



LM-79-08 Test Report

for

ABBlighting, Inc.

3 Adams St Belvidere, NJ 07823.

Flood Light

Model: ABBFL100501-III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15070048b

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

Reviewed by:

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Jul. 29, 2015



Jim Zhang

Manager: Jim Zhang
Jul. 29, 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: ABBFL100501-III

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
87.6	8858.7	101.15	0.9977
CCT (K)	CRI	Stabilization Time (Light & Power)	
4877	67.7	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jul. 25, 2015
Date of Test	: Jul. 27, 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	: ABBFL100501-III
Electrical Ratings	: 100~277VAC, 50/60Hz, 100W
Product Description	: 5000K, Architectural Flood and Spot Luminaires Manufacturer of light source: Philips Model of light source: LUXEON Rebel ES Quantity of LED light source: 45pcs
Manufacturer	: ABB Lighting (shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza, # 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 25.5°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.

The photometric distance is 30m.

Luminous data was taken at 0.5°vertical intervals and 10°horizontal intervals.

Parameter	Result		
Test Voltage (V)	120.0	100.0	277.0
Voltage frequency (Hz)	60	60	60
Test Current (A)	0.845	1.032	0.369
Power Factor	0.9977	0.9960	0.9635
Test Power (W)	101.15	102.84	98.51
THD A%	2.64	2.52	8.22
Luminous Efficacy (lm/W)	87.6	86.1	89.9
Total Luminous Flux (lm)	8858.7	8852.5	8855.1
Color Rendering Index (CRI)	67.7		
R9	-41		
Correlated Color Temperature (CCT) (K)	4877		
Chromaticity (Chroma x, Chroma y)	(0.3519, 0.3832)		
Chromaticity (Chroma u, Chroma v)	(0.2041, 0.3325)		
Chromaticity (Chroma u', Chroma v')	(0.2041, 0.5002)		
Duv	0.0125		
Average Beam Angle (°)	74.4		
Center Beam Candle Power (cd)	3176		
NEMA Type	7H x 5V		
Zonal Lumens in the 0°-60°Zone	79.82%		
Zonal Lumens in the 60°-90°Zone	20.11%		
Zonal Lumens in the 90°-120°Zone	0.03%		
Zonal Lumens in the 120°-180°Zone	0.04%		

Special Color Rendering Indices	
R1	64
R2	71
R3	77
R4	69
R5	66
R6	62
R7	78
R8	54
R9	-41
R10	33
R11	65
R12	40
R13	64
R14	87

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

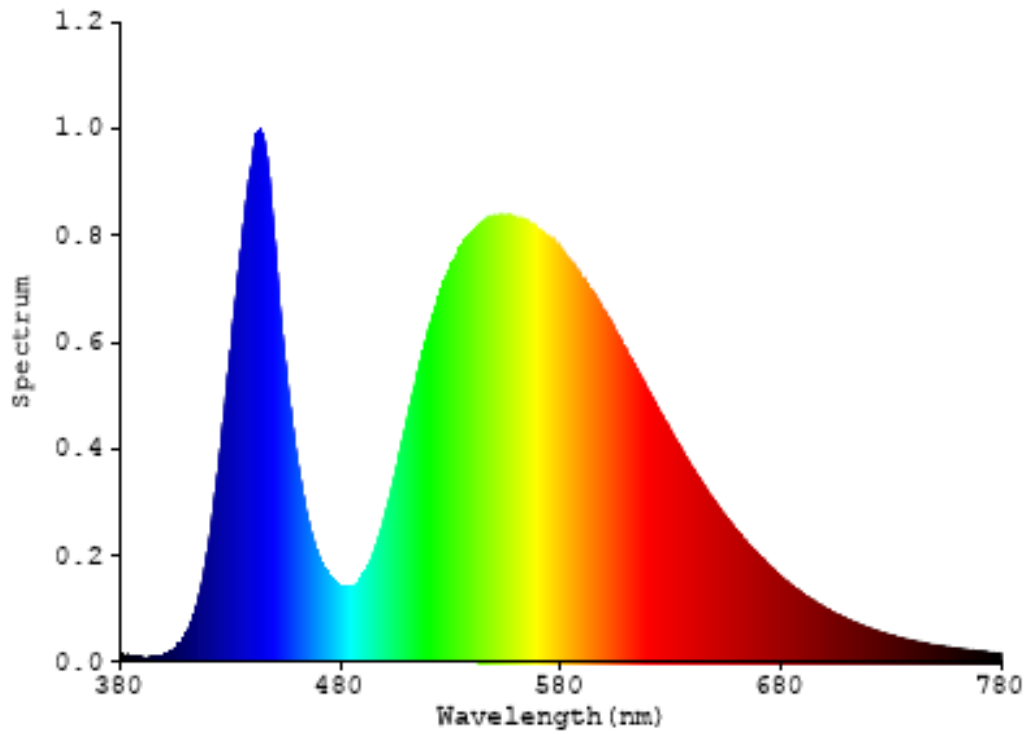


Chart 1: Spectral Power Distribution

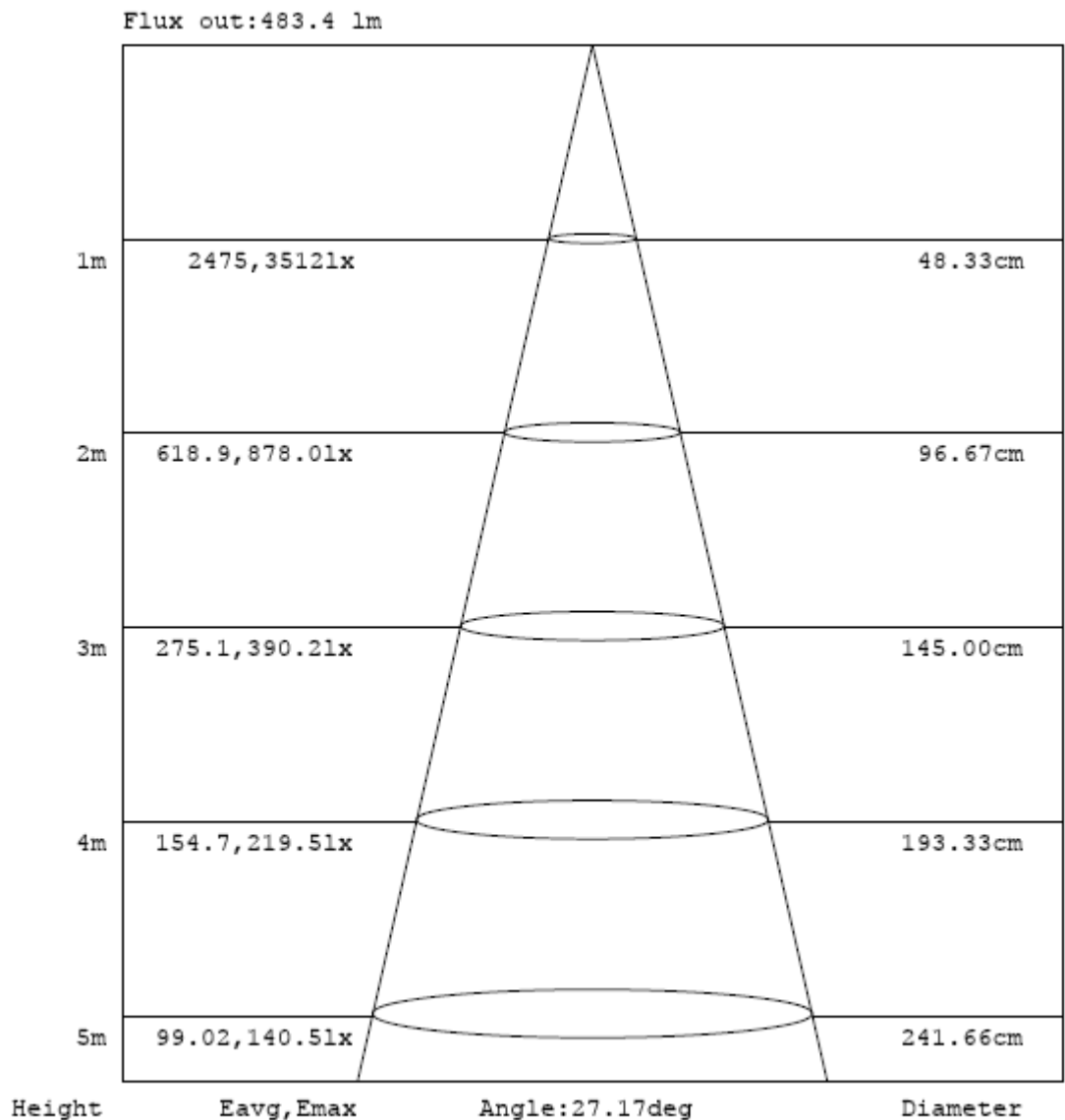
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	267.059	3.01%
10- 20	627.907	7.09%
20- 30	906.152	10.23%
30- 40	1229.336	13.88%
40- 50	1857.368	20.97%
50- 60	2182.982	24.64%
60- 70	1368.137	15.44%
70- 80	393.897	4.45%
80- 90	19.688	0.22%
90-100	0.569	0.01%
100-110	0.955	0.01%
110-120	0.972	0.01%
120-130	0.883	0.01%
130-140	0.894	0.01%
140-150	0.793	0.01%
150-160	0.616	0.01%
160-170	0.388	0.00%
170-180	0.137	0.00%
Total	8858.7	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	7070.804	79.82%
60- 90	1781.722	20.11%
0-90	8852.526	99.93%
90- 180	6.207	0.07%
0- 180	8858.7	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

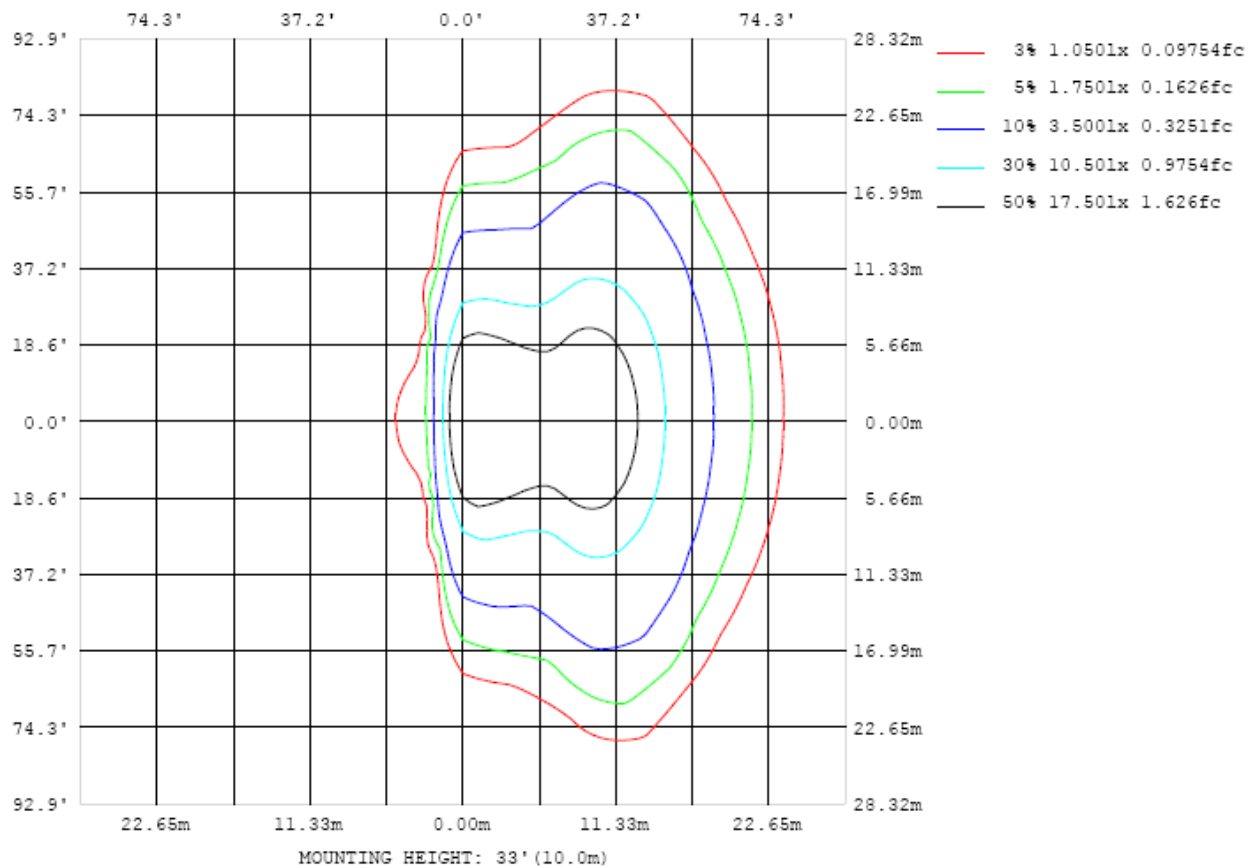


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

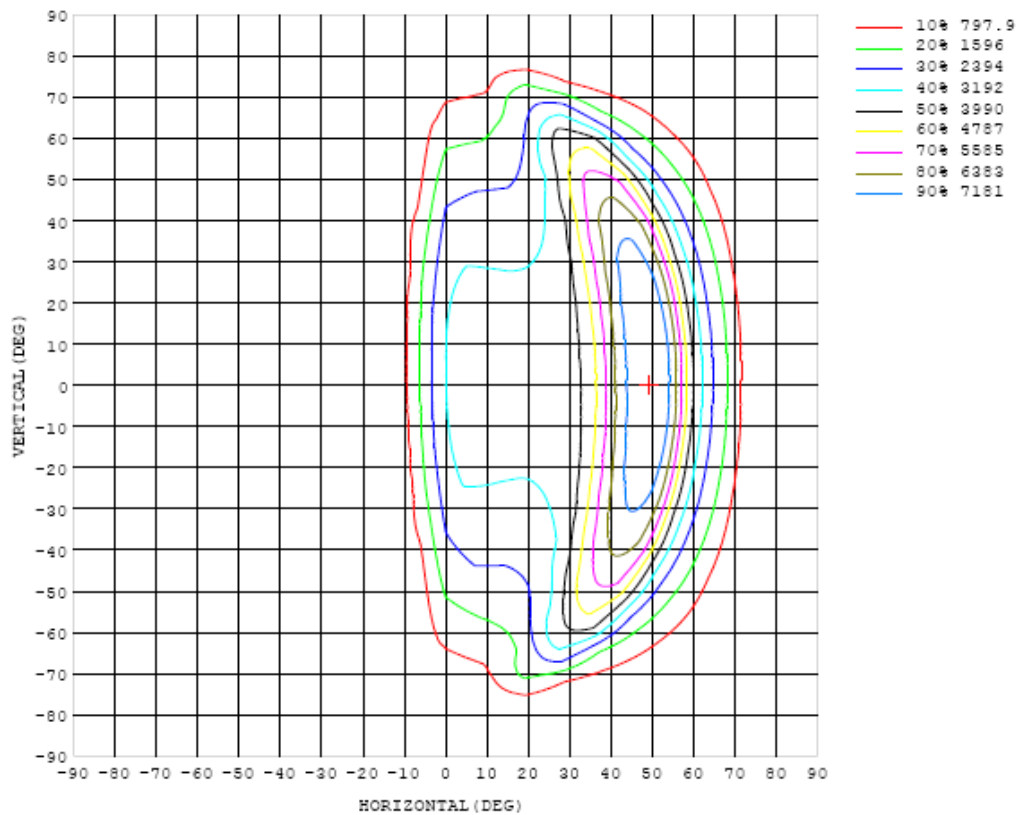


Chart 4: Isocandela Plot

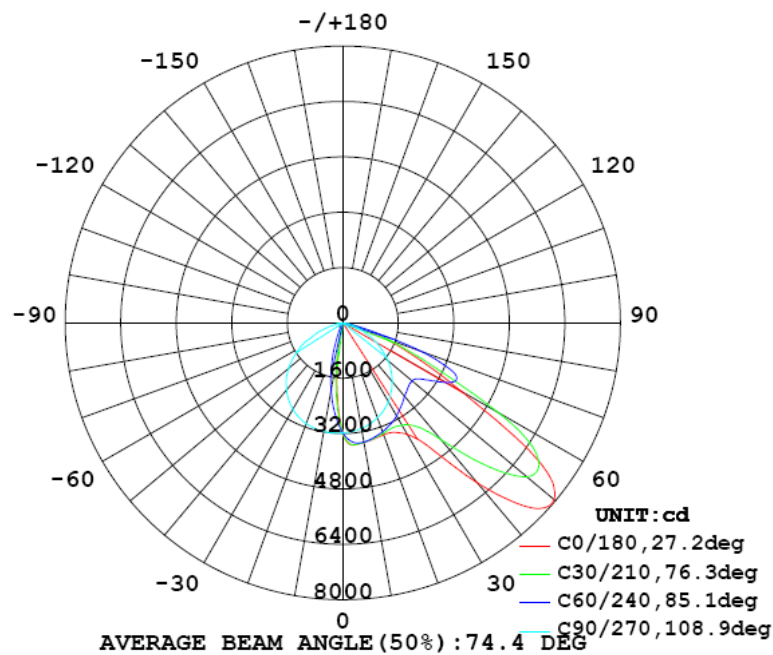


Chart 5: Polar Candela Distribution

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	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176
5	3540	3538	3540	3534	3524	3500	3462	3396	3290	3146	2975	2781	2592	2413	2254	2120	2026	1969	1955
10	3511	3509	3507	3501	3500	3497	3498	3467	3354	3099	2727	2301	1879	1498	1177	935	771	685	673
15	3471	3466	3462	3455	3446	3441	3435	3431	3354	3023	2437	1768	1144	663	360	241	199	185	184
20	3441	3428	3416	3396	3377	3359	3348	3341	3301	2918	2116	1229	529	225	167	159	157	156	157
25	3492	3464	3414	3353	3306	3268	3238	3218	3196	2786	1769	727	218	156	151	149	148	147	147
30	3724	3670	3558	3416	3267	3164	3101	3061	3037	2623	1405	353	154	144	140	140	141	141	142
35	4421	4287	3987	3641	3330	3079	2934	2871	2841	2430	1039	180	138	134	132	134	139	143	143
40	6033	5816	5256	4399	3583	3065	2772	2660	2614	2213	692	132	123	123	126	136	148	153	155
45	7513	7319	6774	5815	4450	3219	2653	2423	2356	1971	394	116	111	112	126	140	149	154	155
50	7943	7853	7577	6916	5643	3909	2608	2164	2056	1690	197	101	98.3	109	120	133	143	147	148
55	6782	6874	7033	6880	6242	4820	2846	1917	1724	1390	106	85.5	88.2	102	109	119	127	129	130
60	3911	3983	4374	5141	5599	5082	3440	1742	1392	1098	79.1	71.4	79.5	86.6	92.2	100	107	110	111
65	2277	2301	2431	2646	3184	4093	3601	1685	967	749	64.7	59.6	64.8	68.4	71.7	78.5	85.9	89.6	90.2
70	1182	1251	1326	1386	1490	1649	2386	1807	670	478	48.2	47.7	48.7	47.8	50.5	57.8	64.6	68.3	68.7
75	417	445	475	505	577	625	681	1066	411	215	30.5	30.4	29.9	31.1	33.3	37.2	41.6	44.4	45.3
80	68.5	70.5	75.5	83.5	92.9	126	135	149	163	60.8	13.1	12.1	13.7	14.8	15.1	15.8	17.5	18.1	18.9
85	1.57	1.56	2.41	2.70	3.65	5.53	6.21	11.7	9.25	5.35	2.66	2.38	3.07	3.18	2.38	2.34	2.35	2.33	3.20
90	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.10	0.13	0.15	0.17	0.20	0.23	0.25	0.22	0.19	0.18	0.18	0.80
95	0.07	0.07	0.07	0.07	0.07	0.08	0.09	0.13	0.18	0.23	0.26	0.30	0.34	0.40	0.40	0.36	0.32	0.32	1.36
100	0.07	0.07	0.07	0.07	0.07	0.09	0.11	0.17	0.24	0.32	0.37	0.43	0.47	0.56	0.60	0.57	0.52	0.51	2.17
105	0.07	0.07	0.07	0.07	0.08	0.11	0.14	0.22	0.30	0.41	0.49	0.59	0.64	0.71	0.78	0.79	0.75	0.76	2.92
110	0.08	0.08	0.08	0.08	0.09	0.13	0.19	0.28	0.37	0.52	0.64	0.77	0.83	0.94	0.99	1.04	1.04	1.09	3.09
115	0.09	0.09	0.09	0.09	0.11	0.16	0.21	0.33	0.44	0.63	0.83	0.97	1.05	1.17	1.25	1.38	1.34	1.41	2.84
120	0.10	0.10	0.09	0.10	0.14	0.19	0.29	0.36	0.52	0.71	0.99	1.20	1.30	1.41	1.53	1.60	1.62	1.70	2.62
125	0.11	0.11	0.11	0.12	0.16	0.25	0.36	0.41	0.61	0.77	1.12	1.46	1.61	1.77	1.85	1.91	1.94	1.98	2.31
130	0.11	0.12	0.13	0.15	0.20	0.31	0.43	0.52	0.65	0.85	1.19	1.59	1.85	2.07	2.15	2.22	2.16	2.16	2.31
135	0.13	0.13	0.16	0.24	0.28	0.39	0.51	0.64	0.73	0.92	1.20	1.62	1.92	2.17	2.30	2.33	2.32	2.31	2.44
140	0.16	0.17	0.23	0.32	0.36	0.49	0.56	0.64	0.79	0.93	1.15	1.52	1.77	2.08	2.24	2.27	2.29	2.30	2.48
145	0.23	0.25	0.34	0.43	0.46	0.54	0.62	0.69	0.86	0.96	1.10	1.41	1.69	1.95	2.12	2.20	2.28	2.27	2.44
150	0.35	0.41	0.50	0.61	0.62	0.62	0.68	0.82	0.90	1.02	1.14	1.38	1.63	1.86	2.01	2.12	2.18	2.20	2.31
155	0.50	0.58	0.66	0.79	0.74	0.67	0.75	0.87	0.97	1.00	1.17	1.38	1.55	1.72	1.84	1.93	1.91	1.96	2.04
160	0.68	0.75	0.84	0.94	0.92	0.81	0.83	0.98	1.05	0.92	1.17	1.41	1.53	1.64	1.72	1.74	1.73	1.77	1.81
165	0.83	0.91	1.02	1.10	1.11	0.95	0.93	1.12	1.08	1.05	1.21	1.49	1.57	1.62	1.64	1.66	1.67	1.71	1.51
170	1.01	1.07	1.13	1.18	1.19	1.02	0.93	1.06	1.27	1.18	1.11	1.44	1.56	1.58	1.59	1.61	1.60	1.60	1.32
175	1.13	1.16	1.19	1.27	1.34	1.31	1.21	1.34	1.43	1.38	1.43	1.60	1.73	1.74	1.77	1.79	1.75	1.70	1.19
180	1.04	1.07	1.10	1.20	1.27	1.33	1.38	1.32	1.29	1.39	1.42	1.43	1.47	1.56	1.56	1.55	1.56	1.56	1.03

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	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176		
5	1978	2045	2149	2286	2454	2634	2827	3020	3190	3331	3424	3485	3519	3533	3538	3537	3538		
10	707	811	989	1246	1576	1965	2398	2821	3187	3419	3508	3529	3530	3523	3518	3513	3510		
15	191	210	263	415	749	1274	1912	2582	3154	3436	3483	3486	3485	3483	3476	3477	3475		
20	158	160	162	178	263	645	1417	2311	3095	3400	3414	3417	3423	3431	3434	3442	3442		
25	149	151	153	156	166	271	928	2012	3008	3312	3320	3334	3354	3372	3412	3452	3486		
30	143	144	144	147	151	170	508	1691	2885	3171	3188	3225	3274	3364	3496	3617	3706		
35	143	140	138	138	141	146	247	1355	2723	2992	3015	3081	3235	3473	3768	4081	4341		
40	155	148	137	130	128	130	156	1016	2530	2777	2822	2951	3273	3797	4593	5399	5894		
45	156	154	146	129	116	117	125	684	2309	2531	2601	2879	3506	4784	6096	6944	7402		
50	150	149	139	126	110	104	109	394	2043	2240	2380	2901	4312	6034	7205	7725	7926		
55	133	134	128	116	107	93.4	93.4	193	1736	1903	2170	3245	5277	6618	7137	7160	6935		
60	115	114	109	102	95.7	83.9	78.2	104	1435	1573	2041	3943	5484	5910	5470	4554	4068		
65	93.1	92.3	86.2	82.0	78.1	71.9	64.7	75.2	1015	1155	2132	4070	4463	3533	2916	2601	2373		
70	70.7	70.0	64.5	58.7	56.7	55.4	52.9	67.0	699	876	2159	2755	2081	1757	1572	1438	1299		
75	48.1	47.6	43.2	38.3	37.2	36.5	36.2	50.5	368	608	1372	936	828	736	592	538	476		
80	20.1	20.9	19.5	20.2	20.2	18.5	17.4	23.7	108	288	258	231	202	156	107	89.7	78.8		
85	3.94	4.23	4.15	4.65	5.67	6.22	4.43	6.05	18.7	32.6	28.2	28.4	14.4	5.66	4.15	2.91	2.13		
90	0.84	0.92	1.03	1.17	1.25	1.13	0.90	0.63	0.37	0.20	0.12	0.11	0.12	0.11	0.12	0.12	0.12		
95	1.38	1.48	1.65	1.78	1.73	1.48	1.15	0.79	0.49	0.27	0.15	0.11	0.11	0.12	0.12	0.12	0.12		
100	2.19	2.32	2.46	2.51	2.31	1.94	1.51	1.11	0.82	0.64	0.52	0.38	0.26	0.19	0.15	0.13	0.13		
105	2.93	3.00	3.06	2.93	2.59	2.12	1.66	1.24	0.91	0.71	0.57	0.45	0.36	0.26	0.20	0.15	0.14		
110	3.09	3.18	3.05	2.84	2.45	1.99	1.60	1.21	0.91	0.74	0.60	0.45	0.39	0.30	0.21	0.15	0.14		
115	2.83	2.81	2.66	2.43	2.07	1.73	1.43	1.10	0.86	0.72	0.60	0.45	0.38	0.30	0.20	0.15	0.13		
120	2.55	2.40	2.17	1.91	1.64	1.45	1.24	0.98	0.80	0.67	0.58	0.45	0.36	0.27	0.19	0.15	0.13		
125	2.21	2.06	1.84	1.66	1.44	1.32	1.16	0.92	0.79	0.65	0.57	0.44	0.35	0.24	0.19	0.15	0.13		
130	2.26	2.13	1.96	1.73	1.53	1.39	1.21	0.98	0.85	0.68	0.58	0.45	0.36	0.25	0.20	0.16	0.14		
135	2.45	2.38	2.26	2.07	1.84	1.59	1.35	1.16	0.96	0.81	0.67	0.54	0.41	0.32	0.24	0.18	0.15		
140	2.56	2.51	2.43	2.29	2.06	1.75	1.46	1.25	1.06	0.88	0.71	0.63	0.50	0.39	0.30	0.22	0.17		
145	2.55	2.54	2.50	2.35	2.14	1.83	1.59	1.30	1.19	0.92	0.86	0.75	0.65	0.50	0.39	0.29	0.23		
150	2.41	2.47	2.44	2.33	2.14	1.86	1.68	1.40	1.21	1.09	1.03	0.88	0.83	0.71	0.57	0.44	0.36		
155	2.15	2.24	2.32	2.23	2.08	1.84	1.71	1.52	1.33	1.28	1.10	1.03	0.96	0.93	0.87	0.68	0.57		
160	1.86	1.93	2.05	2.04	1.96	1.84	1.74	1.55	1.32	1.42	1.28	1.17	1.12	1.20	1.15	0.99	0.86		
165	1.52	1.57	1.65	1.73	1.77	1.74	1.69	1.50	1.36	1.36	1.40	1.29	1.25	1.36	1.38	1.30	1.15		
170	1.34	1.39	1.46	1.55	1.65	1.70	1.74	1.56	1.51	1.56	1.61	1.49	1.40	1.56	1.61	1.57	1.46		
175	1.21	1.26	1.34	1.47	1.50	1.60	1.61	1.54	1.48	1.57	1.65	1.54	1.53	1.70	1.73	1.66	1.61		
180	1.04	1.06	1.10	1.21	1.27	1.33	1.37	1.39	1.35	1.49	1.43	1.43	1.51	1.62	1.62	1.61	1.59		

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 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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