



LM-79-08 Test Report

for

ABBlighting, Inc.

3 Adams St Belvidere, NJ 07823.

Flood Light

Model: ABBFL140501-N

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15070048f

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

Reviewed by:

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Aug. 05, 2015



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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-N

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
92.3	13431.0	145.51	0.9943
CCT (K)	CRI	Stabilization Time (Light & Power)	
4847	65.7	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jul. 25, 2015
Date of Test	: Jul. 28, 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-N
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 25.4°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	62
Voltage frequency (Hz)	60	60	60	R2	69
Test Current (A)	1.219	1.468	0.559	R3	76
Power Factor	0.9943	0.9963	0.9277	R4	67
Test Power (W)	145.51	146.19	143.60	R5	63
THD A%	6.88	6.45	13.84	R6	59
Luminous Efficacy (lm/W)	92.3	91.2	92.7	R7	77
Total Luminous Flux (lm)	13431.0	13329.0	13308.0	R8	53
Color Rendering Index (CRI)	65.7			R9	-46
R9	-46			R10	28
Correlated Color Temperature (CCT) (K)	4847			R11	63
Chromaticity (Chroma x, Chroma y)	(0.3527, 0.3827)			R12	35
Chromaticity (Chroma u, Chroma v)	(0.2049, 0.3334)			R13	62
Chromaticity (Chroma u', Chroma v')	(0.2049, 0.5001)			R14	86
Duv	0.0119				
Average Beam Angle (°)	76.9				
Center Beam Candle Power (cd)	10340				
NEMA Type	5H x 5V				
Zonal Lumens in the 0°-60°Zone	99.29%				
Zonal Lumens in the 60°-90°Zone	0.66%				
Zonal Lumens in the 90°-120°Zone	0.00%				
Zonal Lumens in the 120°-180°Zone	0.05%				

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

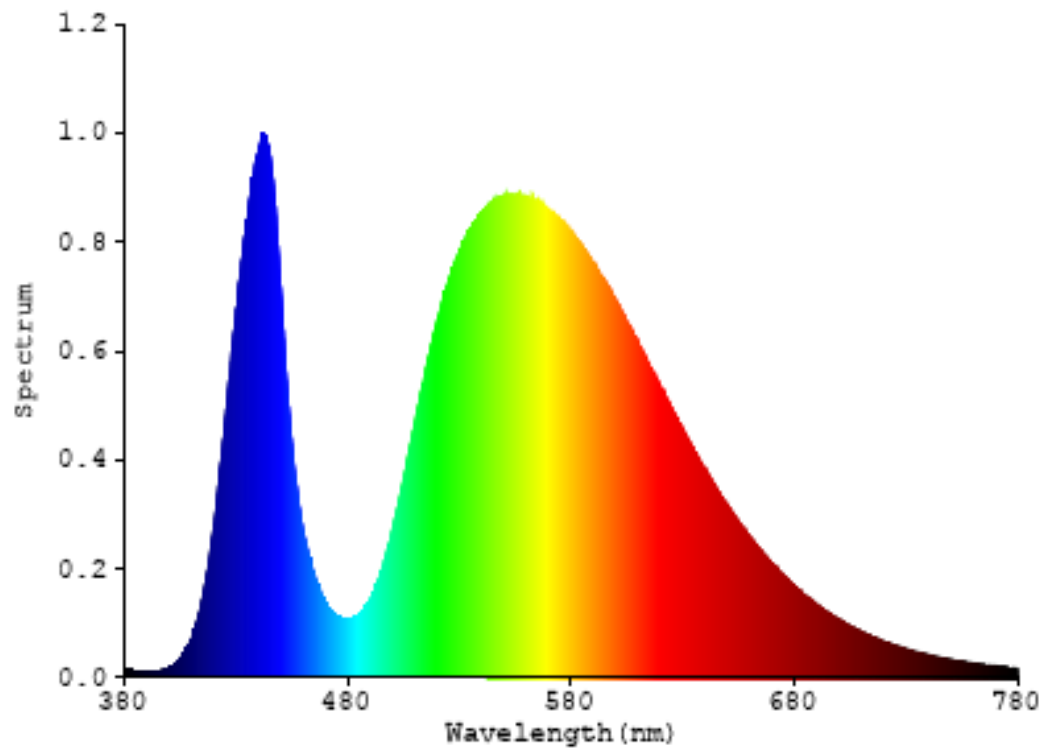


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

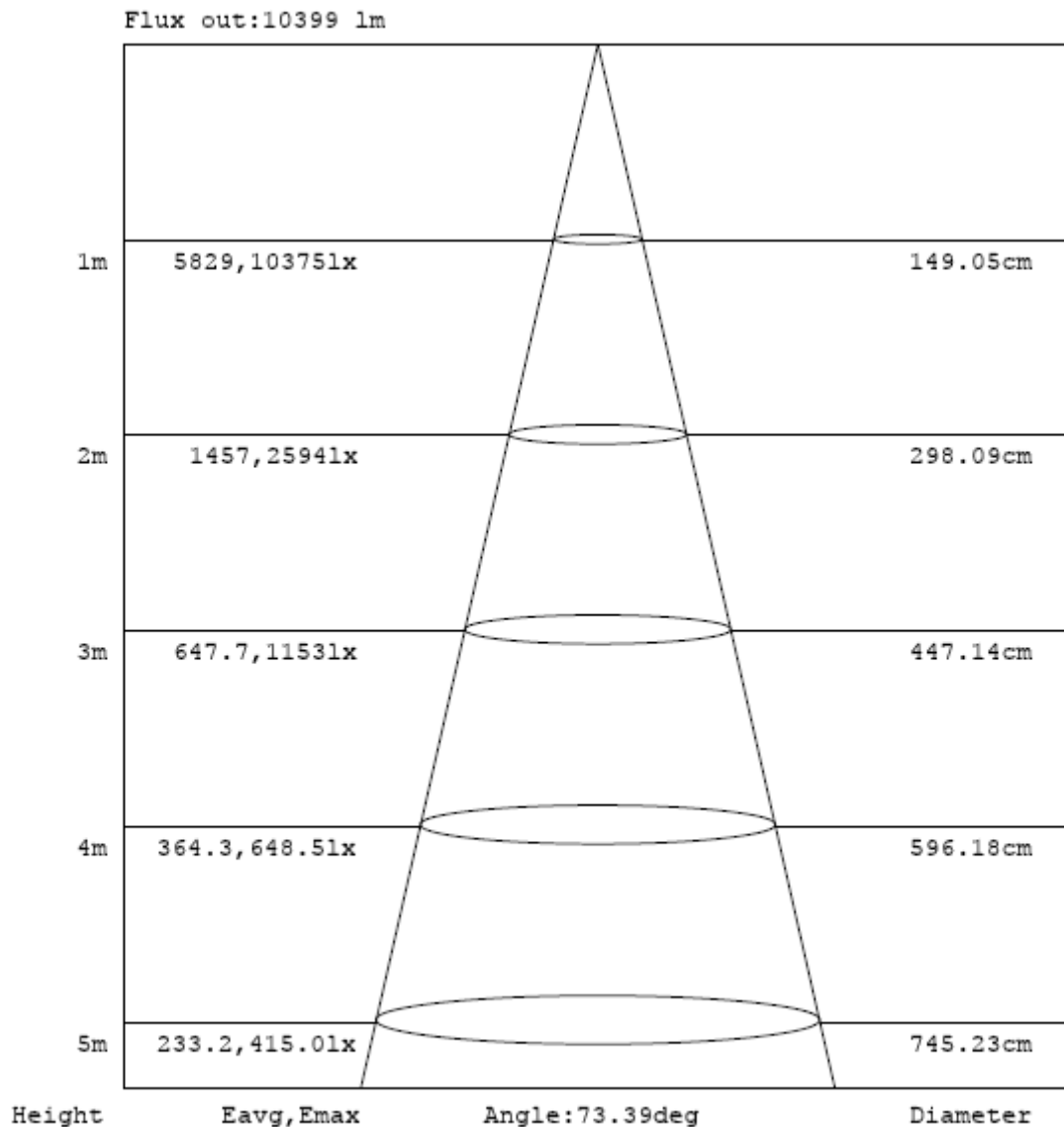
$\gamma(^{\circ})$	Lumens	% Total
0- 10	978.659	7.29%
10- 20	2701.721	20.12%
20- 30	3837.507	28.57%
30- 40	3957.044	29.46%
40- 50	1698.578	12.65%
50- 60	161.767	1.20%
60- 70	57.697	0.43%
70- 80	26.907	0.20%
80- 90	4.088	0.03%
90-100	0.095	0.00%
100-110	0.121	0.00%
110-120	0.29	0.00%
120-130	0.691	0.01%
130-140	1.173	0.01%
140-150	1.477	0.01%
150-160	1.491	0.01%
160-170	1.103	0.01%
170-180	0.429	0.00%
Total	13430.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	13335.276	99.29%
60- 90	88.692	0.66%
0-90	13423.968	99.95%
90- 180	6.87	0.05%
0- 180	13430.8	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

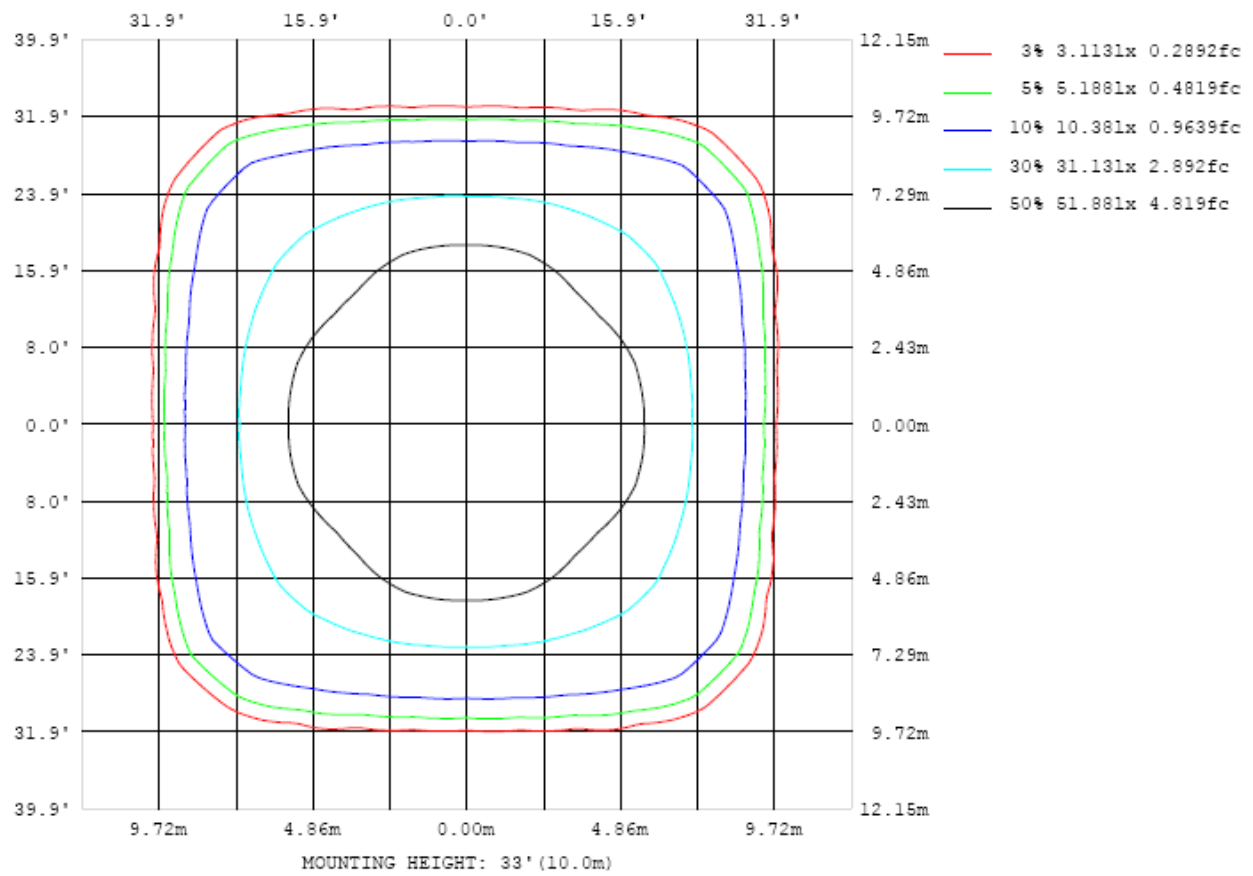


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

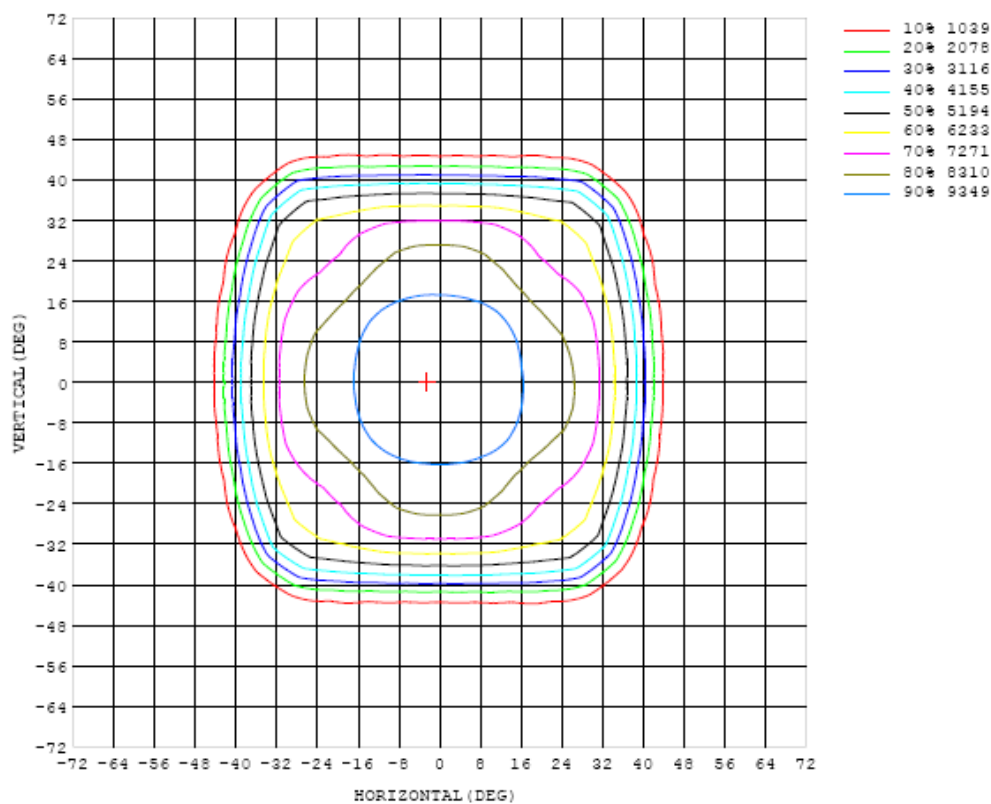


Chart 4: Isocandela Plot

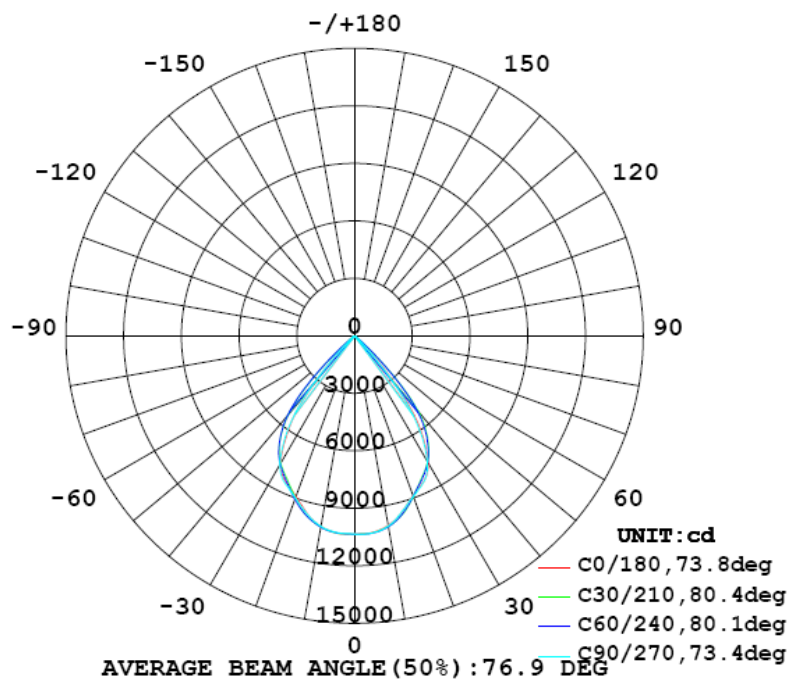


Chart 5: Polar Candela Distribution

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	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034
5	1031	1031	1032	1032	1033	1034	1034	1034	1033	1033	1034	1034	1035	1036	1035	1035	1034	1034	1033
10	1005	1005	1008	1010	1010	1011	1011	1010	1008	1008	1009	1011	1013	1014	1014	1014	1014	1012	1010
15	952	954	960	963	966	965	961	955	952	950	952	957	962	969	970	970	966	962	959
20	888	889	892	892	890	891	891	891	893	891	893	894	893	894	894	896	898	897	894
25	843	844	839	822	801	804	827	840	846	845	847	843	830	808	804	820	840	847	845
30	762	770	778	759	736	736	760	773	763	755	765	776	764	737	734	757	781	778	770
35	594	607	640	664	681	677	656	630	592	575	592	632	659	675	678	669	649	620	605
40	329	349	416	513	590	586	497	397	322	295	320	394	494	583	594	531	442	374	351
45	65.7	73.2	118	237	389	382	226	113	68.2	63.3	67.7	109	220	381	414	267	143	87.3	77.2
50	25.9	25.6	28.7	42.4	86.6	89.8	41.3	26.4	23.5	23.7	23.5	25.7	40.2	90.3	106	50.7	29.8	26.8	27.3
55	13.8	12.4	13.1	14.1	12.4	11.5	12.0	12.1	11.5	12.6	11.7	12.0	12.1	10.8	12.3	14.8	14.5	12.9	14.2
60	10.2	8.64	7.74	7.93	7.85	6.96	6.63	6.96	7.72	9.25	7.81	6.95	6.44	6.57	7.46	8.06	7.70	8.47	10.2
65	7.17	6.47	5.88	5.89	5.31	4.52	4.85	5.25	5.85	6.71	5.87	5.21	4.74	4.33	4.88	5.91	5.85	6.38	7.36
70	5.06	4.59	3.91	3.95	3.37	2.98	3.27	3.62	4.32	4.82	4.32	3.57	3.18	2.89	3.09	3.94	4.00	4.57	5.24
75	2.88	2.77	2.22	2.28	1.86	1.84	2.05	2.25	2.99	2.94	2.91	2.20	2.01	1.80	1.86	2.35	2.46	3.13	3.40
80	1.14	1.08	0.87	0.84	0.78	0.83	0.93	1.08	1.37	1.30	1.33	1.05	0.92	0.89	0.92	1.06	1.16	1.50	1.70
85	0.09	0.09	0.08	0.09	0.10	0.11	0.14	0.21	0.31	0.32	0.30	0.25	0.20	0.18	0.19	0.22	0.27	0.33	0.39
90	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
95	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
105	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
110	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02
115	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03
120	0.05	0.04	0.04	0.04	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	0.04
125	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.08	0.08	0.07	0.07	0.08	0.08	0.08	0.07
130	0.12	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.12	0.12	0.11	0.11	0.10	0.11	0.11	0.11	0.10
135	0.17	0.16	0.16	0.16	0.15	0.16	0.17	0.17	0.16	0.17	0.17	0.16	0.15	0.14	0.14	0.14	0.15	0.15	0.14
140	0.21	0.20	0.20	0.19	0.19	0.20	0.20	0.21	0.21	0.22	0.21	0.20	0.19	0.18	0.17	0.17	0.18	0.19	0.18
145	0.25	0.25	0.25	0.23	0.23	0.24	0.24	0.25	0.26	0.25	0.25	0.24	0.23	0.21	0.21	0.21	0.23	0.23	0.23
150	0.29	0.30	0.30	0.29	0.28	0.28	0.29	0.29	0.29	0.29	0.28	0.27	0.27	0.26	0.26	0.27	0.28	0.28	0.29
155	0.33	0.34	0.33	0.34	0.32	0.31	0.31	0.32	0.32	0.31	0.31	0.30	0.30	0.31	0.32	0.33	0.32	0.32	0.32
160	0.36	0.37	0.36	0.36	0.35	0.34	0.33	0.33	0.33	0.31	0.33	0.33	0.33	0.35	0.37	0.37	0.36	0.35	0.38
165	0.38	0.39	0.39	0.39	0.39	0.37	0.36	0.35	0.35	0.34	0.36	0.37	0.38	0.39	0.39	0.39	0.38	0.37	0.39
170	0.41	0.41	0.41	0.42	0.41	0.39	0.38	0.37	0.38	0.37	0.37	0.39	0.39	0.40	0.41	0.40	0.40	0.40	0.44
175	0.48	0.49	0.49	0.50	0.49	0.47	0.46	0.45	0.44	0.42	0.45	0.46	0.46	0.47	0.47	0.47	0.47	0.47	0.47
180	0.48	0.49	0.49	0.50	0.50	0.49	0.48	0.48	0.47	0.47	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.48

Table 4: Luminous Intensity Data

Table--2

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

C (DEG) y (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034	1034		
5	1032	1033	1033	1033	1033	1033	1032	1031	1030	1030	1030	1031	1031	1031	1031	1031	1030		
10	1010	1011	1013	1013	1013	1013	1012	1011	1009	1010	1011	1012	1012	1010	1010	1008	1006		
15	960	965	969	972	973	971	967	963	961	962	965	968	970	969	966	959	954		
20	894	897	900	905	906	908	905	903	900	902	903	904	902	898	893	892	889		
25	844	842	829	818	822	838	849	853	852	852	847	836	815	811	824	838	842		
30	775	784	769	745	744	774	792	784	777	783	789	770	741	742	765	779	771		
35	620	654	680	686	689	682	664	630	614	629	661	676	684	683	674	645	611		
40	376	447	538	606	609	543	458	390	364	387	451	534	602	601	530	432	357		
45	91.3	157	277	436	441	292	171	105	89.7	104	163	279	427	426	264	138	79.2		
50	27.6	31.8	52.8	137	149	59.2	32.1	27.6	27.3	27.3	31.2	56.0	135	129	46.8	29.7	26.7		
55	14.0	15.0	16.7	16.1	16.4	15.3	14.8	13.9	15.0	13.9	14.7	14.6	15.7	16.0	16.2	14.3	13.1		
60	8.87	7.97	8.39	8.71	7.71	7.09	7.43	8.39	9.90	8.33	7.41	6.92	7.14	8.14	8.65	7.98	8.85		
65	6.60	5.97	6.30	5.69	4.90	5.19	5.71	6.36	7.46	6.27	5.58	5.09	4.69	5.31	6.35	5.97	6.51		
70	4.83	4.11	4.24	3.67	3.25	3.57	4.03	4.71	5.26	4.63	3.87	3.50	3.12	3.37	4.16	4.05	4.59		
75	3.38	2.64	2.72	2.18	2.11	2.36	2.62	3.40	3.54	3.31	2.50	2.28	2.00	2.00	2.41	2.40	2.91		
80	1.70	1.33	1.26	1.12	1.12	1.19	1.38	1.88	1.81	1.80	1.31	1.12	1.00	0.91	0.95	0.97	1.15		
85	0.40	0.37	0.31	0.30	0.31	0.33	0.43	0.54	0.52	0.51	0.39	0.26	0.20	0.16	0.14	0.14	0.13		
90	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
95	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
100	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
105	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01		
110	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		
115	0.03	0.03	0.03	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.03	0.03	0.03		
120	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.06	0.05	0.05	0.05	0.05		
125	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.07		
130	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10		
135	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15		
140	0.18	0.18	0.18	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.19	0.18	0.18	0.18		
145	0.23	0.22	0.22	0.23	0.23	0.24	0.25	0.26	0.26	0.25	0.24	0.24	0.24	0.23	0.22	0.22	0.23		
150	0.29	0.28	0.27	0.28	0.28	0.29	0.30	0.30	0.29	0.30	0.30	0.29	0.29	0.27	0.28	0.28	0.29		
155	0.33	0.33	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.33	0.34	0.32	0.32	0.34	0.33	0.33		
160	0.38	0.38	0.39	0.39	0.38	0.37	0.37	0.38	0.37	0.38	0.37	0.38	0.37	0.38	0.38	0.38	0.38		
165	0.40	0.41	0.41	0.42	0.43	0.42	0.41	0.40	0.40	0.40	0.41	0.42	0.41	0.42	0.41	0.41	0.40		
170	0.44	0.45	0.46	0.46	0.47	0.47	0.46	0.44	0.44	0.44	0.45	0.45	0.44	0.45	0.46	0.45	0.44		
175	0.47	0.48	0.48	0.49	0.49	0.49	0.48	0.47	0.46	0.46	0.49	0.48	0.47	0.48	0.49	0.48	0.48		
180	0.48	0.49	0.49	0.50	0.49	0.49	0.48	0.48	0.47	0.47	0.46	0.47	0.47	0.48	0.48	0.48	0.48		

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.

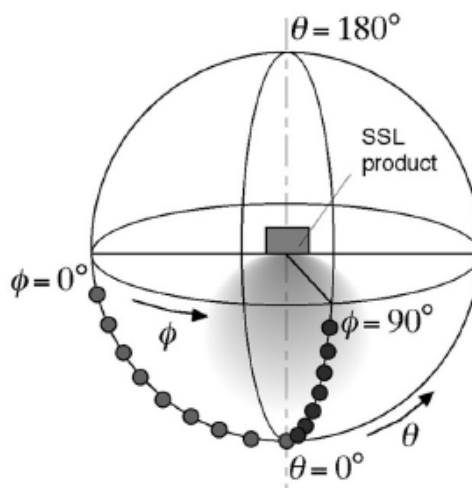
Color Characteristics Measurements

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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