



## LM-79-08 Test Report

for

**ABBlighting, Inc.**

3 Adams St Belvidere, NJ 07823.

**Flood Light**

**Model: ABBFL140501**

**Laboratory: Leading Testing Laboratories**

**NVLAP CODE: 200960-0**

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Report No.: HZ15070048i

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

Reviewed by:

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Engineer: April Zou  
Aug. 05, 2015



*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**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
95.9	14029.0	146.30	0.9863
CCT (K)	CRI	Stabilization Time (Light & Power)	
4867	66.4	60	

Table 1: Executive Data Summary

### Test specifications:

<b>Date of Receipt</b>	: Jul. 25, 2015
<b>Date of Test</b>	: Jul. 29, 2015
<b>Test item</b>	: Total Luminous Flux, Luminous Distribution Intensity, Luminous Efficacy, Correlated Color Temperature, Color Rendering Index, Chromaticity Coordinate, Electrical parameters
<b>Reference Standard</b>	: 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)

<b>Name</b>	: Flood Light
<b>Model</b>	: ABBFL140501
<b>Electrical Ratings</b>	: 100~277VAC, 50/60Hz, 140W
<b>Product Description</b>	: 5000K, Architectural Flood and Spot Luminaires Manufacturer of light source: Philips Model of light source: LUXEON Rebel ES Quantity of LED light source: 54 pcs
<b>Manufacturer</b>	: ABB Lighting (shanghai) Co., Ltd.
<b>Address</b>	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

## TEST RESULTS

Test ambient temperature was 25.3°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	64
Voltage frequency (Hz)	60	60	60	R2	70
Test Current (A)	1.236	1.483	0.574	R3	75
Power Factor	0.9863	0.9938	0.9102	R4	68
Test Power (W)	146.30	147.40	144.81	R5	65
THD A%	6.77	5.79	11.53	R6	60
Luminous Efficacy (lm/W)	95.9	94.9	96.5	R7	76
Total Luminous Flux (lm)	14029.0	13995.0	13976.0	R8	54
Color Rendering Index (CRI)	66.4			R9	-41
R9	-41			R10	29
Correlated Color Temperature (CCT) (K)	4867			R11	66
Chromaticity (Chroma x, Chroma y)	(0.3519, 0.3807)			R12	39
Chromaticity (Chroma u, Chroma v)	(0.2050, 0.3327)			R13	63
Chromaticity (Chroma u', Chroma v')	(0.2050, 0.4991)			R14	85
Duv	0.0114				
Average Beam Angle (°)	111.1				
Center Beam Candle Power (cd)	5173				
NEMA Type	7H x 7V				
Zonal Lumens in the 0°-60°Zone	84.37%				
Zonal Lumens in the 60°-90°Zone	15.57%				
Zonal Lumens in the 90°-120°Zone	0.02%				
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

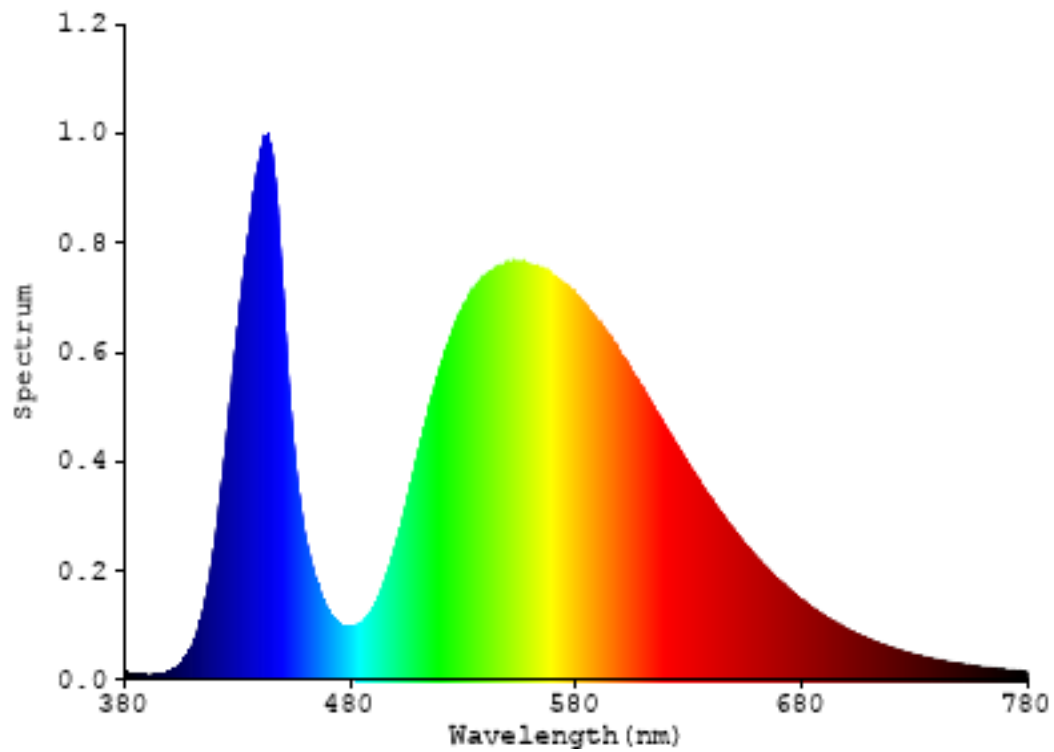


Chart 1: Spectral Power Distribution

## Zonal Lumen Tabulation

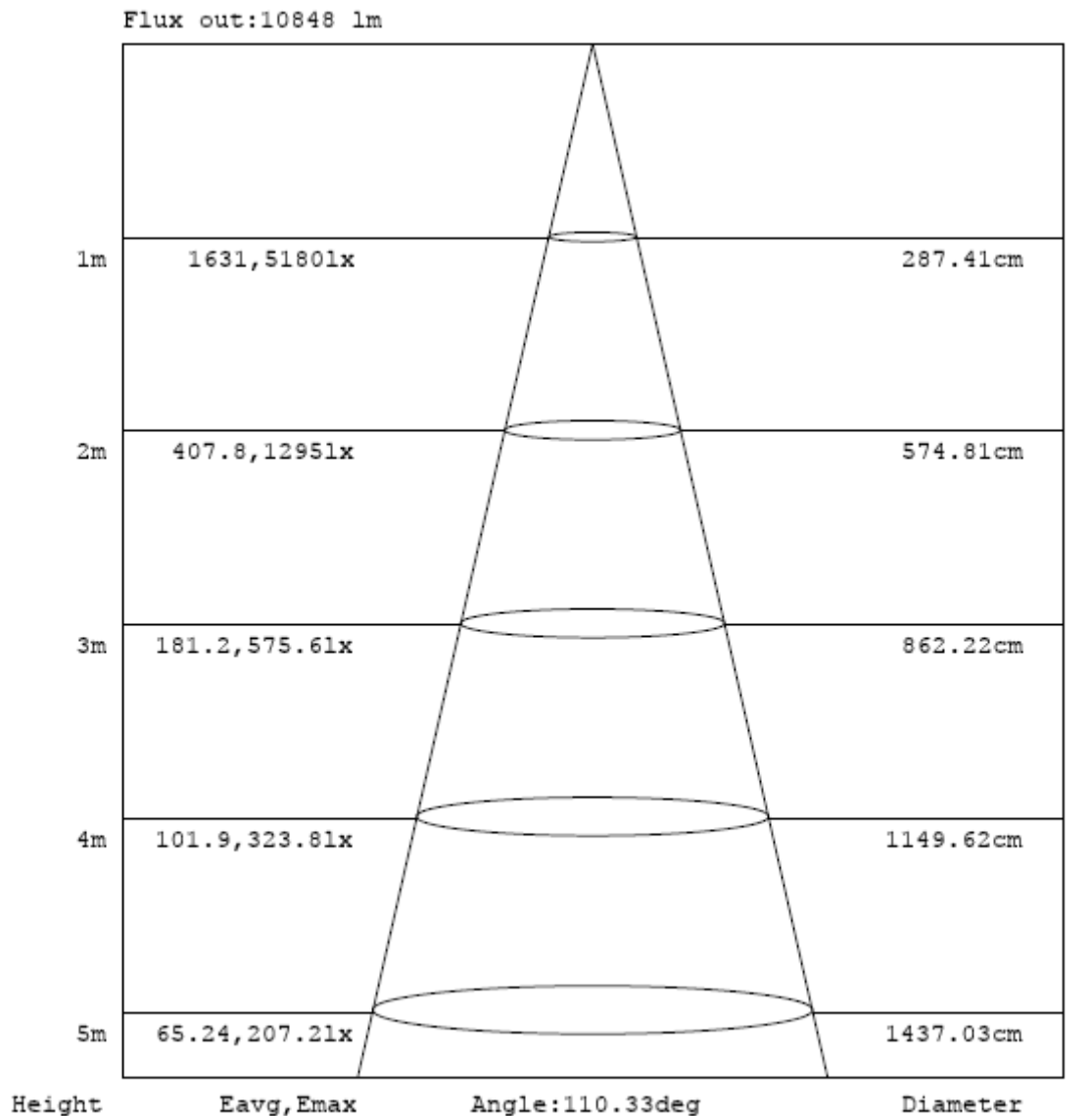
$\gamma(^{\circ})$	Lumens	% Total
0- 10	491.153	3.50%
10- 20	1418.241	10.11%
20- 30	2177.161	15.52%
30- 40	2651.55	18.90%
40- 50	2735.655	19.50%
50- 60	2361.577	16.83%
60- 70	1564.923	11.16%
70- 80	576.336	4.11%
80- 90	43.206	0.31%
90-100	0.699	0.00%
100-110	1.04	0.01%
110-120	1.146	0.01%
120-130	1.162	0.01%
130-140	1.299	0.01%
140-150	1.285	0.01%
150-160	1.092	0.01%
160-170	0.738	0.01%
170-180	0.278	0.00%
Total	14028.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	11835.337	84.37%
60- 90	2184.465	15.57%
0-90	14019.802	99.94%
90- 180	8.739	0.06%
0- 180	14028.5	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



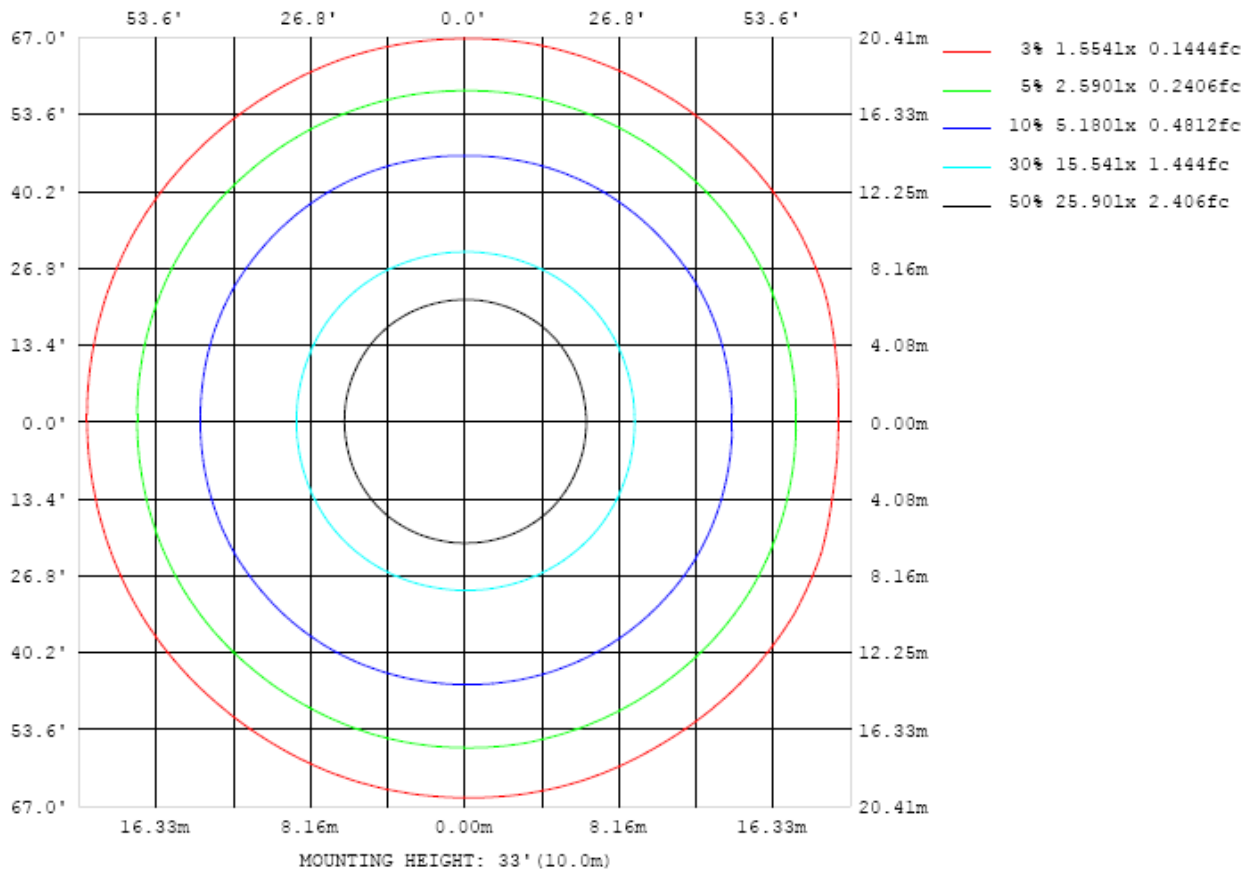


Chart 3: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots

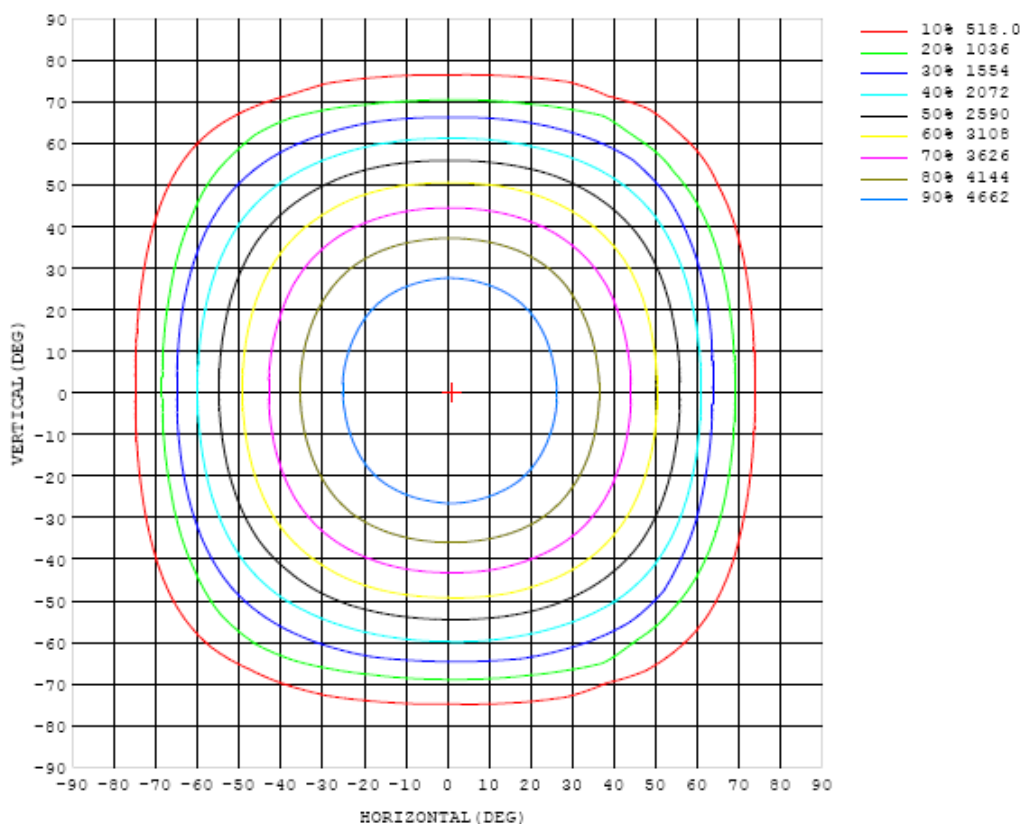


Chart 4: Isocandela Plot

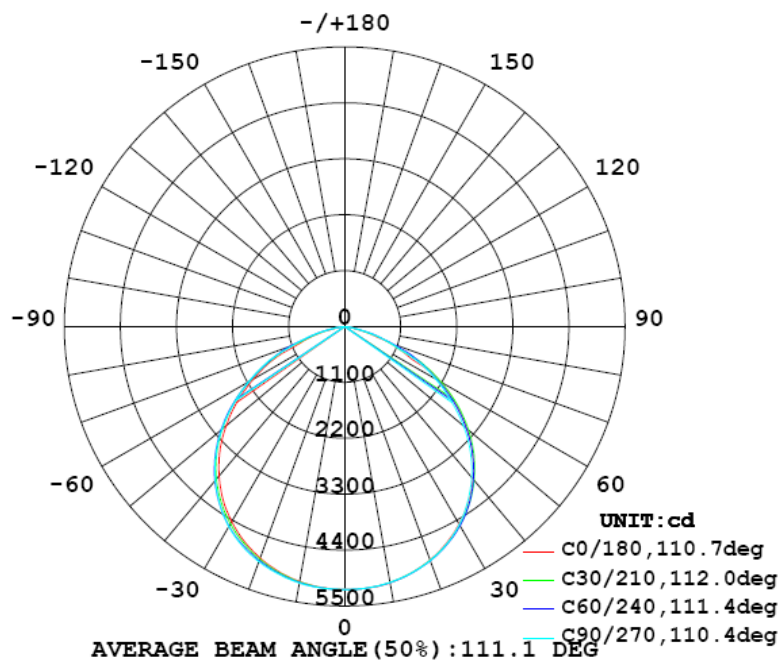


Chart 5: Polar Candela Distribution

## Luminous Intensity Data

Table--1

UNIT: 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	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173
5	5166	5164	5165	5164	5164	5164	5164	5163	5162	5161	5160	5158	5157	5156	5155	5154	5155	5155	5154
10	5119	5117	5116	5114	5114	5115	5116	5116	5115	5113	5109	5106	5101	5099	5096	5097	5095	5095	5095
15	5023	5021	5022	5023	5024	5028	5029	5028	5027	5025	5022	5016	5011	5008	5004	5000	4995	4994	4993
20	4890	4889	4890	4895	4899	4902	4904	4904	4904	4900	4896	4894	4887	4882	4874	4861	4853	4851	4850
25	4711	4711	4719	4728	4734	4738	4736	4735	4732	4727	4722	4722	4719	4714	4704	4690	4677	4668	4665
30	4488	4489	4501	4514	4525	4529	4525	4519	4507	4498	4496	4500	4501	4500	4486	4471	4453	4438	4434
35	4223	4223	4242	4255	4265	4268	4258	4242	4220	4208	4210	4217	4225	4233	4221	4206	4184	4171	4163
40	3912	3914	3932	3947	3957	3943	3927	3908	3888	3874	3874	3885	3895	3901	3902	3888	3866	3849	3838
45	3551	3553	3572	3590	3592	3570	3547	3533	3508	3487	3491	3501	3509	3515	3522	3521	3498	3473	3464
50	3133	3145	3160	3172	3159	3138	3112	3102	3069	3043	3043	3060	3069	3073	3079	3088	3066	3050	3034
55	2669	2674	2696	2702	2673	2647	2627	2598	2570	2546	2540	2557	2573	2579	2582	2605	2594	2579	2574
60	2159	2159	2173	2176	2150	2117	2094	2084	2077	2056	2055	2049	2042	2048	2069	2083	2083	2075	2074
65	1377	1372	1393	1626	1618	1598	1583	1590	1537	1498	1506	1551	1539	1536	1542	1560	1564	1561	1561
70	953	948	942	937	925	1086	999	961	954	944	948	941	953	1009	1037	987	896	901	915
75	442	434	432	427	482	465	541	537	527	507	516	518	524	495	454	497	502	504	523
80	119	119	127	116	113	140	150	175	164	148	149	163	147	152	140	143	149	142	154
85	1.84	1.76	3.78	3.15	5.98	6.93	9.83	11.2	15.4	14.9	14.7	16.5	12.8	15.7	14.2	10.0	7.22	6.78	13.7
90	0.21	0.21	0.21	0.21	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.22	0.73
95	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.29	0.29	0.28	0.27	0.95
100	0.36	0.37	0.37	0.37	0.38	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.39	0.38	0.37	1.26
105	0.48	0.47	0.47	0.47	0.48	0.49	0.49	0.50	0.50	0.50	0.50	0.51	0.51	0.51	0.50	0.49	0.48	0.47	1.50
110	0.63	0.64	0.63	0.61	0.62	0.63	0.65	0.65	0.64	0.64	0.64	0.66	0.65	0.66	0.64	0.66	0.63	0.63	1.50
115	0.83	0.81	0.82	0.80	0.79	0.81	0.81	0.84	0.82	0.81	0.84	0.85	0.83	0.83	0.85	0.86	0.83	0.85	1.54
120	1.08	1.06	1.01	1.01	0.98	1.03	1.04	1.01	1.03	1.01	1.04	1.04	1.02	1.03	1.06	1.13	1.07	1.09	1.48
125	1.32	1.31	1.25	1.24	1.21	1.28	1.30	1.22	1.25	1.23	1.25	1.26	1.25	1.27	1.29	1.33	1.31	1.31	1.40
130	1.53	1.53	1.50	1.47	1.41	1.45	1.52	1.50	1.48	1.48	1.49	1.50	1.49	1.49	1.49	1.56	1.54	1.54	1.54
135	1.77	1.78	1.75	1.70	1.63	1.66	1.70	1.73	1.66	1.73	1.70	1.70	1.68	1.68	1.70	1.73	1.75	1.76	1.77
140	1.94	1.93	1.92	1.88	1.80	1.85	1.81	1.80	1.80	1.84	1.81	1.80	1.77	1.81	1.83	1.85	1.88	1.91	1.95
145	2.13	2.13	2.15	2.04	1.98	1.97	1.98	1.93	1.99	1.99	1.95	1.96	1.97	1.98	2.00	2.01	2.07	2.05	2.13
150	2.32	2.35	2.36	2.31	2.20	2.11	2.10	2.11	2.11	2.15	2.12	2.12	2.12	2.19	2.21	2.24	2.28	2.26	2.32
155	2.46	2.50	2.46	2.48	2.30	2.17	2.14	2.15	2.18	2.17	2.20	2.22	2.25	2.33	2.42	2.46	2.38	2.39	2.45
160	2.57	2.60	2.55	2.53	2.43	2.24	2.15	2.17	2.22	2.09	2.26	2.31	2.37	2.49	2.57	2.56	2.52	2.54	2.65
165	2.67	2.71	2.70	2.67	2.60	2.41	2.33	2.36	2.33	2.28	2.40	2.52	2.58	2.66	2.67	2.66	2.67	2.64	2.69
170	2.80	2.80	2.80	2.79	2.74	2.53	2.40	2.40	2.54	2.47	2.37	2.56	2.64	2.72	2.75	2.75	2.76	2.76	2.91
175	3.17	3.20	3.21	3.20	3.16	3.02	2.89	2.88	2.85	2.75	2.85	2.92	3.01	3.05	3.11	3.14	3.15	3.16	3.10
180	3.09	3.13	3.12	3.14	3.12	3.07	3.01	2.97	2.94	2.95	2.90	2.88	2.93	3.03	3.02	2.98	3.06	3.04	3.08

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	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173	5173		
5	5155	5158	5158	5159	5161	5161	5162	5162	5164	5165	5165	5166	5166	5166	5167	5168	5165		
10	5097	5101	5103	5107	5111	5115	5118	5120	5124	5127	5129	5128	5126	5124	5124	5122	5120		
15	4994	5002	5008	5016	5021	5026	5032	5037	5041	5044	5045	5043	5041	5037	5034	5029	5024		
20	4854	4864	4874	4885	4895	4903	4907	4914	4924	4927	4926	4924	4919	4913	4906	4898	4891		
25	4671	4684	4698	4713	4730	4743	4749	4755	4761	4765	4766	4763	4757	4749	4740	4725	4713		
30	4448	4466	4485	4508	4526	4539	4545	4543	4548	4554	4557	4561	4559	4551	4534	4510	4493		
35	4174	4200	4225	4251	4271	4277	4277	4273	4273	4284	4294	4305	4307	4298	4276	4253	4232		
40	3855	3882	3920	3942	3959	3965	3957	3950	3950	3958	3976	3990	3997	3990	3974	3949	3927		
45	3481	3514	3556	3579	3593	3594	3589	3582	3577	3588	3607	3621	3628	3632	3625	3596	3568		
50	3065	3103	3137	3151	3150	3169	3164	3155	3147	3164	3183	3197	3207	3212	3218	3190	3148		
55	2598	2640	2672	2670	2676	2690	2691	2676	2662	2680	2706	2730	2732	2735	2751	2725	2688		
60	2099	2132	2158	2156	2158	2167	2177	2185	2183	2197	2201	2206	2220	2232	2239	2214	2184		
65	1594	1615	1631	1638	1646	1660	1685	1695	1697	1709	1703	1695	1694	1705	1693	1539	1442		
70	927	943	1071	1132	1155	1157	1099	1068	1072	1082	1104	1159	1193	1070	996	985	975		
75	536	548	559	563	589	621	630	646	642	644	654	654	548	591	479	466	457		
80	161	173	185	206	222	212	238	243	240	247	248	217	203	168	161	150	131		
85	15.5	23.1	28.8	31.7	30.5	35.7	37.0	30.5	31.7	33.5	38.6	25.7	23.2	13.8	3.81	3.08	2.57		
90	0.85	0.92	1.04	1.06	1.05	1.00	0.96	0.89	0.77	0.71	0.71	0.71	0.71	0.71	0.70	0.70	0.70		
95	0.95	0.96	0.98	0.99	1.00	1.00	0.99	0.99	0.98	0.98	0.98	0.98	0.99	0.99	0.99	0.98	0.98		
100	1.26	1.27	1.28	1.30	1.30	1.29	1.28	1.27	1.27	1.26	1.27	1.27	1.28	1.28	1.29	1.28	1.27		
105	1.49	1.50	1.50	1.52	1.54	1.54	1.52	1.51	1.50	1.50	1.51	1.51	1.51	1.52	1.52	1.50	1.51		
110	1.50	1.64	1.53	1.54	1.56	1.56	1.56	1.54	1.54	1.54	1.54	1.53	1.54	1.54	1.51	1.49	1.50		
115	1.42	1.44	1.40	1.43	1.45	1.47	1.46	1.45	1.44	1.44	1.45	1.44	1.44	1.43	1.41	1.40	1.41		
120	1.41	1.46	1.32	1.30	1.29	1.30	1.30	1.29	1.30	1.30	1.31	1.29	1.30	1.31	1.32	1.36	1.40		
125	1.39	1.34	1.30	1.29	1.25	1.26	1.27	1.25	1.25	1.22	1.25	1.23	1.25	1.28	1.30	1.35	1.41		
130	1.54	1.50	1.49	1.42	1.38	1.38	1.38	1.38	1.39	1.36	1.39	1.35	1.39	1.36	1.45	1.48	1.53		
135	1.77	1.77	1.77	1.72	1.68	1.64	1.63	1.67	1.65	1.62	1.61	1.59	1.60	1.69	1.69	1.72	1.76		
140	1.99	1.97	1.97	1.96	1.94	1.90	1.87	1.87	1.84	1.79	1.73	1.81	1.81	1.87	1.87	1.89	1.91		
145	2.16	2.14	2.15	2.13	2.14	2.11	2.09	2.09	2.11	1.97	2.01	2.01	2.08	2.06	2.05	2.08	2.09		
150	2.32	2.33	2.31	2.31	2.30	2.25	2.26	2.23	2.17	2.14	2.24	2.20	2.28	2.26	2.32	2.34	2.33		
155	2.46	2.48	2.52	2.48	2.41	2.35	2.34	2.33	2.30	2.34	2.30	2.36	2.37	2.44	2.57	2.52	2.48		
160	2.65	2.63	2.67	2.66	2.60	2.51	2.48	2.48	2.34	2.47	2.41	2.47	2.48	2.66	2.72	2.71	2.71		
165	2.68	2.70	2.72	2.77	2.79	2.73	2.66	2.56	2.50	2.51	2.52	2.56	2.60	2.71	2.78	2.79	2.77		
170	2.91	2.94	2.97	2.99	3.01	2.99	2.92	2.78	2.79	2.81	2.80	2.78	2.73	2.88	2.98	2.99	2.94		
175	3.11	3.15	3.14	3.17	3.11	3.11	3.02	2.96	2.91	2.94	3.04	2.93	2.95	3.10	3.19	3.16	3.17		
180	3.08	3.12	3.11	3.12	3.11	3.06	3.01	2.96	2.92	2.96	2.87	2.88	2.96	3.05	3.07	3.05	3.08		

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  $10^\circ$  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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