



## LM-79-08 Test Report

for

**ABBlighting, Inc.**

3 Adams St Belvidere, NJ 07823.

**70W CANOPY**

**Model: ABBCAN70501**

**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.: HZ15060001a

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

Reviewed by:

*April Zou*

Engineer: April Zou  
Jun. 02, 2015



Approved by

*Jim Zhang*

Manager: Jim Zhang  
Jun. 02, 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: **ABBCAN70501**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
97.3	6429.4	66.06	0.9898
CCT (K)	CRI	Stabilization Time (Light & Power)	
4969	77.3	60	

Table 1: Executive Data Summary

### Test specifications:

**Date of Receipt** : Jun. 01, 2015

**Date of Test** : Jun. 01, 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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## Photos



Figure 1- Overview of the sample

### Equipment Under Test (EUT)

<b>Name</b>	: 70W CANOPY
<b>Model</b>	: ABBCAN70501
<b>Electrical Ratings</b>	: 100~277VAC, 50/60Hz, 70W
<b>Product Description</b>	: 5000K, Fuel Pump Canopy Luminaires, Plastic Light Cover Manufacturer of light source: Philips Lumileds Model of light source: LUXEON 3030 2D Quantity of light source: 80 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 24.8°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 95 minutes.

The photometric distance of Goniophotometer is 2.475 m.

Luminous data was taken at 0.5° vertical intervals and 10.0° horizontal intervals.

Parameter	Result			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	75
Voltage frequency (Hz)	60	60	60	R2	84
Test Current (A)	0.556	0.672	0.253	R3	87
Power Factor	0.9898	0.9907	0.9390	R4	75
Test Power (W)	66.06	66.56	65.78	R5	75
THD A%	9.50	9.77	16.01	R6	75
Luminous Efficacy (lm/W)	97.3	95.3	95.8	R7	84
Total Luminous Flux (lm)	6429.4	6345.3	6302.8	R8	62
Color Rendering Index (CRI)	77.3			R9	-8
R9	-8			R10	58
Correlated Color Temperature (CCT) (K)	4969			R11	71
Chromaticity (Chroma x, Chroma y)	(0.3460, 0.3527)			R12	48
Chromaticity (Chroma u, Chroma v)	(0.2116, 0.3235)			R13	77
Chromaticity (Chroma u', Chroma v')	(0.2116, 0.4853)			R14	92
Duv	0.0002				
Average Beam Angle (°)	118.2				
Center Beam Candle Power (cd)	1611				
Spacing Criteria	1.51 (0°-180°)/ 1.47 (90°-270°)				
Zonal Lumens in the 0°-60°Zone	71.57%				
Zonal Lumens in the 60°-90°Zone	20.35%				
Zonal Lumens in the 90°-120°Zone	6.04%				
Zonal Lumens in the 120°-180°Zone	2.04%				

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

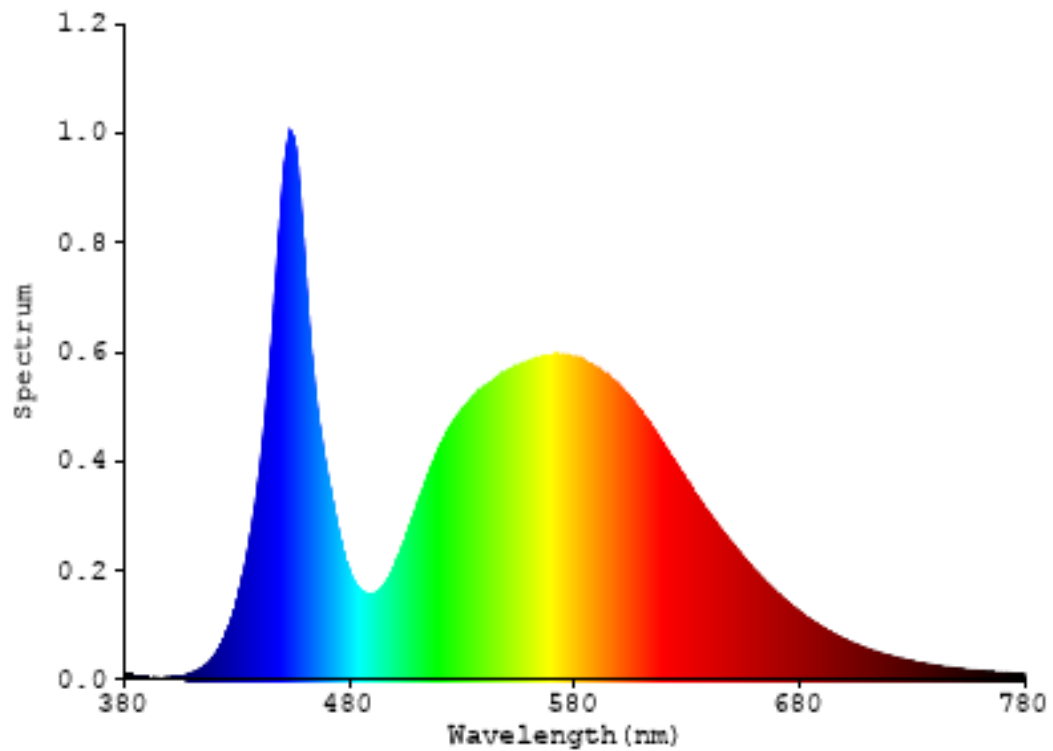


Chart 1: Spectral Power Distribution

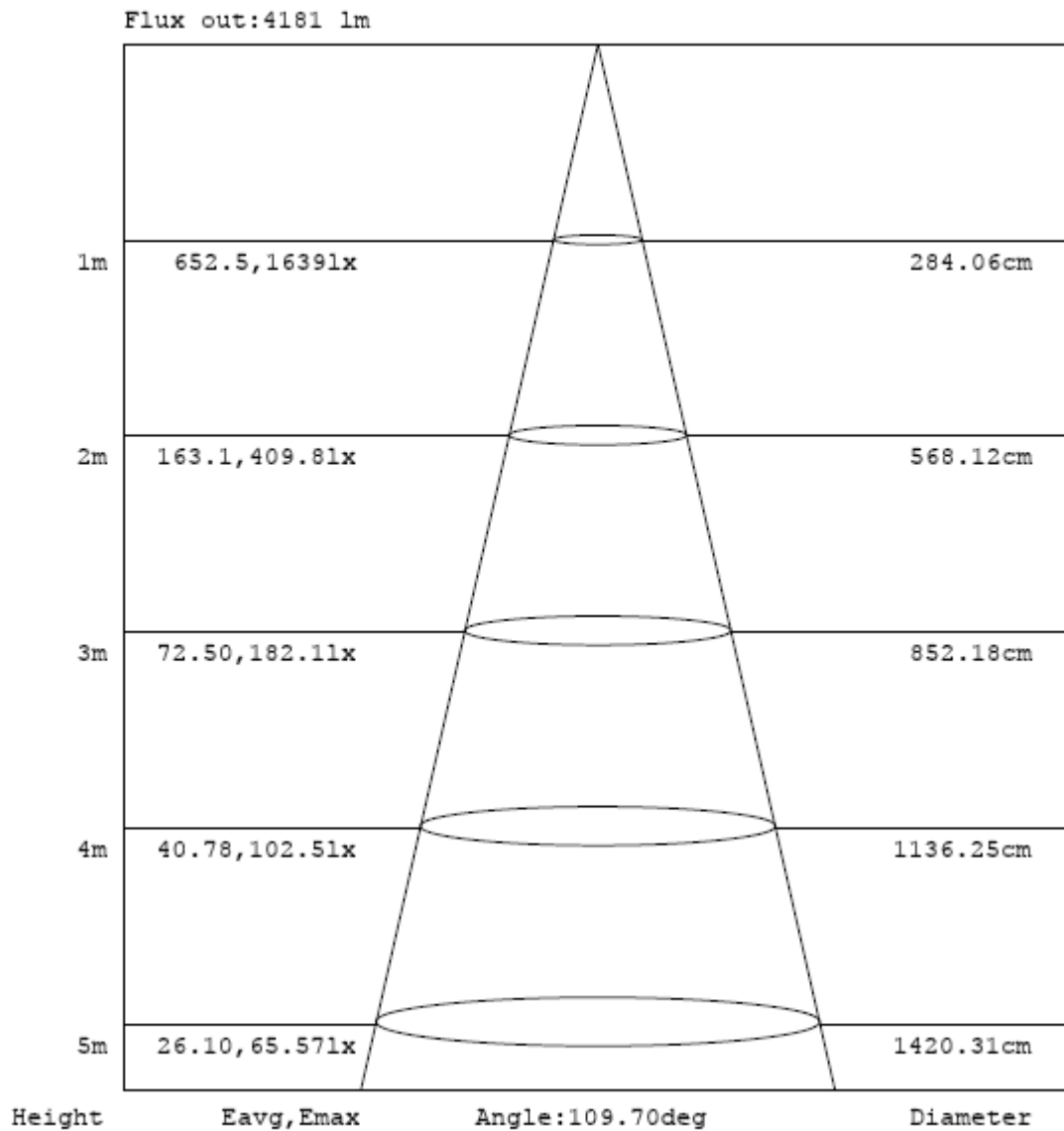
## Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	157.371	2.45%
10- 20	490.191	7.62%
20- 30	836.258	13.01%
30- 40	1096.72	17.06%
40- 50	1118.667	17.40%
50- 60	902.568	14.04%
60- 70	678.498	10.55%
70- 80	405.871	6.31%
80- 90	223.856	3.48%
90-100	158.949	2.47%
100-110	125.501	1.95%
110-120	104.127	1.62%
120-130	77.155	1.20%
130-140	37.615	0.59%
140-150	13.094	0.20%
150-160	2.454	0.04%
160-170	0.391	0.01%
170-180	0.138	0.00%
Total	6429.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4601.775	71.57%
60- 90	1308.225	20.35%
0-90	5910	91.92%
90- 180	519.424	8.08%
0- 180	6429.4	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



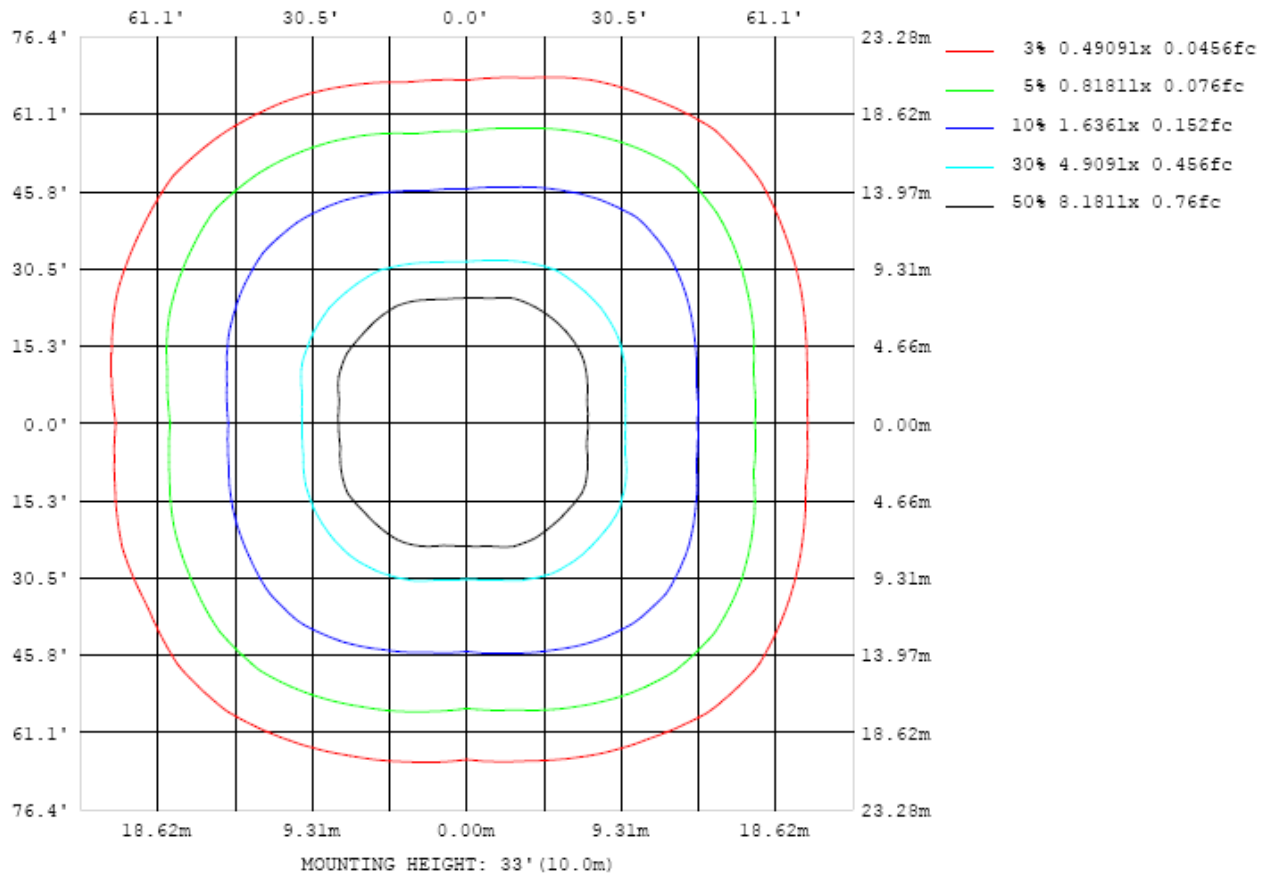


Chart 3: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots

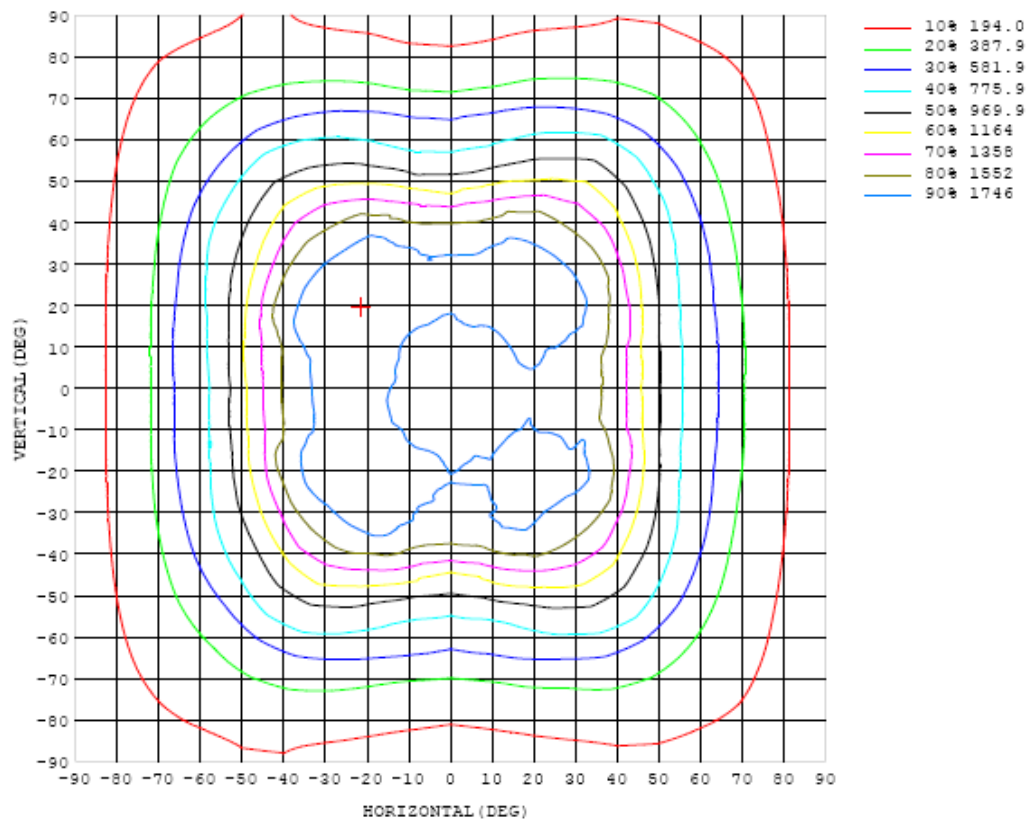


Chart 4: Isocandela Plot

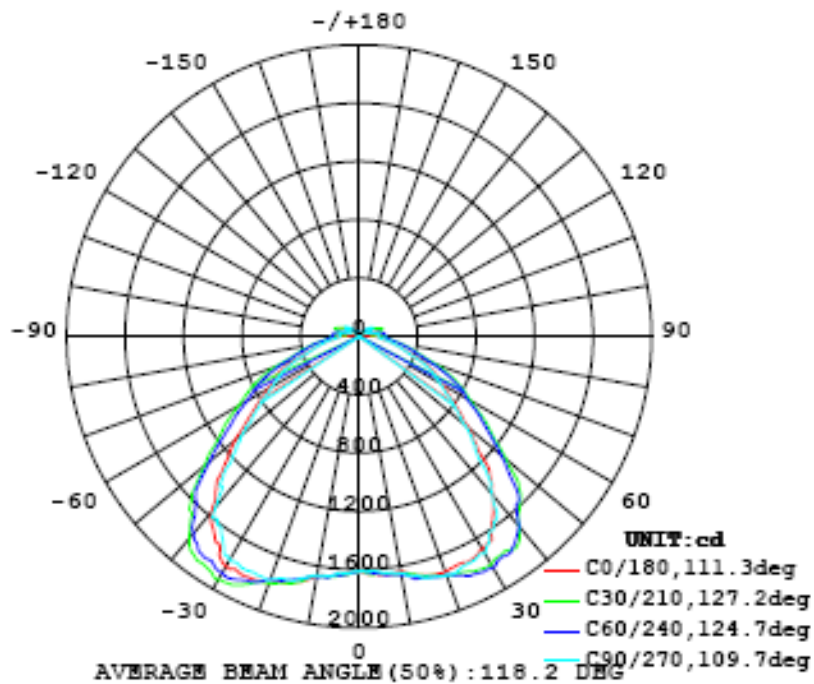


Chart 5: Polar Candela Distribution

## 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	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611
5	1644	1635	1638	1630	1630	1634	1637	1638	1625	1619	1627	1630	1632	1631	1633	1628	1643	1639	1644
10	1636	1635	1636	1652	1669	1667	1663	1662	1662	1650	1666	1664	1667	1676	1676	1659	1662	1664	1670
15	1697	1695	1700	1700	1698	1703	1713	1718	1715	1713	1724	1728	1731	1738	1739	1738	1733	1746	1747
20	1720	1725	1741	1746	1766	1771	1745	1762	1751	1741	1765	1784	1792	1840	1822	1800	1806	1796	1789
25	1712	1710	1715	1779	1801	1832	1811	1740	1737	1727	1752	1778	1864	1889	1918	1870	1836	1827	1820
30	1685	1678	1707	1805	1848	1836	1832	1725	1714	1721	1725	1763	1864	1913	1936	1895	1817	1816	1821
35	1577	1579	1725	1790	1806	1779	1807	1737	1634	1597	1619	1736	1824	1845	1874	1898	1773	1718	1715
40	1425	1450	1598	1706	1690	1705	1699	1633	1480	1418	1454	1624	1736	1752	1751	1794	1709	1607	1567
45	1222	1281	1463	1565	1590	1569	1539	1405	1201	1141	1207	1410	1518	1624	1626	1590	1564	1388	1345
50	979	1030	1161	1314	1393	1367	1271	1139	1023	943	1010	1124	1261	1375	1393	1329	1261	1148	1109
55	793	818	941	1075	1165	1154	1040	918	819	773	817	910	1030	1157	1150	1082	1015	926	877
60	656	677	776	875	967	960	851	762	675	638	688	762	848	950	957	879	839	753	715
65	558	576	652	735	812	788	705	636	566	530	575	631	706	783	795	734	717	660	618
70	398	417	481	547	593	588	515	464	414	386	413	459	525	586	590	543	522	481	446
75	295	317	361	397	432	427	381	352	315	290	315	352	392	427	427	399	387	358	325
80	215	235	268	291	311	308	279	258	231	209	232	261	289	314	313	294	284	264	240
85	149	167	195	207	222	219	201	186	161	147	163	188	209	228	226	211	197	179	165
90	126	139	167	177	185	186	176	162	137	129	138	164	181	192	190	177	163	144	136
95	114	119	129	149	170	179	178	163	137	131	139	165	181	184	173	148	129	122	122
100	40.4	48.9	80.0	97.3	109	137	152	146	132	130	133	146	152	137	107	97.0	82.0	50.9	51.1
105	145	123	143	156	110	101	101	99.9	102	103	99.9	98.7	101	106	117	169	138	124	152
110	138	114	124	160	134	102	80.1	64.7	67.4	68.1	69.8	65.8	78.6	109	144	162	123	115	142
115	123	99.7	103	136	138	123	88.2	65.2	57.7	55.1	61.0	67.3	95.1	130	140	140	104	102	128
120	106	83.8	84.1	110	113	111	95.7	96.6	91.7	90.0	94.0	97.8	102	114	115	115	83.3	87.8	111
125	83.3	64.8	62.5	83.1	85.5	79.2	84.5	103	108	110	108	101	83.5	81.2	85.0	83.0	57.5	69.0	86.7
130	28.7	43.5	37.9	57.3	56.2	55.6	72.5	88.7	92.3	93.8	91.5	86.9	70.9	54.7	56.5	56.4	40.2	49.9	33.0
135	33.7	32.2	23.7	24.9	28.6	44.8	59.4	70.9	74.3	75.4	73.5	69.6	57.3	44.4	27.5	23.0	24.6	34.9	34.5
140	13.0	10.1	4.76	1.61	19.8	34.4	46.2	54.3	56.1	57.3	55.9	53.7	45.5	33.4	19.1	1.57	6.08	12.2	14.1
145	1.65	1.57	1.58	1.58	5.81	23.7	33.7	40.7	42.6	43.4	42.4	40.1	34.1	22.9	5.21	1.49	1.52	1.55	1.60
150	1.57	1.56	1.48	1.53	1.49	5.13	19.9	27.3	29.5	30.5	29.4	26.8	20.2	5.20	1.41	1.44	1.37	1.49	1.53
155	1.50	1.52	1.41	1.49	1.40	1.36	1.36	4.99	9.48	11.3	9.77	5.20	1.34	1.38	1.41	1.41	1.32	1.44	1.47
160	1.48	1.48	1.46	1.38	1.37	1.31	1.31	1.27	1.25	1.22	1.28	1.32	1.35	1.38	1.41	1.34	1.42	1.42	1.49
165	1.47	1.47	1.48	1.46	1.36	1.28	1.24	1.24	1.20	1.20	1.25	1.33	1.37	1.37	1.38	1.47	1.45	1.43	1.47
170	1.49	1.49	1.48	1.47	1.43	1.30	1.24	1.20	1.24	1.20	1.20	1.29	1.39	1.47	1.49	1.48	1.48	1.47	1.54
175	1.57	1.57	1.56	1.55	1.55	1.48	1.41	1.37	1.39	1.35	1.38	1.43	1.49	1.53	1.56	1.58	1.57	1.55	1.58
180	1.52	1.54	1.56	1.59	1.59	1.56	1.54	1.51	1.50	1.50	1.47	1.49	1.51	1.54	1.54	1.51	1.50	1.46	1.51

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	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611		
5	1644	1645	1645	1647	1647	1644	1638	1635	1630	1635	1645	1646	1651	1643	1653	1643	1644		
10	1673	1665	1673	1691	1687	1675	1674	1667	1662	1675	1678	1683	1687	1684	1655	1644	1645		
15	1757	1750	1753	1729	1713	1725	1728	1735	1736	1742	1737	1724	1705	1713	1729	1715	1714		
20	1793	1802	1804	1814	1819	1776	1778	1782	1778	1789	1787	1779	1810	1802	1769	1780	1742		
25	1825	1827	1879	1901	1893	1849	1782	1780	1776	1793	1795	1847	1890	1866	1801	1746	1733		
30	1844	1829	1927	1931	1918	1876	1800	1768	1767	1777	1811	1887	1875	1883	1855	1737	1706		
35	1726	1832	1892	1875	1866	1849	1788	1651	1644	1670	1793	1837	1841	1832	1804	1726	1598		
40	1614	1761	1807	1771	1776	1761	1673	1549	1530	1582	1718	1732	1740	1736	1693	1587	1464		
45	1407	1610	1635	1685	1646	1581	1477	1338	1293	1385	1520	1606	1652	1613	1560	1442	1287		
50	1190	1304	1381	1451	1432	1336	1204	1080	1040	1117	1254	1389	1436	1434	1316	1154	1021		
55	943	1061	1150	1217	1197	1082	964	850	829	889	1014	1144	1248	1196	1071	934	824		
60	767	878	953	1020	973	888	794	698	688	738	839	931	1052	995	880	769	680		
65	679	760	801	841	803	744	667	594	575	620	708	773	853	821	738	660	577		
70	493	575	610	642	612	566	511	456	437	477	544	596	645	627	566	491	428		
75	362	411	432	456	441	412	378	333	317	351	395	429	459	450	408	362	320		
80	273	307	321	333	327	308	283	249	235	266	300	318	333	329	304	275	239		
85	186	212	224	234	234	221	204	175	162	186	213	224	237	233	217	196	167		
90	149	169	183	193	196	182	164	138	132	146	171	183	193	191	179	163	135		
95	129	142	164	182	188	180	162	137	132	146	171	183	187	181	164	142	121		
100	51.2	70.1	91.9	121	153	162	152	136	135	143	160	164	149	113	74.9	59.7	34.7		
105	127	158	152	113	104	112	111	112	115	114	114	110	104	115	175	138	129		
110	118	143	170	137	101	85.4	73.6	74.4	75.1	76.7	76.5	89.2	110	150	171	122	123		
115	104	122	147	144	127	94.5	66.1	56.6	54.7	60.7	67.4	103	135	144	141	98.9	109		
120	88.6	103	123	121	123	106	101	95.4	93.9	97.0	101	113	121	119	115	79.8	94.9		
125	67.1	76.4	90.7	92.2	90.2	94.3	111	116	117	114	107	88.0	90.8	91.6	87.0	57.0	75.1		
130	45.6	41.2	61.3	61.6	62.6	81.0	95.0	99.2	101	97.9	93.8	76.7	60.3	63.1	59.4	40.6	32.3		
135	31.9	22.6	29.6	33.8	51.7	66.2	76.9	81.6	83.5	81.1	77.1	63.3	46.5	31.2	25.4	27.9	31.9		
140	11.3	6.12	6.81	24.8	39.3	52.4	59.2	62.5	63.5	62.7	59.0	49.1	34.9	15.5	1.55	7.02	10.9		
145	1.32	1.52	1.51	14.2	28.5	38.5	43.1	46.0	46.8	46.1	43.6	35.9	20.5	5.15	1.47	1.48	1.56		
150	1.48	1.46	1.46	1.45	14.0	25.3	29.7	31.5	32.2	30.9	26.9	18.8	6.02	1.41	1.43	1.28	1.51		
155	1.47	1.30	1.43	1.45	1.44	2.45	11.2	14.5	14.4	12.9	8.16	1.37	1.37	1.38	1.43	1.31	1.47		
160	1.49	1.48	1.33	1.45	1.44	1.43	1.41	1.36	1.29	1.29	1.31	1.39	1.35	1.40	1.35	1.47	1.49		
165	1.47	1.50	1.52	1.39	1.40	1.43	1.36	1.30	1.24	1.24	1.25	1.31	1.32	1.32	1.38	1.48	1.47		
170	1.54	1.56	1.58	1.60	1.58	1.45	1.36	1.29	1.27	1.26	1.24	1.26	1.30	1.40	1.49	1.51	1.51		
175	1.58	1.60	1.60	1.61	1.55	1.51	1.44	1.37	1.36	1.34	1.38	1.35	1.38	1.46	1.50	1.51	1.52		
180	1.51	1.54	1.55	1.59	1.58	1.56	1.53	1.51	1.49	1.49	1.47	1.48	1.52	1.56	1.55	1.53	1.50		

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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