



LM-79-08 Test Report

for

ABBlighting, Inc.

3 Adams St Belvidere, NJ 07823.

Flood Light

Model: ABBFL70501

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.: HZ15070048g

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

Reviewed by:

Engineer: April Zou
Jul. 29, 2015



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: **ABBFL70501**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
102.5	5983.6	58.40	0.9966
CCT (K)	CRI	Stabilization Time (Light & Power)	
4881	65.4	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

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
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: 27 pcs
Manufacturer	: ABB Lighting (shanghai) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza,# 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 25.1°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	68
Test Current (A)	0.488	0.592	0.217	R3	72
Power Factor	0.9966	0.9970	0.9657	R4	68
Test Power (W)	58.40	58.97	58.00	R5	65
THD A%	5.25	4.59	14.71	R6	59
Luminous Efficacy (lm/W)	102.5	101.4	103.1	R7	73
Total Luminous Flux (lm)	5983.6	5978.6	5979.0	R8	54
Color Rendering Index (CRI)	65.4			R9	-39
R9	-39			R10	26
Correlated Color Temperature (CCT) (K)	4881			R11	67
Chromaticity (Chroma x, Chroma y)	(0.3508, 0.3751)			R12	37
Chromaticity (Chroma u, Chroma v)	(0.2064, 0.3310)			R13	63
Chromaticity (Chroma u', Chroma v')	(0.2064, 0.4965)			R14	84
Duv	0.0092				
Average Beam Angle (°)	111.9				
Center Beam Candle Power (cd)	2187				
NEMA Type	7H x 7V				
Zonal Lumens in the 0°-60°Zone	84.25%				
Zonal Lumens in the 60°-90°Zone	15.69%				
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

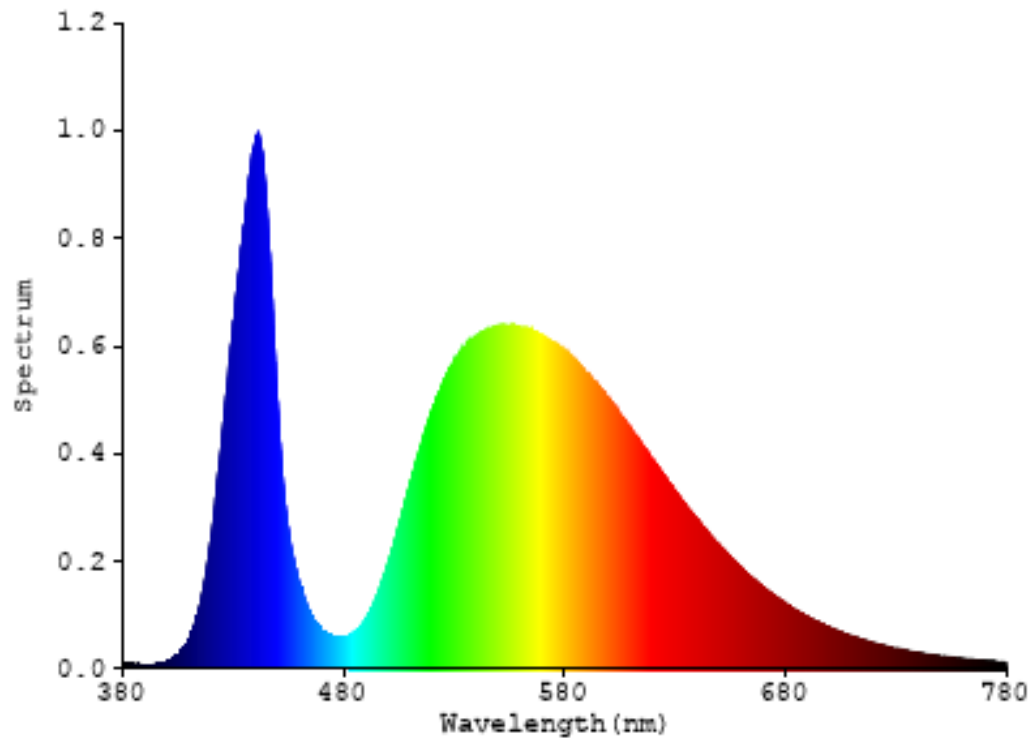


Chart 1: Spectral Power Distribution

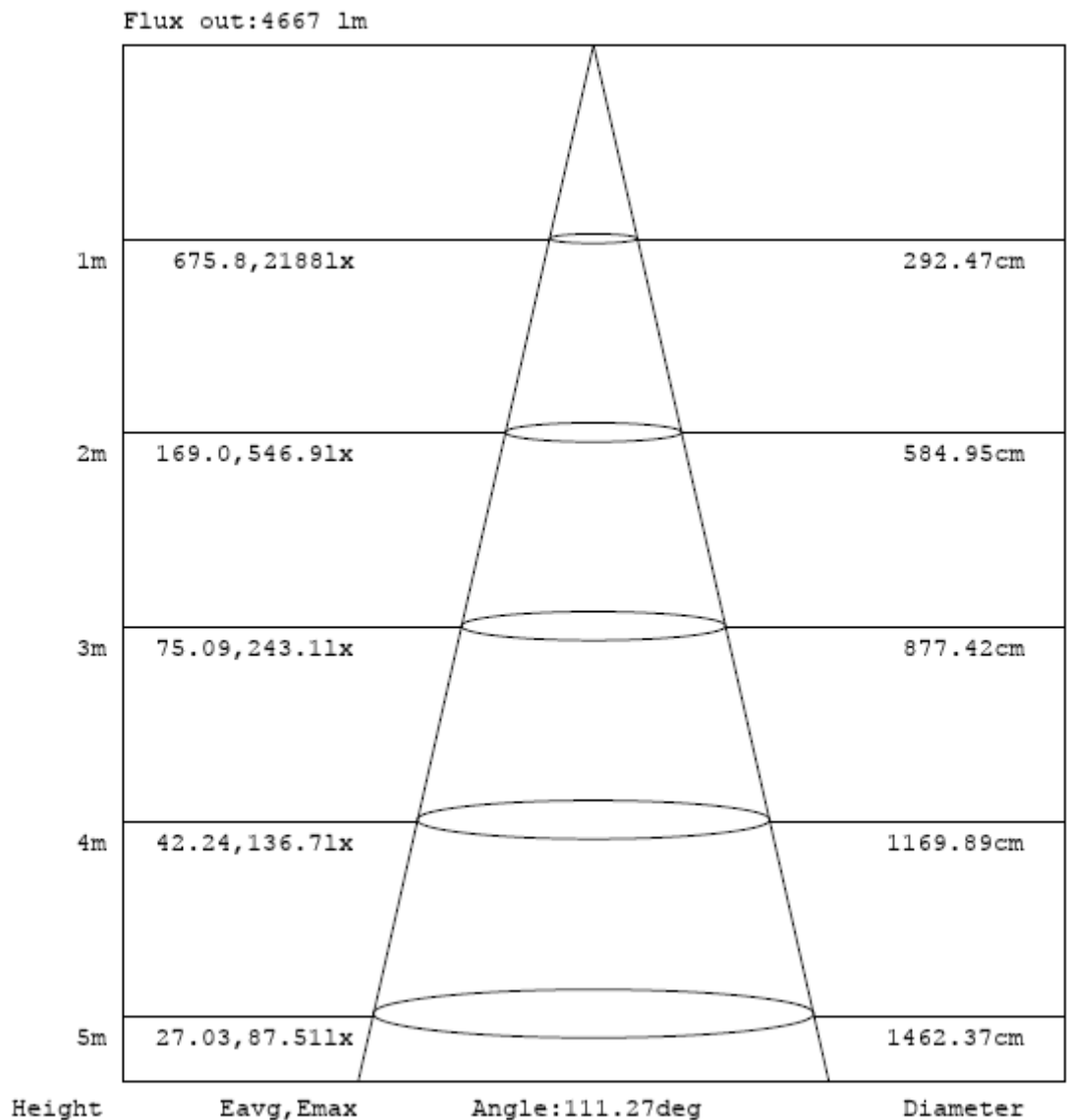
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	207.637	3.47%
10- 20	599.869	10.03%
20- 30	922.46	15.42%
30- 40	1127.726	18.85%
40- 50	1168.906	19.54%
50- 60	1014.627	16.96%
60- 70	682.568	11.41%
70- 80	240.696	4.02%
80- 90	15.361	0.26%
90-100	0.307	0.01%
100-110	0.465	0.01%
110-120	0.521	0.01%
120-130	0.493	0.01%
130-140	0.554	0.01%
140-150	0.546	0.01%
150-160	0.465	0.01%
160-170	0.314	0.01%
170-180	0.118	0.00%
Total	5983.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	5041.225	84.25%
60- 90	938.625	15.69%
0-90	5979.85	99.94%
90- 180	3.783	0.06%
0- 180	5983.6	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

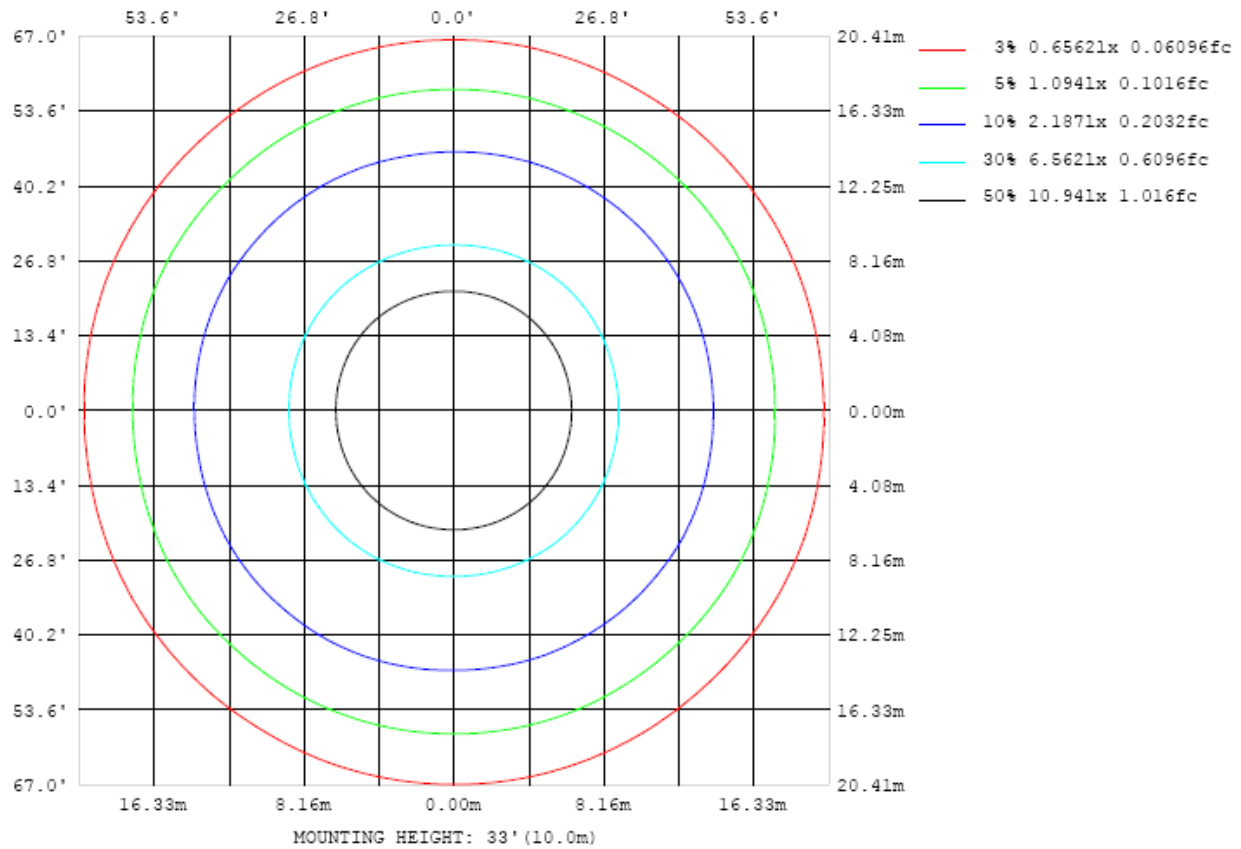


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

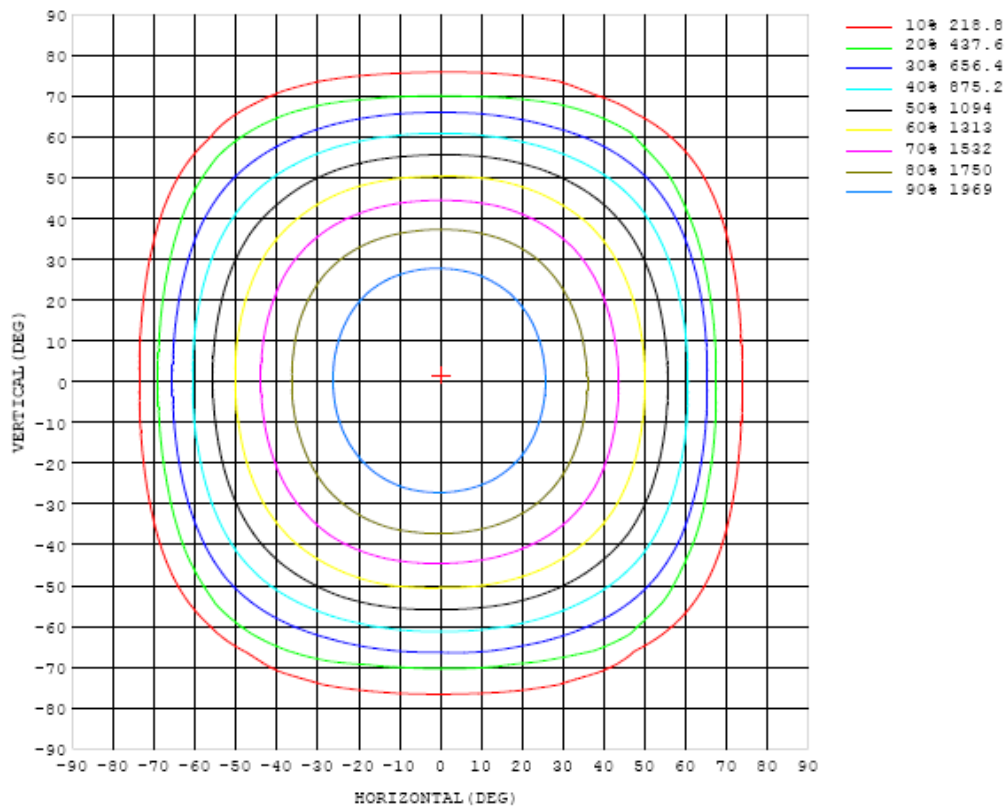


Chart 4: Isocandela Plot

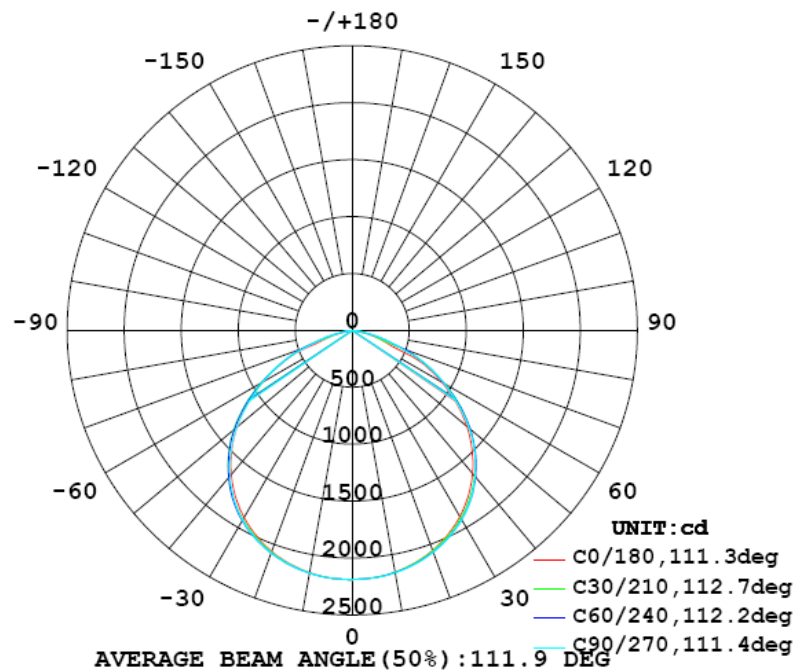


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187
5	2180	2180	2179	2179	2180	2180	2181	2181	2181	2181	2181	2182	2183	2184	2184	2184	2185	2184	2184
10	2157	2157	2157	2157	2158	2158	2159	2160	2162	2162	2162	2163	2163	2163	2163	2162	2161	2160	2160
15	2115	2114	2114	2116	2119	2122	2123	2124	2125	2125	2125	2126	2126	2126	2125	2123	2123	2123	2122
20	2057	2058	2059	2062	2066	2070	2071	2073	2073	2074	2074	2075	2075	2073	2071	2069	2067	2068	2067
25	1981	1982	1985	1991	1996	2000	2004	2004	2005	2005	2005	2008	2007	2004	2001	1997	1993	1992	1991
30	1888	1889	1894	1902	1910	1914	1918	1918	1920	1921	1922	1923	1922	1921	1916	1911	1905	1901	1899
35	1773	1777	1784	1795	1804	1808	1812	1812	1810	1811	1813	1818	1818	1816	1811	1803	1793	1788	1786
40	1640	1645	1654	1668	1677	1683	1681	1678	1675	1674	1678	1686	1691	1689	1684	1673	1661	1656	1653
45	1485	1492	1507	1521	1527	1529	1527	1524	1520	1519	1525	1534	1538	1539	1529	1521	1509	1500	1497
50	1310	1320	1334	1347	1350	1349	1350	1347	1342	1338	1347	1358	1359	1358	1356	1349	1334	1321	1322
55	1116	1127	1141	1153	1148	1148	1145	1145	1135	1131	1143	1155	1160	1154	1155	1149	1136	1124	1125
60	900	911	924	933	930	926	928	932	930	928	932	934	935	932	935	933	919	906	907
65	674	684	698	707	708	709	716	719	723	722	720	718	711	710	707	709	693	684	683
70	323	326	332	440	485	489	491	453	456	454	453	469	496	487	481	473	416	341	338
75	189	191	193	195	191	253	264	273	277	277	277	271	262	248	190	190	188	184	187
80	30.1	39.8	50.0	69.4	75.4	73.4	71.1	101	102	102	99.0	95.2	66.9	69.2	71.0	63.9	58.7	44.5	42.0
85	0.09	0.11	0.18	0.40	1.30	2.47	9.21	11.7	12.4	11.9	11.7	9.46	6.50	6.33	4.64	3.03	2.20	2.19	2.39
90	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.28
95	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.11	0.12	0.41
100	0.15	0.16	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.53
105	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.21	0.21	0.20	0.20	0.21	0.21	0.21	0.21	0.21	0.23	0.20	0.64
110	0.27	0.27	0.27	0.26	0.26	0.26	0.27	0.27	0.26	0.26	0.26	0.27	0.27	0.27	0.26	0.39	0.27	0.27	0.63
115	0.36	0.34	0.35	0.34	0.33	0.33	0.33	0.35	0.34	0.33	0.34	0.35	0.34	0.34	0.35	0.39	0.35	0.36	0.64
120	0.46	0.45	0.43	0.43	0.41	0.43	0.43	0.42	0.43	0.42	0.43	0.43	0.42	0.42	0.44	0.46	0.45	0.45	0.59
125	0.57	0.56	0.54	0.53	0.51	0.53	0.54	0.51	0.52	0.51	0.52	0.52	0.52	0.53	0.54	0.56	0.55	0.55	0.59
130	0.66	0.66	0.64	0.62	0.60	0.61	0.64	0.63	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.65	0.65	0.65	0.64
135	0.77	0.77	0.75	0.73	0.69	0.70	0.72	0.73	0.70	0.72	0.71	0.71	0.70	0.70	0.71	0.73	0.74	0.75	0.75
140	0.84	0.83	0.82	0.80	0.76	0.78	0.77	0.76	0.75	0.77	0.76	0.75	0.74	0.76	0.77	0.78	0.79	0.81	0.82
145	0.92	0.92	0.92	0.87	0.84	0.84	0.83	0.81	0.83	0.83	0.81	0.82	0.82	0.83	0.84	0.85	0.88	0.87	0.89
150	1.01	1.02	1.01	0.98	0.93	0.89	0.89	0.89	0.89	0.91	0.89	0.89	0.89	0.92	0.93	0.95	0.97	0.97	0.98
155	1.06	1.07	1.06	1.05	0.97	0.92	0.90	0.92	0.92	0.92	0.92	0.93	0.94	0.98	1.02	1.04	1.02	1.02	1.04
160	1.11	1.11	1.09	1.07	1.01	0.93	0.91	0.92	0.94	0.88	0.95	0.97	0.99	1.03	1.08	1.09	1.08	1.08	1.12
165	1.16	1.16	1.15	1.13	1.08	1.00	0.97	0.98	0.96	0.93	0.99	1.04	1.07	1.10	1.12	1.12	1.13	1.13	1.14
170	1.20	1.21	1.21	1.19	1.14	1.06	1.02	1.03	1.07	1.04	1.02	1.08	1.13	1.15	1.17	1.17	1.18	1.18	1.21
175	1.37	1.36	1.35	1.33	1.27	1.21	1.18	1.17	1.16	1.12	1.15	1.18	1.21	1.24	1.27	1.30	1.32	1.34	1.34
180	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22

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	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187	2187		
5	2184	2184	2184	2184	2183	2183	2183	2183	2183	2182	2182	2182	2181	2181	2180	2180	2180		
10	2160	2160	2162	2163	2164	2165	2165	2165	2165	2164	2164	2162	2161	2160	2158	2158	2158		
15	2123	2124	2126	2128	2129	2131	2131	2131	2130	2129	2128	2126	2124	2121	2119	2116	2115		
20	2068	2070	2074	2078	2080	2081	2082	2082	2081	2079	2077	2074	2072	2069	2065	2060	2058		
25	1994	1998	2003	2009	2014	2016	2015	2014	2013	2013	2011	2007	2004	1998	1993	1987	1982		
30	1904	1910	1918	1925	1929	1931	1929	1927	1924	1924	1924	1921	1918	1910	1902	1893	1888		
35	1790	1802	1813	1821	1825	1823	1817	1811	1810	1811	1815	1815	1812	1802	1791	1781	1773		
40	1660	1672	1685	1693	1693	1687	1678	1671	1669	1672	1678	1682	1682	1674	1663	1649	1640		
45	1506	1519	1534	1538	1537	1530	1522	1513	1508	1514	1523	1525	1524	1523	1512	1497	1487		
50	1332	1345	1358	1356	1353	1349	1339	1328	1322	1332	1340	1343	1342	1346	1336	1325	1316		
55	1133	1144	1151	1145	1143	1139	1129	1118	1115	1123	1131	1134	1136	1141	1140	1130	1120		
60	915	924	925	917	914	916	911	910	907	910	906	909	911	918	922	912	903		
65	687	695	693	692	690	696	698	697	696	698	693	685	690	689	691	688	685		
70	364	441	467	469	472	477	451	439	433	437	460	472	469	469	343	325	324		
75	185	187	184	203	234	243	247	247	247	246	246	242	194	188	190	190	191		
80	41.7	47.6	62.2	60.8	57.0	72.5	82.6	84.1	84.4	85.6	81.1	59.2	64.6	67.6	46.5	41.7	37.6		
85	2.44	2.46	2.26	2.16	4.68	5.14	6.67	8.08	6.61	8.22	6.52	3.49	0.85	0.51	0.31	0.24	0.21		
90	0.29	0.29	0.30	0.31	0.32	0.33	0.33	0.34	0.34	0.33	0.33	0.33	0.32	0.31	0.31	0.30	0.29		
95	0.41	0.42	0.43	0.45	0.45	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.45	0.45	0.44	0.43	0.42		
100	0.54	0.56	0.56	0.57	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.57	0.57	0.56	0.55		
105	1.15	0.72	0.65	0.66	0.67	0.67	0.67	0.66	0.67	0.67	0.67	0.67	0.67	0.67	0.66	0.65	0.65		
110	1.06	1.85	0.68	0.65	0.67	0.66	0.66	0.66	0.66	0.66	0.67	0.66	0.66	0.66	0.65	0.64	0.64		
115	0.75	0.78	0.60	0.59	0.60	0.62	0.62	0.61	0.61	0.61	0.62	0.62	0.61	0.61	0.60	0.61	0.61		
120	0.61	0.59	0.56	0.55	0.55	0.55	0.54	0.54	0.54	0.55	0.55	0.55	0.55	0.56	0.57	0.59	0.60		
125	0.58	0.57	0.56	0.55	0.54	0.54	0.55	0.55	0.55	0.53	0.54	0.53	0.54	0.55	0.57	0.59	0.61		
130	0.65	0.64	0.64	0.61	0.60	0.60	0.60	0.61	0.60	0.60	0.61	0.59	0.60	0.59	0.63	0.65	0.67		
135	0.75	0.75	0.75	0.74	0.73	0.71	0.70	0.72	0.70	0.70	0.69	0.70	0.70	0.73	0.74	0.75	0.77		
140	0.84	0.84	0.84	0.83	0.83	0.82	0.80	0.81	0.80	0.77	0.76	0.77	0.79	0.81	0.81	0.82	0.83		
145	0.91	0.91	0.91	0.90	0.91	0.89	0.89	0.89	0.90	0.82	0.87	0.87	0.89	0.89	0.89	0.90	0.91		
150	0.98	0.99	0.99	0.98	0.98	0.95	0.96	0.93	0.92	0.94	0.96	0.94	0.98	0.98	1.01	1.01	1.01		
155	1.05	1.05	1.07	1.06	1.03	1.00	0.99	1.00	0.97	1.00	0.98	1.02	1.02	1.06	1.11	1.08	1.07		
160	1.13	1.12	1.13	1.14	1.12	1.08	1.06	1.05	0.99	1.04	1.03	1.06	1.08	1.15	1.17	1.17	1.15		
165	1.14	1.15	1.16	1.18	1.20	1.19	1.16	1.11	1.08	1.09	1.10	1.11	1.13	1.17	1.20	1.20	1.18		
170	1.25	1.25	1.28	1.29	1.29	1.28	1.27	1.21	1.21	1.22	1.23	1.19	1.21	1.27	1.29	1.27	1.23		
175	1.33	1.32	1.34	1.34	1.35	1.33	1.31	1.27	1.23	1.25	1.26	1.26	1.32	1.35	1.35	1.35	1.36		
180	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22		

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 ***

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.