



LM-79-08 Test Report

for

ABBlighting, Inc.

3 Adams St Belvidere, NJ 07823.

Flood Light

Model: ABBFL70501-III

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

No.1805, DongLiu road, BinJiang District, Hangzhou, China

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ15070048a/R1

This report is replaced the old report No. HZ15070048a dated Jul. 29, 2015

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

Reviewed by:

Engineer: April Zou
Aug. 21, 2015



Manager: Jim Zhang
Aug. 21, 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: **ABBFL70501-III**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
91.2	5606.1	61.44	0.9943
CCT (K)	CRI	Stabilization Time (Light & Power)	
4938	68.4	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jul. 25, 2015
Date of Test	: Jul. 25, 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

TABLE OF CONTENT

LM-79-08 Test Report.....	1
Test Summary.....	2
Sample Photo.....	4
TEST RESULTS	5
Spectral Power Distribution	6
Zonal Lumen Tabulation	7
Illuminance Plots.....	8
Luminous Intensity Distribution Plots.....	10
Luminous Intensity Data	11
EQUIPMENT LIST	13
TEST METHODS	13
Seasoning of SSL Product.....	13
Goniophotometer Method	13
Photometric and Electrical Measurements	13
Color Characteristics Measurements.....	14
Color Spatial Uniformity	14

Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: Flood light
Model	: ABBFL70501-III
Electrical Ratings	: 100~277VAC, 50/60Hz, 62W
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: 27pcs
Manufacturer	: ABB Lighting (shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 25.2°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)	0.515	0.622	0.237	R3	77
Power Factor	0.9943	0.9967	0.9189	R4	70
Test Power (W)	61.44	61.99	60.37	R5	67
THD A%	5.79	5.33	11.87	R6	63
Luminous Efficacy (lm/W)	91.2	90.3	92.7	R7	78
Total Luminous Flux (lm)	5606.1	5595.1	5593.4	R8	56
Color Rendering Index (CRI)	68.4			R9	-37
R9	-37			R10	33
Correlated Color Temperature (CCT) (K)	4938			R11	67
Chromaticity (Chroma x, Chroma y)	(0.3495, 0.3793)			R12	41
Chromaticity (Chroma u, Chroma v)	(0.2040, 0.3321)			R13	65
Chromaticity (Chroma u', Chroma v')	(0.2040, 0.4981)			R14	87
Duv	0.0116				
Average Beam Angle (°)	61.9				
Center Beam Candle Power (cd)	1734				
NEMA Type	7H x 5V				
Zonal Lumens in the 0°-60°Zone	80.44%				
Zonal Lumens in the 60°-90°Zone	19.49%				
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

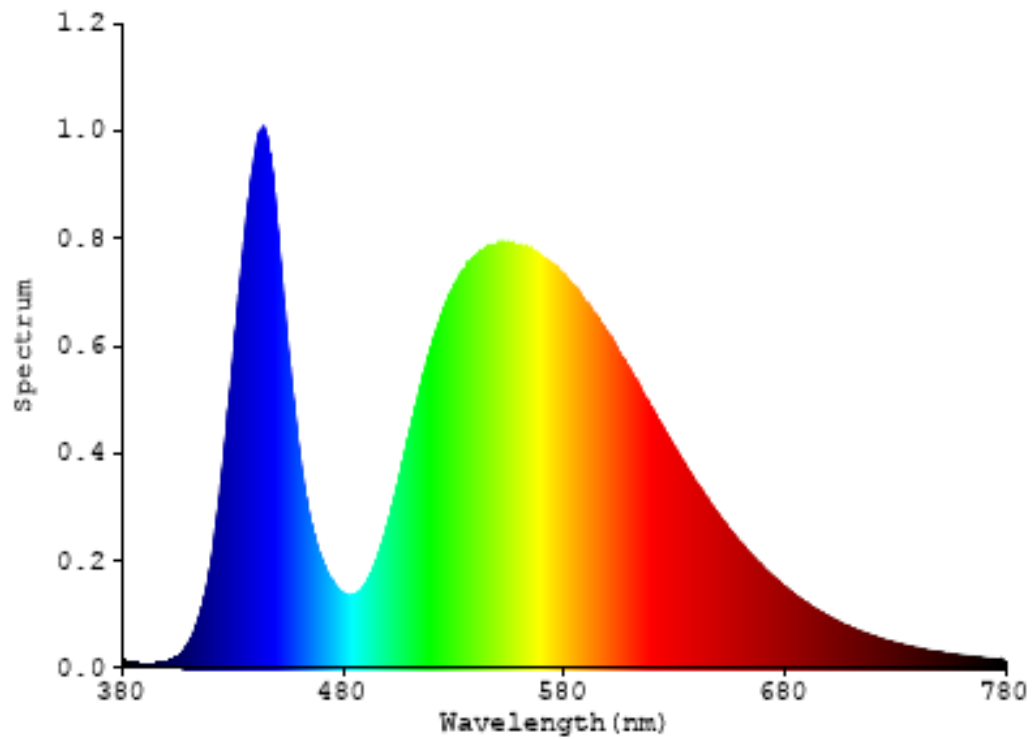


Chart 1: Spectral Power Distribution

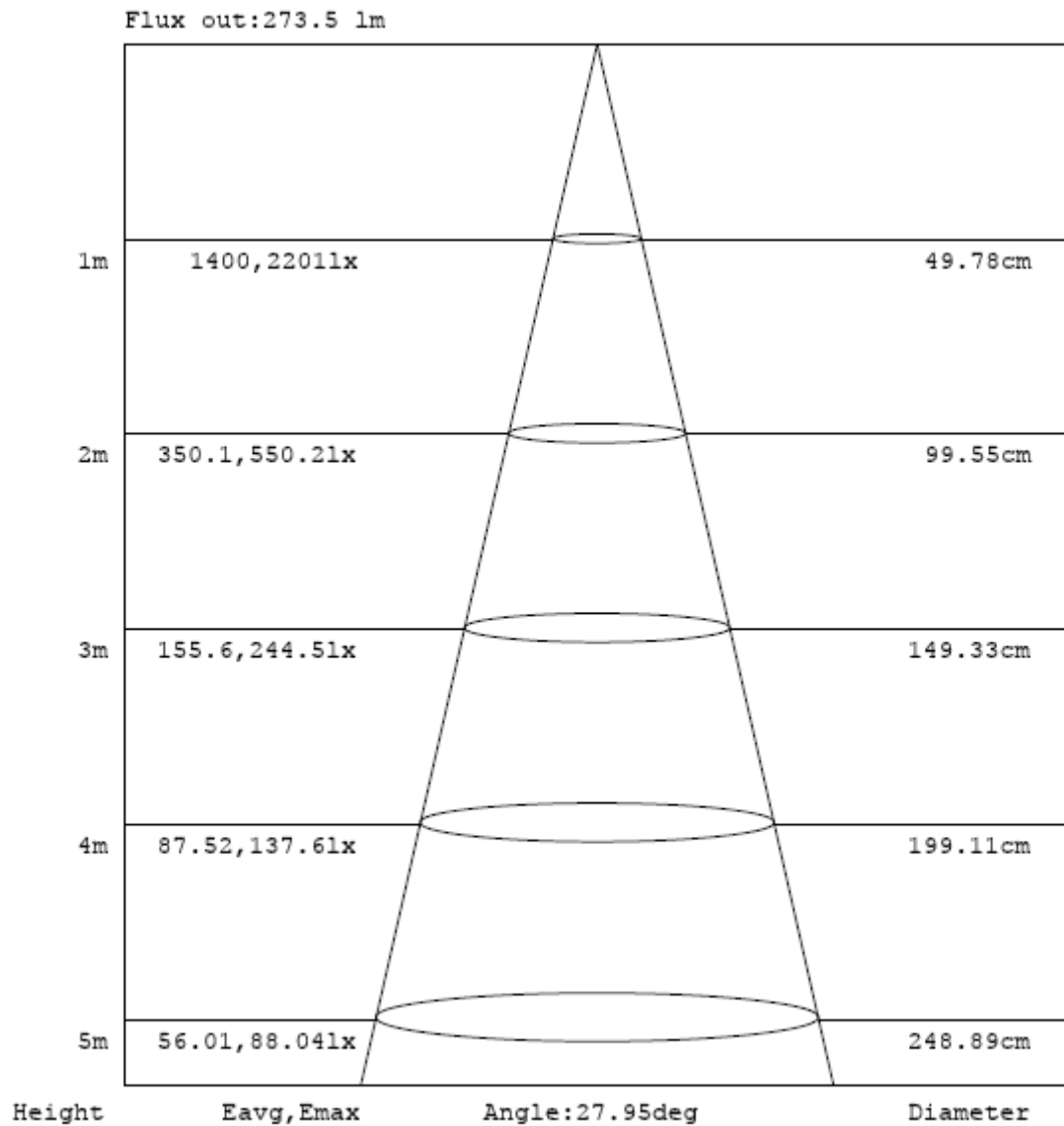
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	149.162	2.66%
10- 20	368.963	6.58%
20- 30	556.447	9.93%
30- 40	825.06	14.72%
40- 50	1260.007	22.48%
50- 60	1349.834	24.08%
60- 70	813.644	14.51%
70- 80	263.456	4.70%
80- 90	15.794	0.28%
90-100	0.353	0.01%
100-110	0.554	0.01%
110-120	0.571	0.01%
120-130	0.515	0.01%
130-140	0.524	0.01%
140-150	0.479	0.01%
150-160	0.376	0.01%
160-170	0.234	0.00%
170-180	0.081	0.00%
Total	5606.1	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4509.473	80.44%
60- 90	1092.894	19.49%
0-90	5602.367	99.93%
90- 180	3.687	0.07%
0- 180	5606.1	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

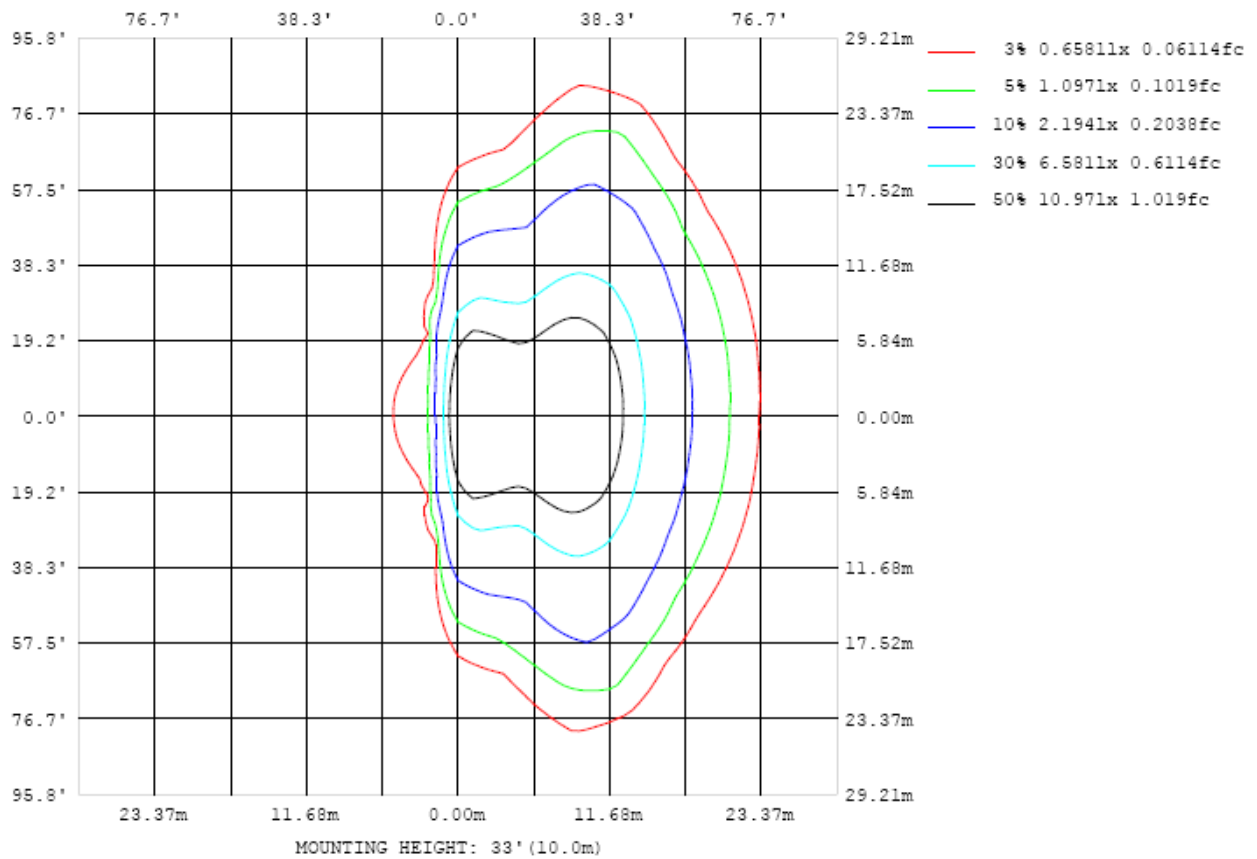


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

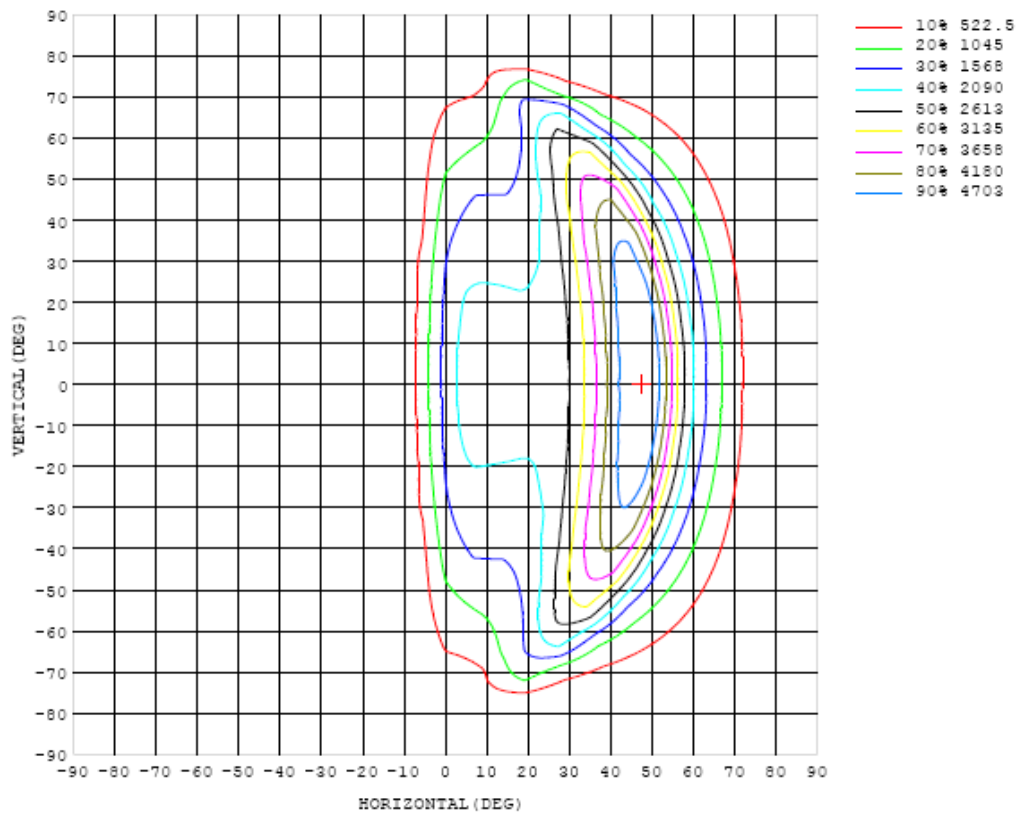


Chart 4: Isocandela Plot

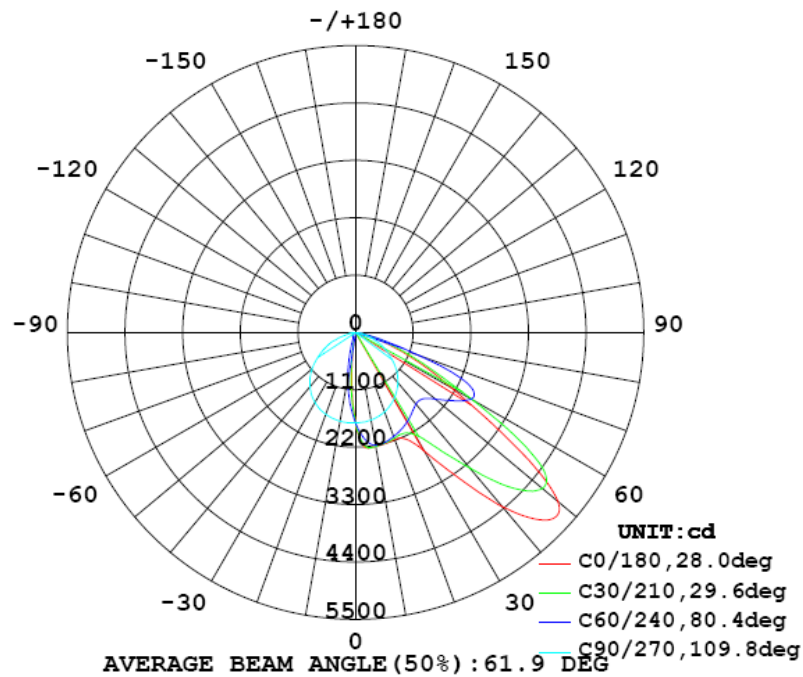


Chart 5: Polar Candela Distribution

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	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734
5	2215	2213	2208	2193	2165	2121	2055	1965	1855	1724	1582	1441	1308	1186	1081	996	931	897	894
10	2221	2219	2219	2220	2216	2214	2194	2115	1947	1704	1418	1130	859	623	432	312	244	213	224
15	2203	2199	2195	2190	2182	2180	2177	2156	2005	1668	1240	810	432	213	132	111	108	107	107
20	2182	2175	2168	2158	2144	2133	2122	2114	2025	1619	1052	500	179	109	104	102	101	99.5	100
25	2250	2229	2189	2139	2100	2079	2055	2036	1992	1549	855	260	107	100	97.1	95.1	94.0	92.8	93.1
30	2623	2565	2434	2260	2103	2013	1973	1945	1915	1468	658	140	99.8	93.9	90.2	88.2	88.0	87.3	87.7
35	3374	3285	3053	2694	2284	2001	1876	1829	1803	1371	462	102	92.8	87.1	83.6	83.5	86.0	87.7	88.3
40	4358	4246	3921	3391	2762	2142	1793	1697	1660	1258	291	90.8	83.9	79.8	79.9	85.7	87.5	88.8	89.1
45	5084	4991	4716	4201	3416	2522	1805	1550	1494	1129	167	82.1	74.6	74.0	78.1	81.0	83.1	84.6	84.7
50	5040	5013	4939	4648	4007	3028	1989	1405	1305	977	98.9	71.7	67.5	70.2	71.6	74.0	77.6	78.0	78.5
55	3536	3605	3889	4188	4092	3427	2283	1317	1091	811	70.9	60.7	61.4	61.9	63.8	65.8	68.4	68.4	68.5
60	2100	2112	2247	2562	3089	3283	2548	1363	894	660	58.2	50.1	52.8	53.3	53.1	54.3	56.0	55.1	54.4
65	1286	1293	1356	1437	1590	2101	2393	1484	695	520	46.7	41.5	43.6	44.0	40.6	40.9	42.5	42.5	42.4
70	686	691	746	791	840	935	1285	1360	520	336	32.7	32.0	31.9	30.3	27.7	28.9	31.1	30.9	30.5
75	285	301	351	369	362	385	430	674	406	173	21.2	23.0	19.1	18.4	17.6	20.1	23.2	24.1	23.9
80	32.8	32.8	37.3	47.8	69.7	90.7	109	119	193	56.9	9.47	9.01	8.38	10.5	10.7	10.2	10.1	10.3	10.8
85	0.40	0.37	1.53	2.14	3.56	5.15	6.87	6.67	11.0	4.57	1.74	1.46	1.94	1.75	1.38	1.42	1.34	1.26	1.79
90	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.11	0.11	0.12	0.14	0.16	0.17	0.14	0.13	0.12	0.12	0.48
95	0.06	0.06	0.06	0.06	0.06	0.07	0.08	0.10	0.13	0.16	0.17	0.20	0.23	0.26	0.25	0.22	0.19	0.19	0.80
100	0.06	0.06	0.06	0.06	0.06	0.07	0.09	0.12	0.16	0.21	0.23	0.27	0.30	0.35	0.37	0.34	0.30	0.30	1.22
105	0.05	0.05	0.05	0.05	0.06	0.07	0.10	0.15	0.20	0.26	0.30	0.36	0.40	0.45	0.48	0.47	0.44	0.48	1.71
110	0.05	0.05	0.05	0.06	0.06	0.08	0.12	0.18	0.24	0.33	0.39	0.47	0.52	0.57	0.60	0.63	0.61	0.64	1.80
115	0.06	0.06	0.06	0.06	0.07	0.10	0.13	0.21	0.28	0.40	0.50	0.59	0.65	0.72	0.76	0.80	0.81	0.85	1.71
120	0.06	0.06	0.06	0.07	0.08	0.11	0.17	0.21	0.33	0.46	0.61	0.73	0.80	0.87	0.93	0.97	0.99	1.03	1.60
125	0.07	0.07	0.07	0.08	0.10	0.14	0.20	0.24	0.37	0.49	0.68	0.87	0.98	1.07	1.10	1.14	1.15	1.18	1.41
130	0.07	0.07	0.08	0.09	0.11	0.17	0.24	0.30	0.39	0.52	0.73	0.98	1.12	1.23	1.27	1.31	1.29	1.31	1.42
135	0.07	0.08	0.09	0.12	0.14	0.20	0.27	0.35	0.41	0.55	0.72	0.99	1.17	1.32	1.40	1.41	1.41	1.43	1.50
140	0.08	0.09	0.12	0.18	0.18	0.27	0.31	0.37	0.47	0.56	0.70	0.92	1.10	1.30	1.40	1.43	1.45	1.46	1.53
145	0.12	0.13	0.19	0.23	0.25	0.30	0.35	0.41	0.52	0.59	0.69	0.89	1.07	1.25	1.36	1.43	1.49	1.47	1.53
150	0.18	0.22	0.28	0.34	0.35	0.35	0.39	0.48	0.55	0.63	0.71	0.87	1.03	1.18	1.30	1.38	1.43	1.44	1.47
155	0.26	0.32	0.38	0.46	0.43	0.39	0.44	0.52	0.60	0.60	0.74	0.87	0.98	1.09	1.18	1.25	1.25	1.27	1.29
160	0.37	0.43	0.49	0.56	0.55	0.47	0.49	0.61	0.65	0.56	0.73	0.89	0.97	1.04	1.09	1.10	1.10	1.11	1.11
165	0.47	0.53	0.60	0.65	0.66	0.56	0.56	0.69	0.66	0.64	0.74	0.94	1.00	1.02	1.03	1.03	1.04	1.05	0.89
170	0.57	0.62	0.68	0.72	0.72	0.60	0.55	0.64	0.77	0.70	0.66	0.90	0.98	0.99	0.99	0.99	1.00	0.98	0.77
175	0.66	0.68	0.70	0.74	0.78	0.75	0.67	0.76	0.84	0.81	0.84	0.95	1.06	1.07	1.08	1.08	1.06	1.02	0.69
180	0.61	0.62	0.65	0.70	0.73	0.76	0.78	0.79	0.76	0.85	0.86	0.84	0.90	0.98	0.98	0.96	0.93	0.90	0.60

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	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734	1734		
5	907	948	1010	1096	1201	1324	1456	1595	1735	1865	1974	2063	2132	2174	2199	2212	2218		
10	234	256	327	451	639	882	1157	1443	1727	1968	2136	2217	2236	2236	2235	2229	2226		
15	108	109	113	137	228	458	840	1276	1704	2039	2192	2212	2213	2211	2211	2210	2209		
20	101	102	104	106	111	193	533	1097	1668	2073	2167	2170	2176	2180	2184	2187	2188		
25	93.9	95.6	97.4	99.4	103	110	287	911	1620	2067	2109	2120	2132	2141	2170	2207	2242		
30	88.2	89.7	90.5	93.0	96.8	102	155	716	1551	2008	2031	2055	2079	2150	2283	2442	2575		
35	87.9	87.2	85.5	86.3	90.0	96.1	106	522	1466	1906	1930	1967	2070	2320	2701	3056	3294		
40	90.2	90.8	85.9	81.4	83.1	87.7	94.9	344	1355	1772	1805	1883	2193	2790	3406	3934	4257		
45	84.8	85.2	84.9	82.6	75.9	78.4	85.0	208	1233	1617	1661	1872	2560	3469	4265	4760	5019		
50	80.0	80.6	78.2	75.5	74.3	69.4	76.0	119	1086	1431	1510	2030	3092	4129	4791	5060	5092		
55	70.2	71.8	70.3	67.9	65.6	63.8	64.0	77.0	917	1220	1398	2335	3565	4333	4519	4122	3734		
60	56.6	59.4	58.4	57.4	56.7	57.2	53.1	62.3	755	1010	1409	2669	3557	3558	2904	2414	2191		
65	44.0	45.4	44.2	44.2	46.7	47.2	44.0	50.7	593	803	1552	2648	2601	1879	1649	1490	1360		
70	31.9	33.4	32.2	31.1	33.4	36.8	35.3	37.8	398	592	1608	1815	1188	1019	929	833	740		
75	24.1	24.2	20.9	20.1	21.4	22.4	25.5	24.8	211	473	1050	619	511	495	450	400	357		
80	11.4	12.9	12.9	13.1	11.4	10.9	12.2	14.0	77.8	298	233	187	163	138	68.8	41.2	35.6		
85	2.06	2.35	2.69	3.18	4.15	3.56	3.28	3.47	12.2	41.7	37.6	24.5	11.5	6.25	2.89	1.64	0.84		
90	0.48	0.50	0.54	0.62	0.70	0.69	0.58	0.43	0.27	0.16	0.11	0.09	0.10	0.10	0.09	0.09	0.09		
95	0.80	0.83	0.92	1.03	1.08	0.98	0.79	0.57	0.36	0.21	0.12	0.09	0.09	0.09	0.08	0.08	0.08		
100	1.22	1.28	1.38	1.46	1.41	1.23	0.96	0.68	0.44	0.25	0.13	0.09	0.09	0.09	0.08	0.08	0.08		
105	1.69	1.76	1.78	1.77	1.63	1.36	1.04	0.75	0.49	0.29	0.16	0.09	0.09	0.09	0.08	0.08	0.08		
110	1.80	1.82	1.84	1.77	1.58	1.28	0.99	0.71	0.48	0.30	0.18	0.10	0.09	0.08	0.08	0.07	0.08		
115	1.67	1.66	1.63	1.53	1.34	1.09	0.86	0.63	0.44	0.30	0.19	0.11	0.09	0.08	0.08	0.07	0.07		
120	1.56	1.49	1.36	1.22	1.03	0.88	0.71	0.53	0.40	0.28	0.20	0.11	0.09	0.08	0.07	0.07	0.07		
125	1.35	1.26	1.14	1.04	0.88	0.77	0.65	0.49	0.39	0.28	0.21	0.13	0.10	0.08	0.08	0.07	0.07		
130	1.37	1.29	1.20	1.05	0.92	0.82	0.68	0.54	0.43	0.32	0.24	0.16	0.12	0.09	0.09	0.08	0.07		
135	1.49	1.44	1.36	1.24	1.09	0.94	0.78	0.64	0.51	0.41	0.31	0.23	0.16	0.13	0.10	0.09	0.08		
140	1.57	1.54	1.48	1.38	1.24	1.04	0.85	0.70	0.58	0.46	0.36	0.30	0.23	0.16	0.13	0.11	0.09		
145	1.57	1.57	1.54	1.44	1.29	1.09	0.93	0.75	0.68	0.49	0.46	0.38	0.32	0.23	0.18	0.15	0.12		
150	1.52	1.54	1.52	1.43	1.30	1.11	1.00	0.82	0.71	0.62	0.58	0.48	0.44	0.36	0.29	0.23	0.19		
155	1.36	1.42	1.45	1.38	1.27	1.12	1.04	0.92	0.78	0.75	0.64	0.59	0.53	0.50	0.47	0.37	0.31		
160	1.14	1.19	1.26	1.25	1.20	1.13	1.07	0.95	0.77	0.86	0.77	0.69	0.63	0.68	0.65	0.56	0.50		
165	0.90	0.93	0.99	1.04	1.07	1.05	1.03	0.90	0.79	0.81	0.85	0.77	0.74	0.80	0.81	0.76	0.68		
170	0.78	0.81	0.86	0.90	0.95	0.99	1.02	0.90	0.86	0.89	0.94	0.87	0.81	0.93	0.97	0.94	0.88		
175	0.70	0.74	0.79	0.86	0.86	0.92	0.93	0.88	0.82	0.90	0.97	0.90	0.89	1.03	1.04	1.00	0.98		
180	0.61	0.62	0.64	0.70	0.73	0.75	0.78	0.78	0.75	0.84	0.84	0.84	0.90	0.98	0.98	0.96	0.95		

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 expanded 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 ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.