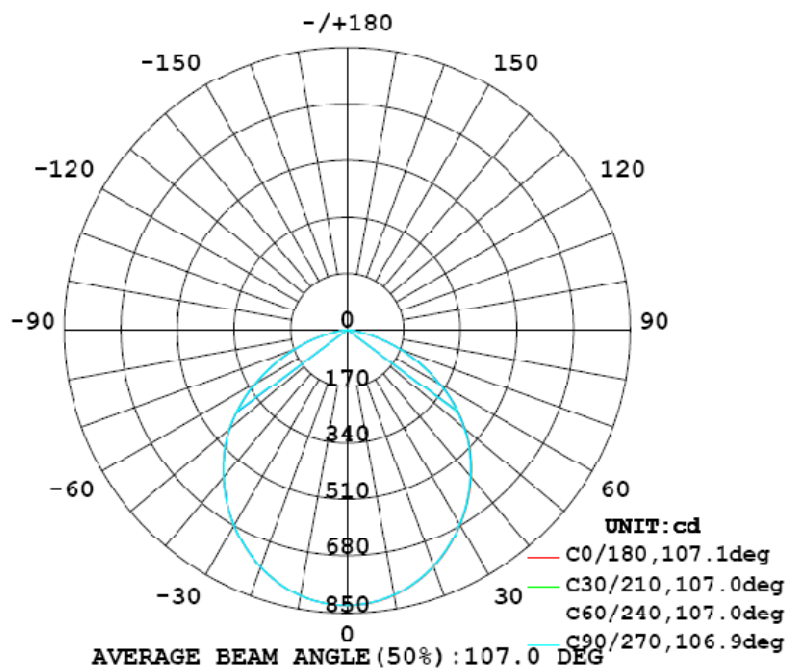


Chart 5: Polar Candela Distribution

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	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827
5	823	822	822	822	822	822	822	821	822	821	822	821	821	822	821	821	821	822	823
10	810	809	809	808	808	808	808	808	808	808	808	807	807	808	808	807	807	808	811
15	788	787	787	787	786	786	786	786	786	786	786	785	785	785	785	785	785	786	790
20	759	758	758	757	757	757	757	756	756	756	756	755	755	755	755	755	755	755	761
25	722	721	721	720	720	720	720	719	719	718	718	718	718	718	717	717	717	718	724
30	679	678	678	677	677	677	676	676	675	675	675	674	674	674	673	673	673	673	681
35	631	630	630	630	629	629	628	628	627	627	626	626	625	625	624	624	624	624	632
40	579	578	578	578	577	577	576	576	575	574	574	573	573	572	572	571	571	571	580
45	523	523	523	523	522	522	521	520	520	519	518	518	517	516	516	515	515	515	524
50	462	462	462	462	462	461	460	459	458	458	457	455	454	453	452	451	450	450	462
55	394	394	394	394	393	393	392	390	390	389	387	386	385	383	382	381	380	380	392
60	321	321	321	321	321	320	319	318	317	316	314	313	312	310	309	307	306	306	318
65	246	246	246	246	246	246	245	244	243	241	240	238	236	235	233	232	231	230	243
70	169	170	170	170	170	170	169	168	167	166	164	163	161	160	158	156	155	154	168
75	93.2	93.7	94.2	94.4	94.5	94.3	93.9	93.1	92.3	91.2	90.0	88.9	87.6	86.3	85.1	83.9	82.8	82.0	94.8
80	30.9	31.3	31.6	31.8	31.9	31.9	31.6	31.3	30.8	30.2	29.7	29.1	28.4	27.8	27.0	26.4	25.8	25.4	32.6
85	10.7	10.8	10.8	10.9	10.9	10.9	10.9	10.9	10.8	10.6	10.4	10.2	10.00	9.73	9.50	9.23	8.98	8.78	10.9
90	0.04	0.04	0.03	0.03	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.15
95	0.05	0.05	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	0.16
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	0.11	0.11	0.25
110	0.14	0.14	0.15	0.14	0.14	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	0.27
115	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	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	0.25	0.25	0.25	0.25	0.25	0.26	0.26	0.28
125	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.30
130	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.35
135	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
140	0.46	0.46	0.47	0.46	0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.49
145	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.53	0.53	0.56
150	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.63
155	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.61	0.60	0.61	0.61	0.60	0.60	0.69
160	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.64	0.64	0.64	0.64	0.63	0.63	0.72
165	0.67	0.67	0.67	0.67	0.67	0.66	0.66	0.66	0.66	0.66	0.66	0.67	0.67	0.67	0.67	0.67	0.67	0.66	0.74
170	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.77
175	0.79	0.79	0.79	0.79	0.79	0.79	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.79	0.79	0.79	0.79	0.80
180	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

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	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827	827		
5	823	823	823	823	823	823	823	823	823	823	823	823	823	823	823	823	823		
10	810	810	810	811	810	811	811	811	811	811	811	811	812	812	812	811	811		
15	789	790	789	789	789	790	790	790	791	791	791	791	791	791	791	791	791		
20	760	760	760	760	760	760	761	761	761	762	762	762	763	763	763	763	763		
25	724	723	723	723	723	724	724	724	725	725	725	726	726	727	727	727	728		
30	680	680	680	680	680	681	681	681	682	682	683	683	684	685	685	685	686		
35	632	631	631	632	632	632	632	633	633	634	635	635	636	637	637	638	638		
40	579	579	578	579	579	579	580	580	581	582	583	583	584	585	585	586	587		
45	523	523	523	523	523	524	524	525	526	527	527	528	529	530	531	531	532		
50	461	461	461	461	461	462	462	463	464	465	466	467	468	470	470	472	473		
55	391	391	391	391	391	392	393	394	395	396	397	398	400	401	402	404	405		
60	318	317	317	317	318	319	320	320	322	323	325	326	327	329	330	332	333		
65	242	242	242	242	243	244	245	246	247	248	250	251	253	254	256	257	258		
70	167	167	167	167	168	169	170	171	173	174	175	177	179	180	181	182			
75	93.9	93.5	93.3	93.2	93.5	93.9	94.6	95.2	96.2	97.4	98.6	99.7	101	103	104	105	106		
80	32.0	31.8	31.7	31.5	31.6	31.8	32.1	32.7	33.0	33.7	34.5	35.3	36.0	36.9	37.8	38.5	39.3		
85	10.8	10.6	10.6	10.5	10.5	10.6	10.7	10.9	11.0	11.3	11.5	11.8	12.1	12.3	12.4	12.6	12.8		
90	0.14	0.14	0.13	0.13	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.16	0.20	0.24	0.31	0.37	0.42		
95	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15		
100	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	0.20	0.20	0.20	0.20		
105	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.24	0.24	0.24	0.24	0.24	0.24		
110	0.27	0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26		
115	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	0.27	0.27	0.27		
120	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		
125	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29		
130	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34		
135	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.41	0.41		
140	0.49	0.49	0.50	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49		
145	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.56	0.56		
150	0.64	0.64	0.64	0.64	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.63	0.63	0.63		
155	0.70	0.70	0.70	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.70	0.69	0.69	0.69	0.69		
160	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.73		
165	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	0.77	0.75		
170	0.80	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	0.78		
175	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.81	0.82	0.81	0.82	0.82	0.82	0.82	0.82	0.80		
180	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83		

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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