



LM-79-08 Test Report

for

ABBlighting, Inc.

3 Adams St Belvidere, NJ 07823.

Flood Light

Model: ABBFL140501-III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15070048c

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

Reviewed by:

April Zou

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Aug. 05, 2015



Approved by

Jim Zhang

Manager: Jim Zhang
Aug. 05, 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: ABBFL140501-III

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
88.1	12208.0	138.61	0.9962
CCT (K)	CRI	Stabilization Time (Light & Power)	
4938	68.2	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	: ABBFL140501-III
Electrical Ratings	: 100~277VAC, 50/60Hz, 140W
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: 54pcs
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			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	65
Voltage frequency (Hz)	60	60	60	R2	72
Test Current (A)	1.160	1.400	0.539	R3	77
Power Factor	0.9962	0.9978	0.9156	R4	70
Test Power (W)	138.61	139.73	136.63	R5	66
THD A%	6.42	5.86	13.80	R6	63
Luminous Efficacy (lm/W)	88.1	86.8	88.2	R7	79
Total Luminous Flux (lm)	12208.0	12124.0	12056.0	R8	55
Color Rendering Index (CRI)	68.2			R9	-39
R9	-39			R10	34
Correlated Color Temperature (CCT) (K)	4938			R11	66
Chromaticity (Chroma x, Chroma y)	(0.3496, 0.3806)			R12	41
Chromaticity (Chroma u, Chroma v)	(0.2036, 0.3325)			R13	65
Chromaticity (Chroma u', Chroma v')	(0.2036, 0.4988)			R14	87
Duv	0.0122				
Average Beam Angle (°)	73.9				
Center Beam Candle Power (cd)	4140				
NEMA Type	7H x 5V				
Zonal Lumens in the 0°-60°Zone	78.01%				
Zonal Lumens in the 60°-90°Zone	21.93%				
Zonal Lumens in the 90°-120°Zone	0.03%				
Zonal Lumens in the 120°-180°Zone	0.04%				

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

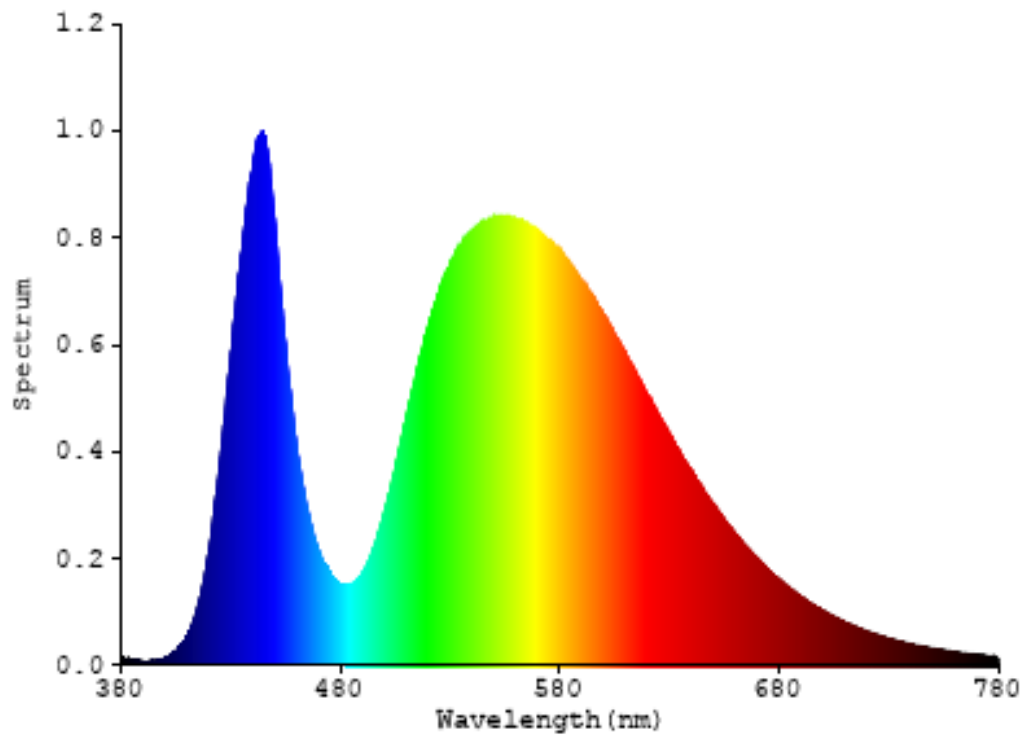


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

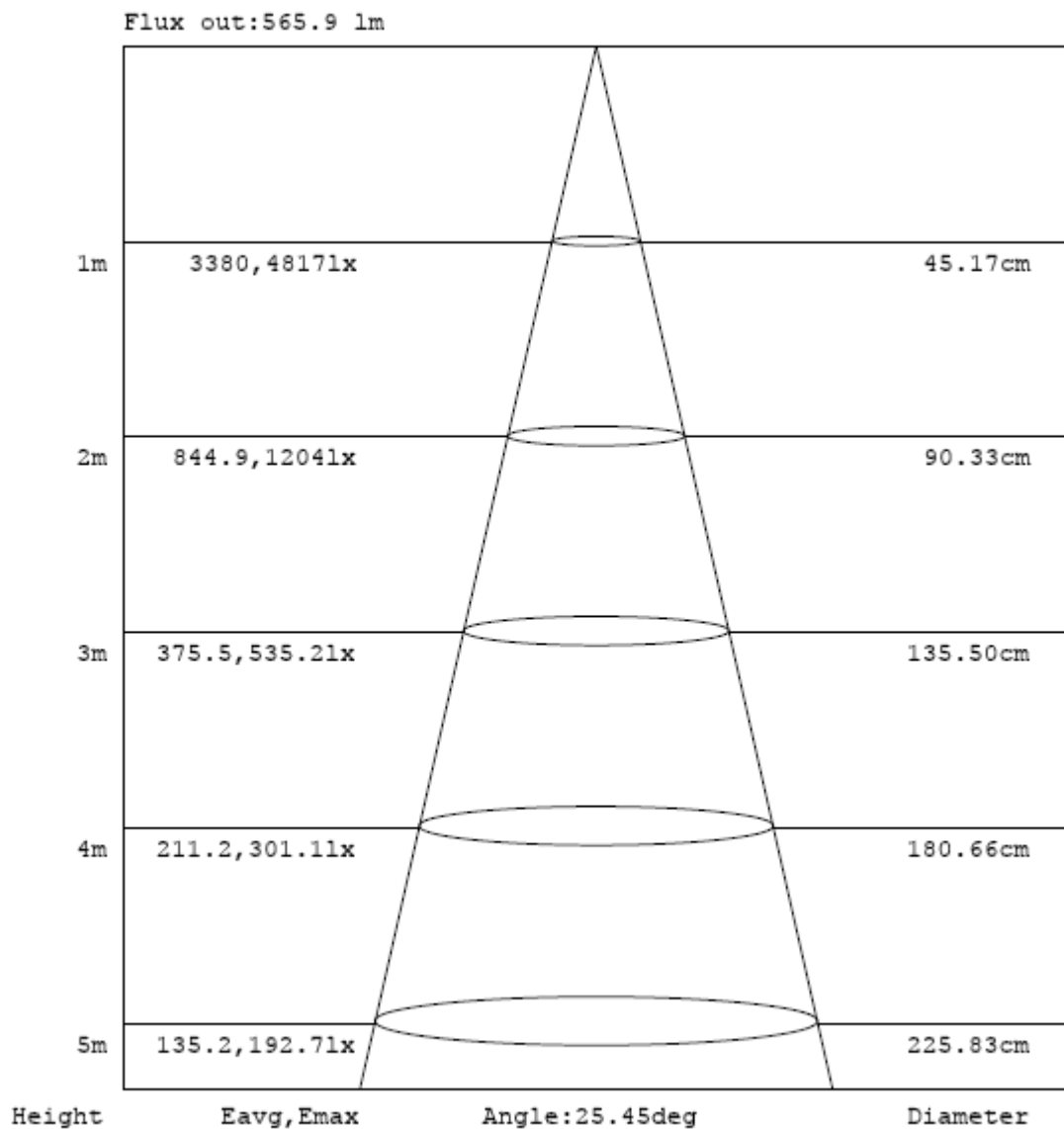
$\gamma(^{\circ})$	Lumens	% Total
0- 10	354.074	2.90%
10- 20	848.657	6.95%
20- 30	1222.156	10.01%
30- 40	1614.87	13.23%
40- 50	2446.263	20.04%
50- 60	3036.996	24.88%
60- 70	1996.502	16.35%
70- 80	641.595	5.26%
80- 90	38.666	0.32%
90-100	0.831	0.01%
100-110	1.284	0.01%
110-120	1.286	0.01%
120-130	1.176	0.01%
130-140	1.193	0.01%
140-150	1.044	0.01%
150-160	0.809	0.01%
160-170	0.515	0.00%
170-180	0.183	0.00%
Total	12208.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	9523.016	78.01%
60- 90	2676.763	21.93%
0-90	12199.779	99.93%
90- 180	8.321	0.07%
0- 180	12208.1	100%

Table 3: Zonal Lumen Data

Note: The Flux in this table might be a little different from the total flux in Table 2 due to rounding.

Illuminance Plots



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

Chart 2: Beam Angle

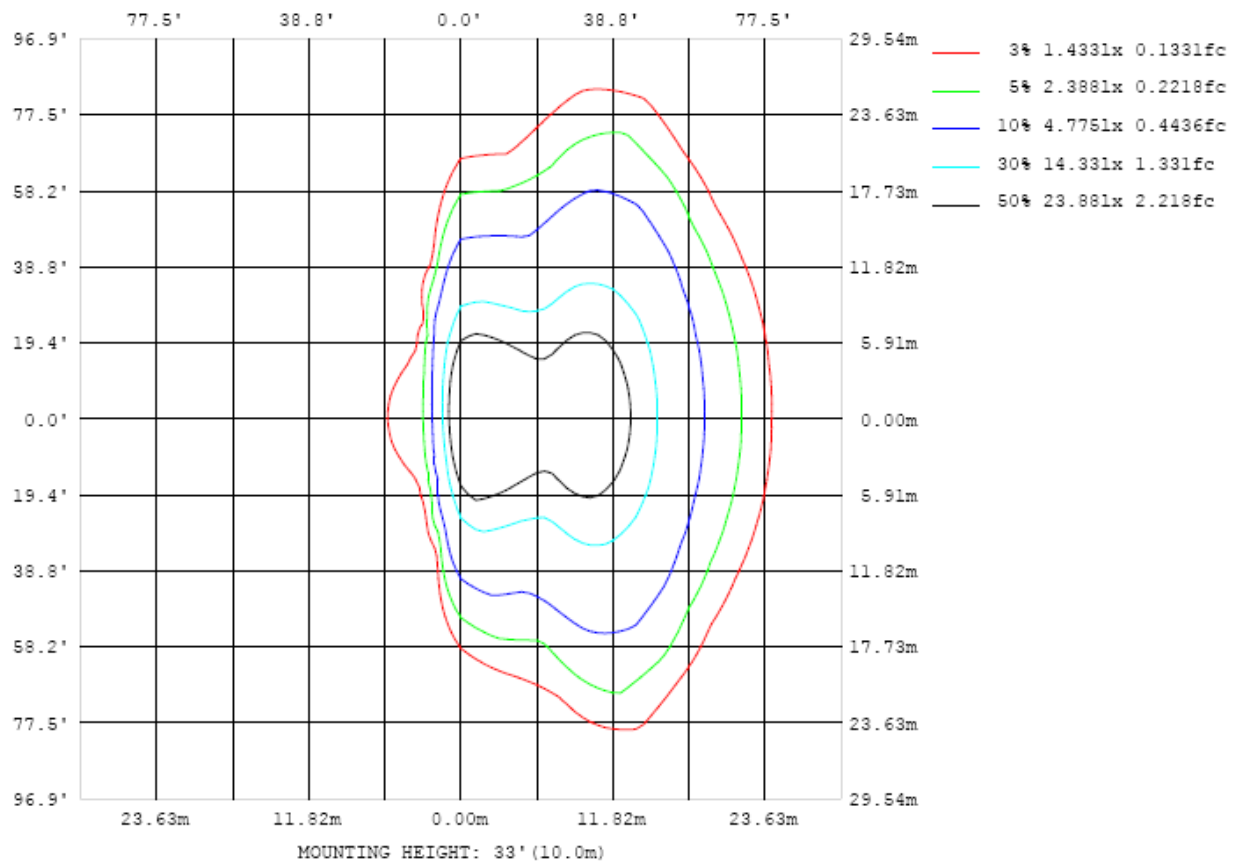


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

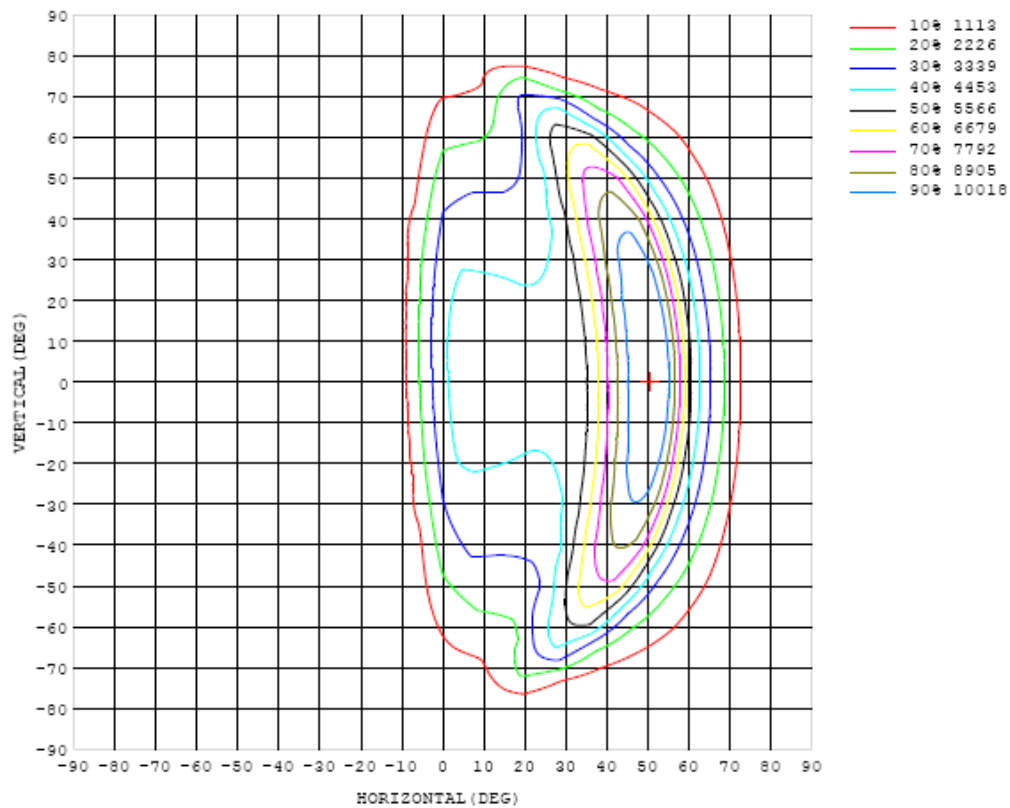


Chart 4: Isocandela Plot

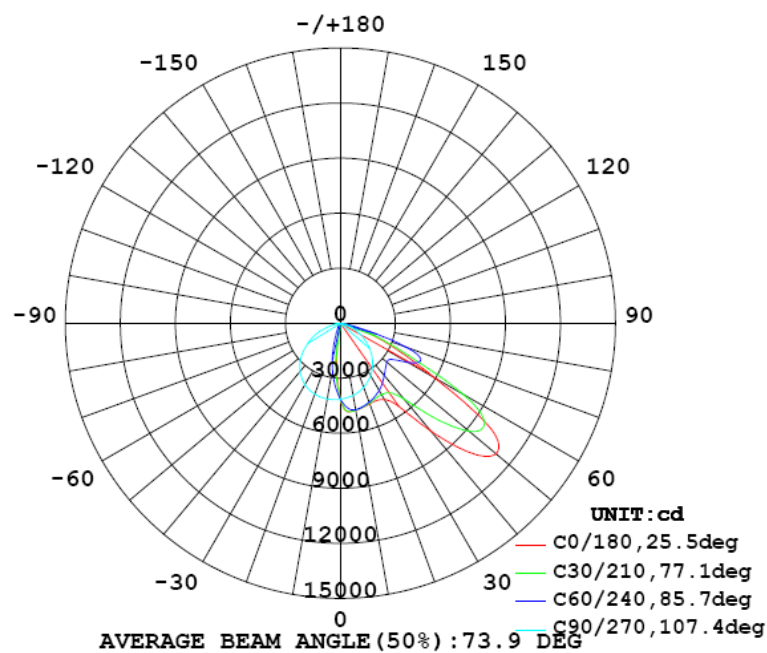


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: $\times 10\text{cd}$

C (DEG) Y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414
5	485	485	484	483	480	474	464	449	430	408	383	356	331	307	287	270	258	251	250
10	482	482	481	481	481	480	479	470	442	399	346	290	235	184	142	112	94.1	85.0	84.4
15	475	475	473	473	472	471	471	469	447	387	305	218	136	79.1	53.5	39.7	33.9	31.4	31.2
20	468	467	464	464	462	460	458	457	444	371	261	144	66.5	37.3	27.3	23.9	23.5	23.3	23.4
25	465	462	457	452	448	445	442	440	433	352	214	83.3	35.9	23.9	22.7	22.6	22.5	22.3	22.4
30	480	474	462	449	435	428	423	419	415	329	165	48.6	24.1	21.8	21.6	21.5	21.6	21.5	21.6
35	553	535	500	463	432	410	399	393	389	303	117	31.3	21.3	20.6	20.4	20.9	22.0	22.2	22.3
40	767	735	652	540	449	398	371	363	358	273	75.8	21.9	19.8	19.3	20.2	21.5	22.2	22.5	22.6
45	996	962	874	735	545	403	348	329	322	240	47.4	18.6	17.9	18.5	19.7	21.1	21.8	22.1	22.1
50	1107	1085	1028	915	719	476	331	290	281	203	29.3	16.7	16.2	17.5	18.7	20.0	20.8	20.9	21.0
55	1000	1005	1004	958	837	611	344	252	236	164	18.3	14.2	15.2	16.1	17.2	18.1	19.0	19.2	19.1
60	586	600	665	767	793	683	428	223	192	128	12.6	12.1	13.5	14.2	15.1	16.0	16.6	16.7	16.6
65	341	346	362	394	486	590	482	221	149	97.5	10.1	10.1	11.3	12.1	12.4	13.4	14.1	14.3	14.4
70	182	187	196	205	223	281	380	239	98.2	58.9	7.79	7.99	8.80	9.14	9.54	10.4	11.1	11.2	11.3
75	53.6	58.4	65.9	85.3	95.3	103	128	182	59.7	26.1	5.06	5.42	5.88	6.49	6.83	7.72	8.10	8.13	8.29
80	11.6	11.8	12.4	13.5	16.1	19.9	27.7	42.0	32.8	7.08	2.21	2.22	3.00	3.56	3.64	3.57	3.75	3.67	3.76
85	0.53	0.52	0.56	0.60	0.60	0.77	1.40	2.17	2.81	0.51	0.39	0.56	0.54	0.58	0.55	0.53	0.54	0.55	0.60
90	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.12
95	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.04	0.04	0.05	0.06	0.06	0.05	0.05	0.05	0.21
100	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.09	0.08	0.08	0.08	0.32
105	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.06	0.07	0.09	0.09	0.10	0.11	0.12	0.11	0.11	0.43
110	0.01	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.08	0.09	0.11	0.12	0.14	0.14	0.15	0.15	0.16	0.45
115	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.05	0.06	0.09	0.12	0.14	0.15	0.17	0.18	0.19	0.19	0.20	0.41
120	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.07	0.10	0.14	0.17	0.19	0.20	0.22	0.23	0.23	0.24	0.37
125	0.02	0.02	0.02	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.16	0.21	0.23	0.25	0.26	0.27	0.27	0.27	0.32
130	0.02	0.02	0.02	0.02	0.03	0.04	0.06	0.07	0.09	0.12	0.17	0.22	0.26	0.29	0.30	0.31	0.30	0.30	0.32
135	0.02	0.02	0.02	0.03	0.04	0.05	0.07	0.09	0.10	0.13	0.16	0.22	0.27	0.30	0.32	0.32	0.32	0.32	0.34
140	0.02	0.02	0.03	0.05	0.05	0.07	0.08	0.09	0.11	0.12	0.15	0.20	0.24	0.28	0.31	0.31	0.31	0.31	0.34
145	0.03	0.03	0.05	0.06	0.06	0.07	0.08	0.09	0.12	0.13	0.15	0.19	0.23	0.26	0.28	0.29	0.31	0.30	0.33
150	0.05	0.05	0.07	0.08	0.08	0.08	0.09	0.11	0.12	0.14	0.15	0.18	0.22	0.25	0.27	0.28	0.29	0.29	0.31
155	0.07	0.08	0.09	0.11	0.10	0.09	0.10	0.12	0.13	0.13	0.16	0.18	0.20	0.23	0.24	0.26	0.25	0.26	0.27
160	0.09	0.10	0.11	0.13	0.13	0.11	0.11	0.13	0.14	0.12	0.16	0.19	0.20	0.22	0.23	0.23	0.23	0.24	0.24
165	0.11	0.12	0.14	0.15	0.15	0.13	0.13	0.15	0.15	0.14	0.16	0.20	0.21	0.22	0.22	0.22	0.22	0.23	0.20
170	0.14	0.14	0.15	0.16	0.16	0.14	0.12	0.14	0.17	0.16	0.15	0.19	0.21	0.21	0.21	0.22	0.21	0.21	0.18
175	0.15	0.16	0.16	0.17	0.18	0.18	0.16	0.18	0.19	0.19	0.19	0.21	0.23	0.23	0.24	0.24	0.24	0.23	0.16
180	0.14	0.14	0.14	0.15	0.16	0.17	0.18	0.18	0.17	0.19	0.19	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.14

Table 4: Luminous Intensity Data

Table--2

UNIT: $\times 10\text{cd}$

γ (DEG) C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414	414		
5	253	262	276	294	316	341	367	393	418	439	457	471	479	483	485	485	485		
10	88.5	101	123	158	202	255	311	368	419	458	480	485	485	485	484	483	482		
15	32.4	35.7	43.6	60.4	96.1	164	251	339	417	467	479	480	479	478	478	477	476		
20	23.6	23.8	24.9	30.0	44.2	86.1	186	306	411	466	471	471	470	470	471	470	469		
25	22.5	22.8	23.0	23.3	26.8	45.7	123	270	401	456	458	459	459	460	461	464	466		
30	21.7	21.9	22.0	22.3	22.9	28.9	73.8	230	387	438	439	442	445	452	462	472	479		
35	22.3	21.9	21.1	21.1	21.7	22.6	44.4	187	368	414	416	422	434	454	482	516	544		
40	22.9	22.5	21.7	20.4	20.2	20.8	28.4	144	343	384	389	400	429	486	582	685	750		
45	22.3	22.3	21.4	20.3	18.7	18.7	20.6	102	313	349	356	382	452	614	791	912	980		
50	21.3	21.2	20.3	19.4	17.9	16.8	17.7	65.6	278	309	322	376	561	799	976	1064	1101		
55	19.5	19.5	18.8	17.8	16.6	15.5	15.1	38.2	237	263	288	427	706	913	1017	1037	1017		
60	17.1	17.2	16.5	15.6	14.8	14.1	12.7	21.4	196	217	271	529	765	860	812	689	612		
65	14.8	14.4	13.8	13.1	12.7	11.8	10.6	14.1	154	174	306	571	650	532	432	384	354		
70	11.7	11.6	11.2	10.3	9.98	9.42	8.60	12.5	104	134	346	445	321	254	229	209	190		
75	8.76	8.67	8.23	7.41	6.91	6.38	5.92	8.86	56.8	107	240	169	132	119	100	71.9	62.9		
80	4.17	4.32	4.74	4.53	4.29	3.30	2.85	4.50	20.6	68.4	53.6	41.3	29.4	23.0	19.9	15.0	12.8		
85	0.70	0.79	0.88	0.96	1.13	0.95	0.83	0.83	3.69	7.61	7.21	3.72	3.15	2.58	1.66	0.73	0.58		
90	0.13	0.14	0.16	0.18	0.19	0.17	0.14	0.10	0.06	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
95	0.21	0.22	0.25	0.26	0.25	0.22	0.17	0.11	0.07	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
100	0.33	0.34	0.36	0.36	0.32	0.26	0.20	0.14	0.09	0.05	0.03	0.02	0.02	0.02	0.02	0.02	0.02		
105	0.43	0.43	0.43	0.40	0.35	0.28	0.21	0.15	0.10	0.06	0.03	0.02	0.02	0.02	0.02	0.02	0.02		
110	0.44	0.44	0.42	0.39	0.33	0.26	0.20	0.14	0.10	0.06	0.04	0.02	0.02	0.02	0.02	0.02	0.02		
115	0.40	0.39	0.36	0.33	0.27	0.22	0.18	0.13	0.09	0.06	0.04	0.02	0.02	0.02	0.02	0.02	0.02		
120	0.36	0.33	0.30	0.26	0.22	0.19	0.15	0.11	0.08	0.06	0.04	0.03	0.02	0.02	0.02	0.02	0.02		
125	0.31	0.28	0.25	0.22	0.19	0.17	0.14	0.11	0.08	0.06	0.05	0.03	0.02	0.02	0.02	0.02	0.02		
130	0.31	0.29	0.27	0.24	0.21	0.18	0.15	0.12	0.10	0.07	0.05	0.04	0.03	0.02	0.02	0.02	0.02		
135	0.34	0.33	0.31	0.28	0.25	0.21	0.17	0.14	0.11	0.09	0.07	0.05	0.04	0.03	0.02	0.02	0.02		
140	0.35	0.34	0.33	0.31	0.28	0.23	0.19	0.16	0.13	0.10	0.08	0.07	0.05	0.04	0.03	0.02	0.02		
145	0.35	0.34	0.34	0.31	0.28	0.24	0.20	0.16	0.15	0.11	0.10	0.09	0.07	0.06	0.04	0.03	0.03		
150	0.32	0.33	0.33	0.31	0.28	0.24	0.22	0.18	0.15	0.14	0.13	0.11	0.10	0.09	0.07	0.05	0.05		
155	0.29	0.30	0.31	0.29	0.27	0.24	0.22	0.19	0.17	0.16	0.14	0.13	0.12	0.12	0.11	0.09	0.07		
160	0.25	0.26	0.27	0.27	0.26	0.24	0.23	0.20	0.17	0.18	0.16	0.15	0.14	0.16	0.15	0.13	0.11		
165	0.20	0.21	0.22	0.23	0.23	0.23	0.22	0.19	0.18	0.18	0.18	0.17	0.16	0.18	0.18	0.17	0.15		
170	0.18	0.19	0.20	0.21	0.22	0.22	0.23	0.20	0.20	0.20	0.21	0.20	0.18	0.21	0.21	0.21	0.20		
175	0.16	0.17	0.18	0.20	0.20	0.21	0.21	0.20	0.20	0.21	0.22	0.20	0.20	0.23	0.23	0.22	0.22		
180	0.14	0.14	0.15	0.16	0.17	0.18	0.18	0.19	0.18	0.20	0.19	0.19	0.20	0.22	0.22	0.22	0.21		

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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