



LM-79-08 Test Report

for

ABB Lighting, Inc.

3 Adams St Belvidere, NJ 07823.

Flood light

Model: ABBFL25LED50-40

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15100046a

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

Reviewed by:

Engineer: April Zou
Oct. 30, 2015

Approved by:



Manager: Jim Zhang
Oct. 30, 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: ABBFL25LED50-40

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
101.4	2251.6	22.20	0.9918
CCT (K)	CRI	Stabilization Time (Light & Power)	
4949	71.1	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Oct. 28, 2015
Date of Test	: Oct. 29, 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 Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: Flood light
Model	: ABBFL25LED50-40
Electrical Ratings	: 100~277Vac, 50/60Hz, 25W
Product Description	: 5000K, Architectural Flood and Spot Luminaires Manufacturer of light source: SAMSUNG Model of light source: LH351B Quantity of LED light source: 9pcs
Manufacturer	: ABB Lighting (shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza, # 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 24.8°C.

Base 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 85 minutes.

Parameter	Result			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	66
Voltage frequency (Hz)	60	60	60	R2	77
Test Current (A)	0.187	0.225	0.094	R3	86
Power Factor	0.9918	0.9967	0.8715	R4	70
Test Power (W)	22.20	22.45	22.75	R5	67
THD A%	8.43	6.92	14.39	R6	69
Luminous Efficacy (lm/W)	101.4	100.2	98.9	R7	82
Total Luminous Flux (lm)	2251.6	2250.2	2250.0	R8	52
Color Rendering Index (CRI)	71.1			R9	-41
R9	-41			R10	47
Correlated Color Temperature (CCT) (K)	4949			R11	65
Chromaticity (Chroma x, Chroma y)	(0.3473, 0.3604)			R12	43
Chromaticity (Chroma u, Chroma v)	(0.2095, 0.3261)			R13	68
Chromaticity (Chroma u', Chroma v')	(0.2095, 0.4892)			R14	92
Duv	0.0035				
Average Beam Angle (°)	39.3				
Center Beam Candle Power (cd)	2804				
Spacing Criteria	0.62 (0°-180°)/ 0.63 (90°-270°)				
Zonal Lumens in the 0°-60°Zone	97.11%				
Zonal Lumens in the 60°-90°Zone	2.81%				
Zonal Lumens in the 90°-120°Zone	0.01%				
Zonal Lumens in the 120°-180°Zone	0.07%				

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

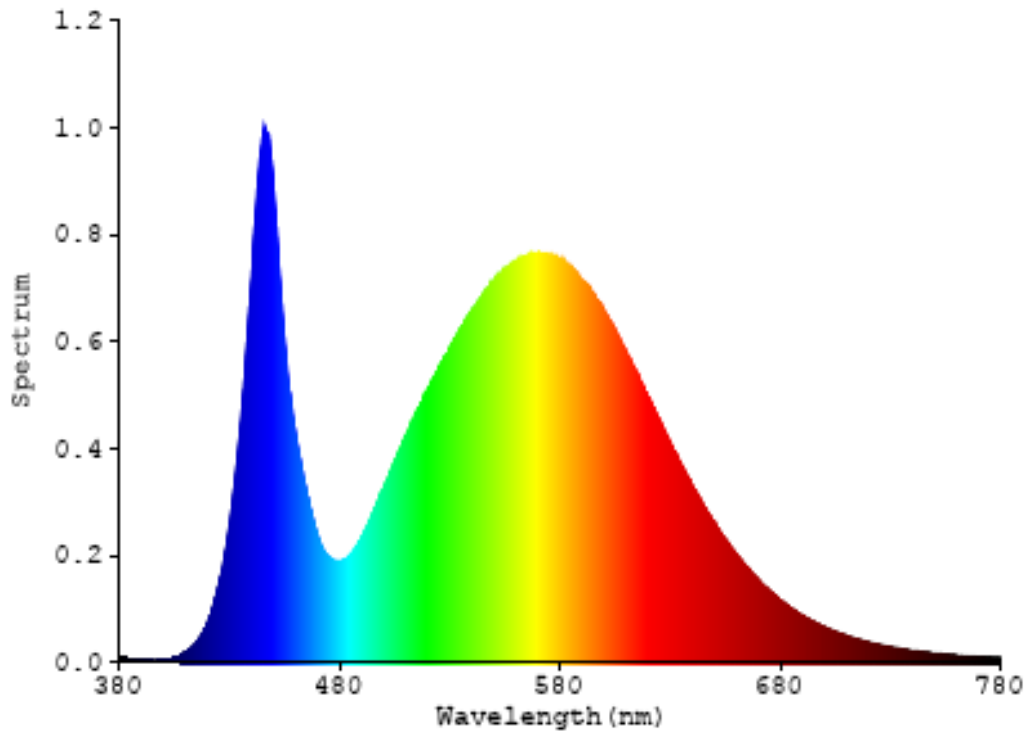


Chart 1: Spectral Power Distribution

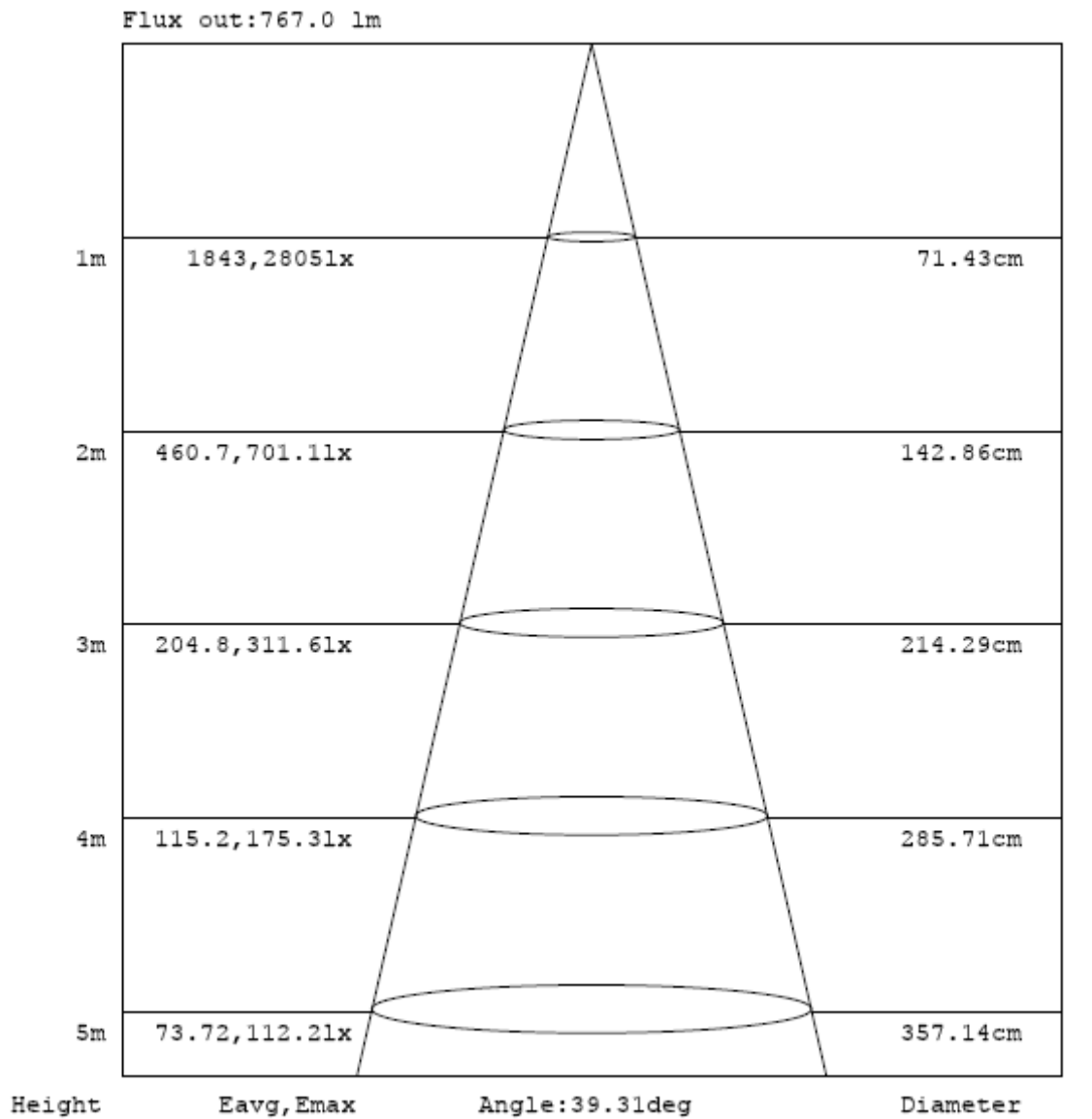
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	246.268	10.94%
10- 20	520.737	23.13%
20- 30	450.843	20.02%
30- 40	416.397	18.49%
40- 50	372.811	16.56%
50- 60	179.383	7.97%
60- 70	49.831	2.21%
70- 80	12.616	0.56%
80- 90	0.875	0.04%
90-100	0.043	0.00%
100-110	0.077	0.00%
110-120	0.118	0.01%
120-130	0.168	0.01%
130-140	0.274	0.01%
140-150	0.386	0.02%
150-160	0.399	0.02%
160-170	0.284	0.01%
170-180	0.098	0.00%
Total	2251.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2186.439	97.11%
60- 90	63.322	2.81%
0-90	2249.761	99.92%
90- 180	1.847	0.08%
0- 180	2251.6	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

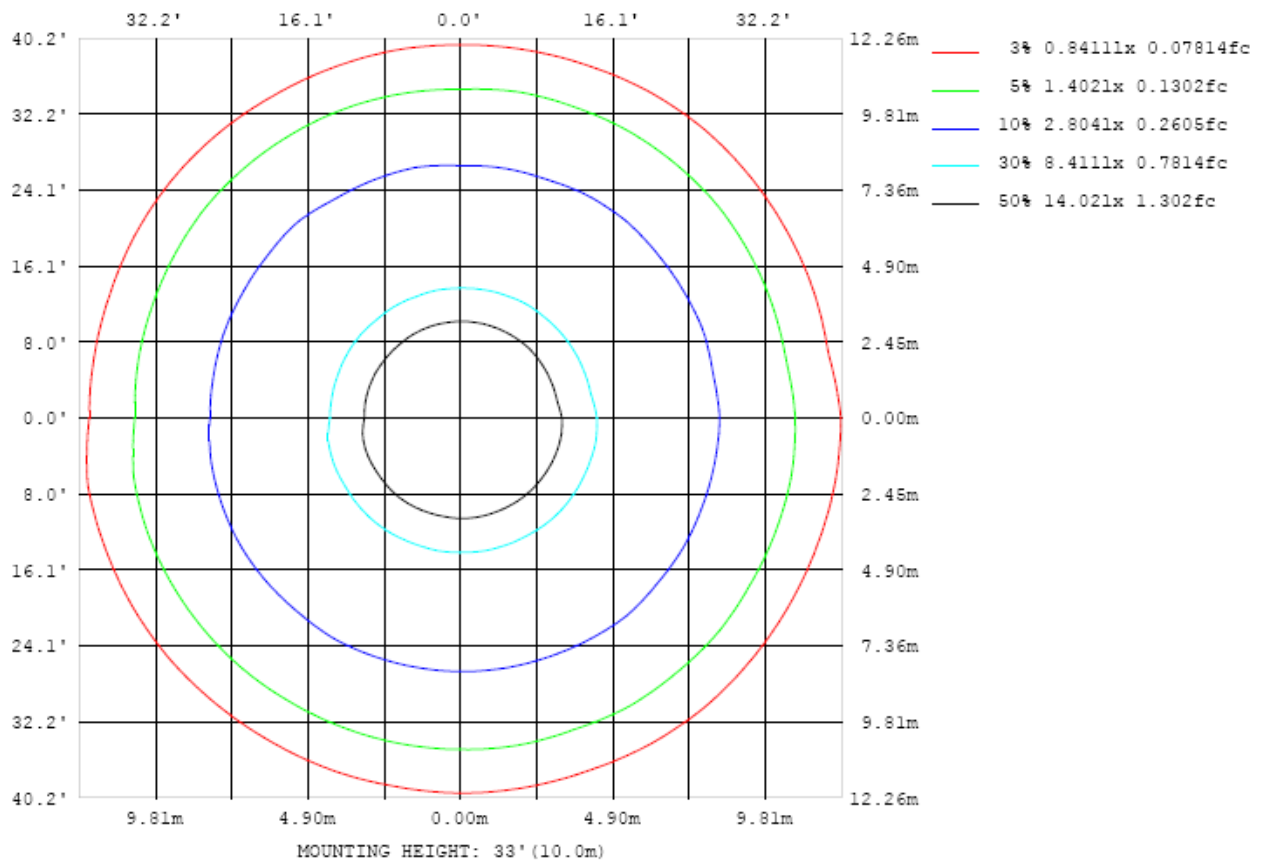


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

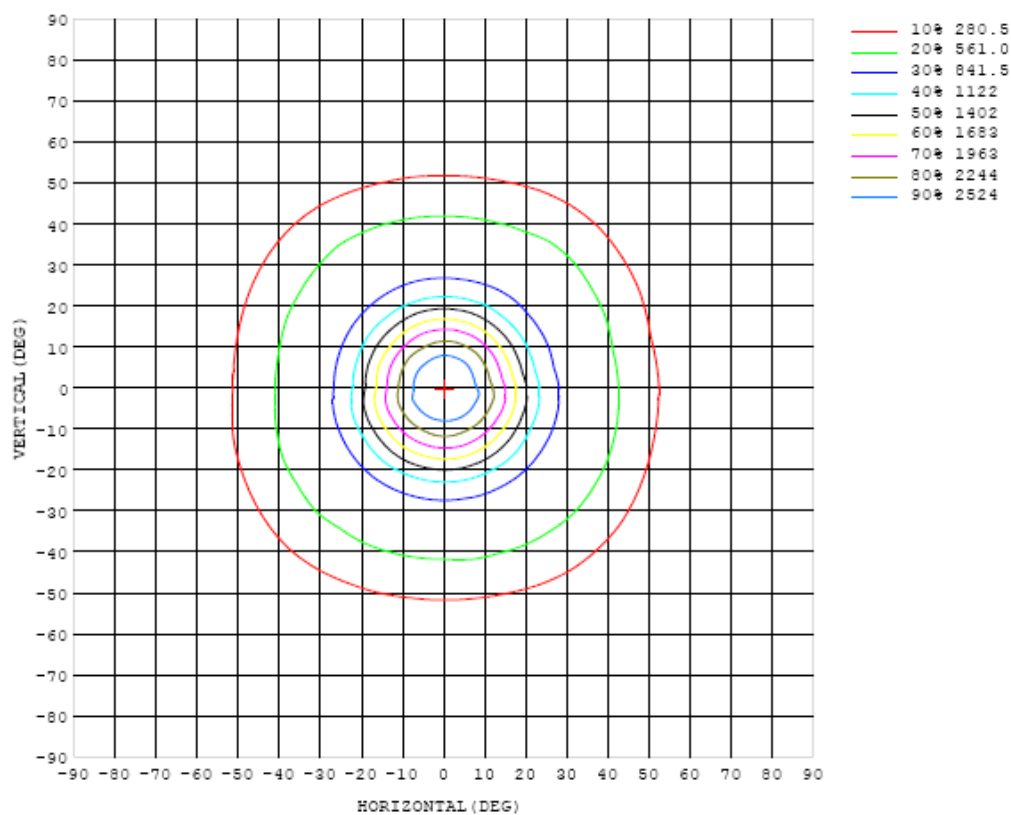


Chart 4: Isocandela Plot

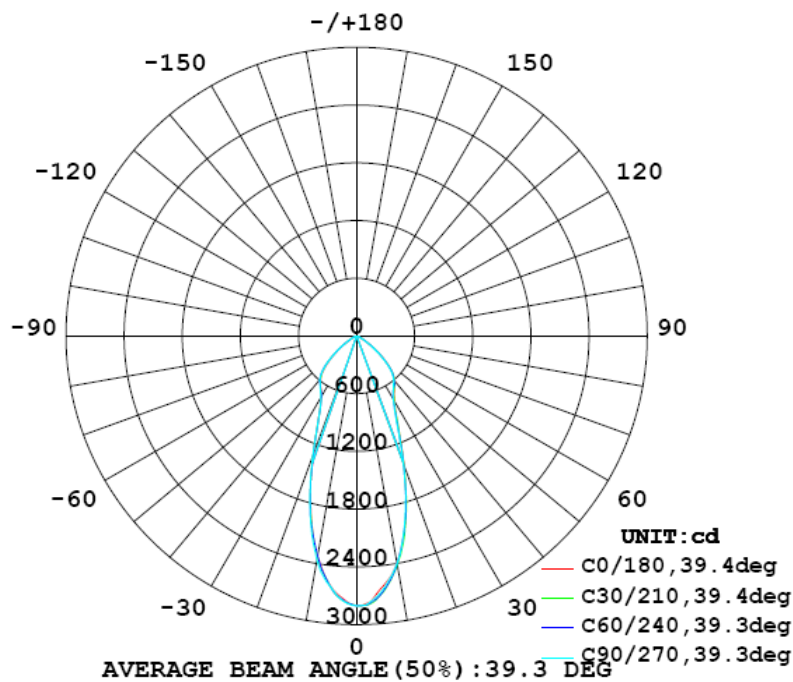


Chart 5: Polar Candela Distribution

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	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804
5	2657	2703	2719	2712	2715	2711	2710	2703	2693	2693	2685	2677	2679	2676	2676	2685	2681	2652	2661
10	2397	2446	2430	2414	2411	2407	2404	2402	2406	2400	2395	2384	2377	2369	2377	2381	2391	2360	2326
15	1953	1994	1984	1963	1956	1953	1950	1951	1943	1931	1932	1924	1929	1932	1922	1916	1929	1911	1840
20	1428	1448	1430	1429	1430	1425	1419	1411	1413	1411	1401	1405	1407	1406	1397	1395	1403	1396	1314
25	1000	1020	1011	1007	1005	994	983	987	984	972	981	975	976	975	976	965	975	969	927
30	780	781	780	773	770	768	755	755	746	756	754	751	755	746	746	753	760	754	735
35	680	685	674	674	680	672	665	661	661	661	660	659	660	658	654	658	653	650	650
40	617	611	610	610	608	613	603	598	600	594	593	594	596	591	593	594	594	589	580
45	506	511	513	508	512	508	506	497	504	491	490	492	492	496	497	498	500	491	466
50	356	357	351	346	349	351	347	339	339	339	336	338	338	341	347	348	348	348	320
55	205	201	201	202	204	203	200	193	190	190	191	194	196	200	203	202	203	203	178
60	101	98.9	98.8	99.4	100	101	96.4	96.3	94.1	93.9	92.6	95.6	97.5	99.1	102	101	101	101	86.9
65	48.5	47.5	47.1	47.5	47.4	47.1	46.6	44.7	45.1	44.7	44.6	45.4	46.1	46.7	47.6	47.9	48.5	48.6	43.5
70	24.5	23.8	23.6	23.4	23.4	23.4	23.2	22.6	22.6	22.2	22.4	22.7	23.1	23.7	24.0	24.1	24.6	24.6	22.1
75	11.4	11.2	11.1	11.0	11.1	11.2	11.1	11.0	10.9	10.7	10.7	10.9	11.2	11.4	11.5	11.6	11.9	11.9	10.4
80	2.55	2.87	3.65	4.92	5.20	5.25	5.16	4.70	4.16	3.84	3.78	4.32	5.09	5.36	5.47	5.48	4.64	3.66	1.89
85	0.05	0.05	0.06	0.09	0.23	0.48	0.52	0.40	0.34	0.30	0.32	0.43	0.70	0.76	0.31	0.11	0.07	0.06	0.04
90	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	0.04	0.04	0.02
95	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.02
100	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.03
105	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.04
110	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.11	0.06
115	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.13	0.13	0.12	0.09
120	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.14	0.14	0.14
125	0.17	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.17	0.16	0.16	0.16	0.19
130	0.22	0.22	0.22	0.22	0.22	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.23	0.23	0.22	0.22	0.22	0.22	0.26
135	0.32	0.33	0.32	0.33	0.34	0.34	0.34	0.35	0.36	0.36	0.36	0.35	0.34	0.34	0.34	0.33	0.33	0.32	0.35
140	0.44	0.45	0.45	0.47	0.48	0.49	0.50	0.50	0.51	0.51	0.51	0.50	0.50	0.48	0.48	0.46	0.45	0.44	0.46
145	0.58	0.59	0.61	0.63	0.65	0.67	0.69	0.69	0.69	0.69	0.68	0.68	0.66	0.66	0.65	0.62	0.61	0.59	0.56
150	0.75	0.76	0.79	0.81	0.85	0.87	0.87	0.89	0.89	0.89	0.86	0.87	0.86	0.86	0.83	0.82	0.79	0.77	0.65
155	0.89	0.91	0.96	1.00	1.02	1.03	1.04	1.04	1.04	1.05	1.05	1.05	1.03	1.02	1.01	0.99	0.95	0.90	0.73
160	1.06	1.05	1.07	1.11	1.14	1.15	1.16	1.16	1.16	1.14	1.15	1.14	1.14	1.13	1.12	1.11	1.07	1.06	0.85
165	1.11	1.10	1.12	1.15	1.19	1.21	1.23	1.22	1.21	1.20	1.20	1.19	1.19	1.18	1.16	1.14	1.12	1.11	0.92
170	1.14	1.14	1.16	1.18	1.20	1.22	1.23	1.23	1.21	1.22	1.22	1.21	1.20	1.17	1.15	1.14	1.13	1.13	1.01
175	1.10	1.12	1.12	1.13	1.13	1.13	1.13	1.13	1.13	1.14	1.12	1.13	1.13	1.10	1.08	1.08	1.07	1.05	1.05
180	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01

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	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804	2804		
5	2671	2673	2677	2680	2681	2676	2672	2672	2667	2668	2678	2686	2691	2697	2700	2679	2672		
10	2323	2325	2331	2332	2327	2322	2331	2348	2367	2377	2361	2362	2374	2372	2360	2356	2356		
15	1847	1847	1846	1842	1848	1861	1872	1864	1859	1886	1882	1891	1893	1890	1895	1888	1889		
20	1315	1315	1318	1312	1307	1310	1319	1320	1327	1324	1328	1332	1327	1331	1340	1337	1351		
25	922	920	920	920	914	921	919	925	923	922	934	942	946	942	941	949	954		
30	732	732	739	730	730	732	740	735	742	745	747	741	737	749	752	755	750		
35	644	649	653	652	660	654	656	658	659	664	660	663	663	669	672	670	663		
40	577	581	582	585	598	590	592	598	591	594	594	604	611	605	605	611	602		
45	470	475	479	489	492	492	495	488	483	491	494	497	509	507	497	494	492		
50	321	323	330	334	332	329	331	334	333	335	339	346	348	345	341	336	330		
55	182	188	190	192	192	191	186	187	188	188	191	198	199	200	194	192	184		
60	88.3	91.1	92.7	95.1	95.2	94.4	93.8	92.4	92.4	92.8	93.7	96.4	95.9	96.3	94.4	91.2	87.8		
65	44.5	44.9	45.9	46.7	47.0	47.3	47.1	46.4	46.3	46.5	46.9	47.6	46.5	46.6	45.7	44.5	43.3		
70	22.5	22.6	23.1	23.3	23.6	24.1	23.8	23.6	23.5	23.7	23.8	24.1	23.7	23.7	22.9	22.4	21.9		
75	10.5	10.5	10.8	11.0	11.2	11.5	11.4	11.4	11.3	11.4	11.5	11.6	11.6	11.5	10.9	10.6	10.2		
80	2.03	2.62	4.00	5.14	5.05	4.22	3.20	2.58	2.38	2.51	3.02	4.00	5.04	4.56	2.73	1.88	1.53		
85	0.04	0.04	0.05	0.05	0.09	0.13	0.09	0.07	0.07	0.07	0.09	0.10	0.06	0.05	0.05	0.04	0.04		
90	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		
95	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
100	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		
105	0.04	0.04	0.04	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		
110	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06		
115	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09		
120	0.14	0.13	0.13	0.13	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14		
125	0.20	0.19	0.19	0.19	0.20	0.20	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.19		
130	0.27	0.27	0.27	0.27	0.27	0.28	0.28	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.26		
135	0.37	0.37	0.37	0.37	0.37	0.37	0.38	0.37	0.38	0.38	0.38	0.37	0.37	0.36	0.36	0.36	0.36		
140	0.47	0.47	0.48	0.49	0.50	0.49	0.50	0.50	0.50	0.50	0.49	0.49	0.48	0.46	0.45	0.46	0.47		
145	0.57	0.59	0.60	0.61	0.61	0.62	0.62	0.63	0.62	0.62	0.61	0.60	0.59	0.57	0.53	0.55	0.56		
150	0.66	0.70	0.71	0.71	0.70	0.70	0.71	0.71	0.70	0.70	0.69	0.69	0.68	0.66	0.63	0.62	0.64		
155	0.74	0.77	0.79	0.77	0.76	0.76	0.76	0.76	0.74	0.76	0.76	0.76	0.74	0.73	0.73	0.69	0.72		
160	0.79	0.81	0.82	0.83	0.82	0.80	0.79	0.79	0.77	0.80	0.81	0.81	0.81	0.79	0.77	0.74	0.83		
165	0.83	0.85	0.87	0.88	0.87	0.86	0.85	0.86	0.84	0.87	0.88	0.88	0.87	0.84	0.82	0.80	0.90		
170	0.83	0.85	0.85	0.85	0.84	0.82	0.83	0.85	0.83	0.83	0.84	0.83	0.82	0.81	0.81	0.79	0.99		
175	0.95	0.95	0.96	0.96	0.96	0.94	0.94	0.93	0.91	0.92	0.93	0.92	0.92	0.93	0.93	0.96	1.10		
180	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01		

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 P.R. China.

The uncertainty of goniophotometer system reported in this document is expended 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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