



## LM-79-08 Test Report

for

**ABBlighting, Inc.**

3 Adams St Belvidere, NJ 07823.

**40W DS WALLPACK**

**Model: ABWP40LED50DS**

**Laboratory: Leading Testing Laboratories**

**NVLAP CODE: 200960-0**

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Report No.: HZ15050028b/R1

This report is replaced the old report No. HZ15050028b dated Jun. 02, 2015

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

Reviewed by:

Engineer: April Zou  
Oct. 21, 2015

Approved by:

Manager: Jim Zhang  
Oct. 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: **ABWP40LED50DS**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
110.3	3877.4	35.16	0.9922
CCT (K)	CRI	Stabilization Time (Light & Power)	
5001	76.2	60	

Table 1: Executive Data Summary

### Test specifications:

**Date of Receipt** : May 25, 2015

**Date of Test** : May 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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## Photo



Figure 1- Overview of the sample

### Equipment Under Test (EUT)

<b>Name</b>	: 40W DS WALLPACK
<b>Model</b>	: ABWP40LED50DS
<b>Electrical Ratings</b>	: 100~277VAC, 50/60Hz, 40W
<b>Product Description</b>	: 5000K, Outdoor Wall-Mounted Area Luminaires Manufacturer of light source: Philips Lumileds Model of light source: LUXEON 3030 2D Quantity of light source: 50 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 24.6°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 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	74
Voltage frequency (Hz)	60	60	60	R2	83
Test Current (A)	0.295	0.359	0.133	R3	87
Power Factor	0.9922	0.9876	0.9593	R4	74
Test Power (W)	35.16	35.49	34.45	R5	74
THD A%	7.90	8.32	8.41	R6	74
Luminous Efficacy (lm/W)	110.3	108.9	109.2	R7	84
Total Luminous Flux (lm)	3877.4	3866.6	3867.1	R8	60
Color Rendering Index (CRI)	76.2			R9	-14
R9	-14			R10	57
Correlated Color Temperature (CCT) (K)	5001			R11	69
Chromaticity (Chroma x, Chroma y)	(0.3454, 0.3552)			R12	46
Chromaticity (Chroma u, Chroma v)	(0.2102, 0.3243)			R13	76
Chromaticity (Chroma u', Chroma v')	(0.2102, 0.4865)			R14	92
Duv	0.0017				
Average Beam Angle (°)	111.3				
Center Beam Candle Power (cd)	1396				
Spacing Criteria	1.31 (0°-180°)/ 1.32 (90°-270°)				
Zonal Lumens in the 0°-60°Zone	83.68%				
Zonal Lumens in the 60°-90°Zone	16.25%				
Zonal Lumens in the 90°-120°Zone	0.03%				
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

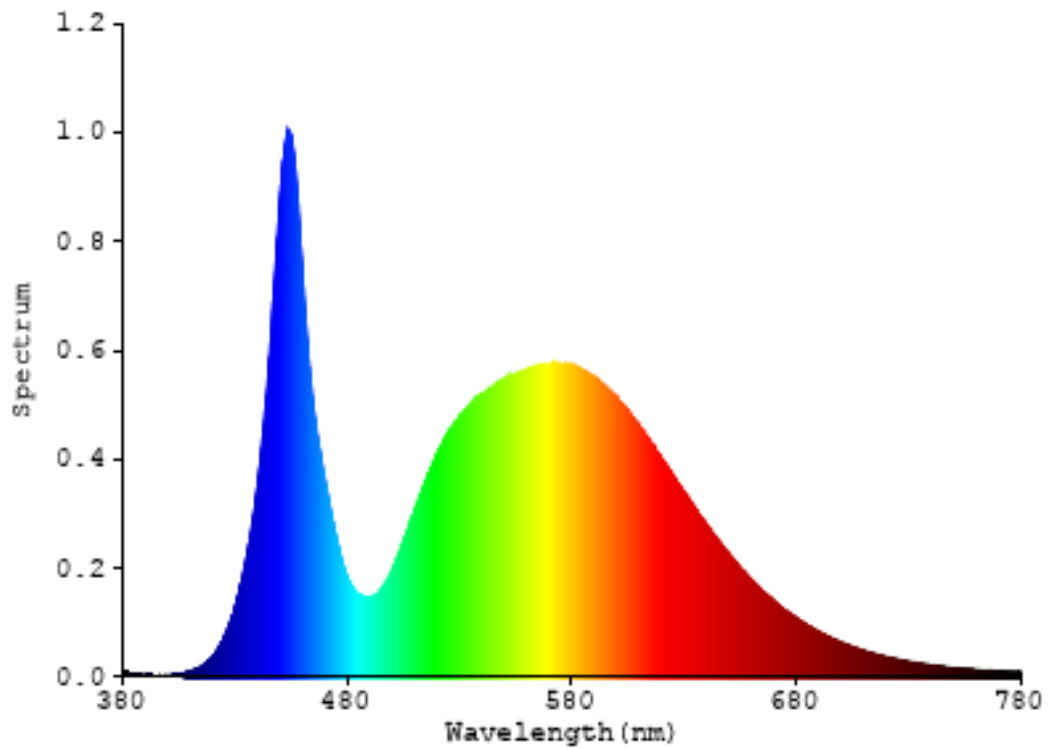


Chart 1: Spectral Power Distribution

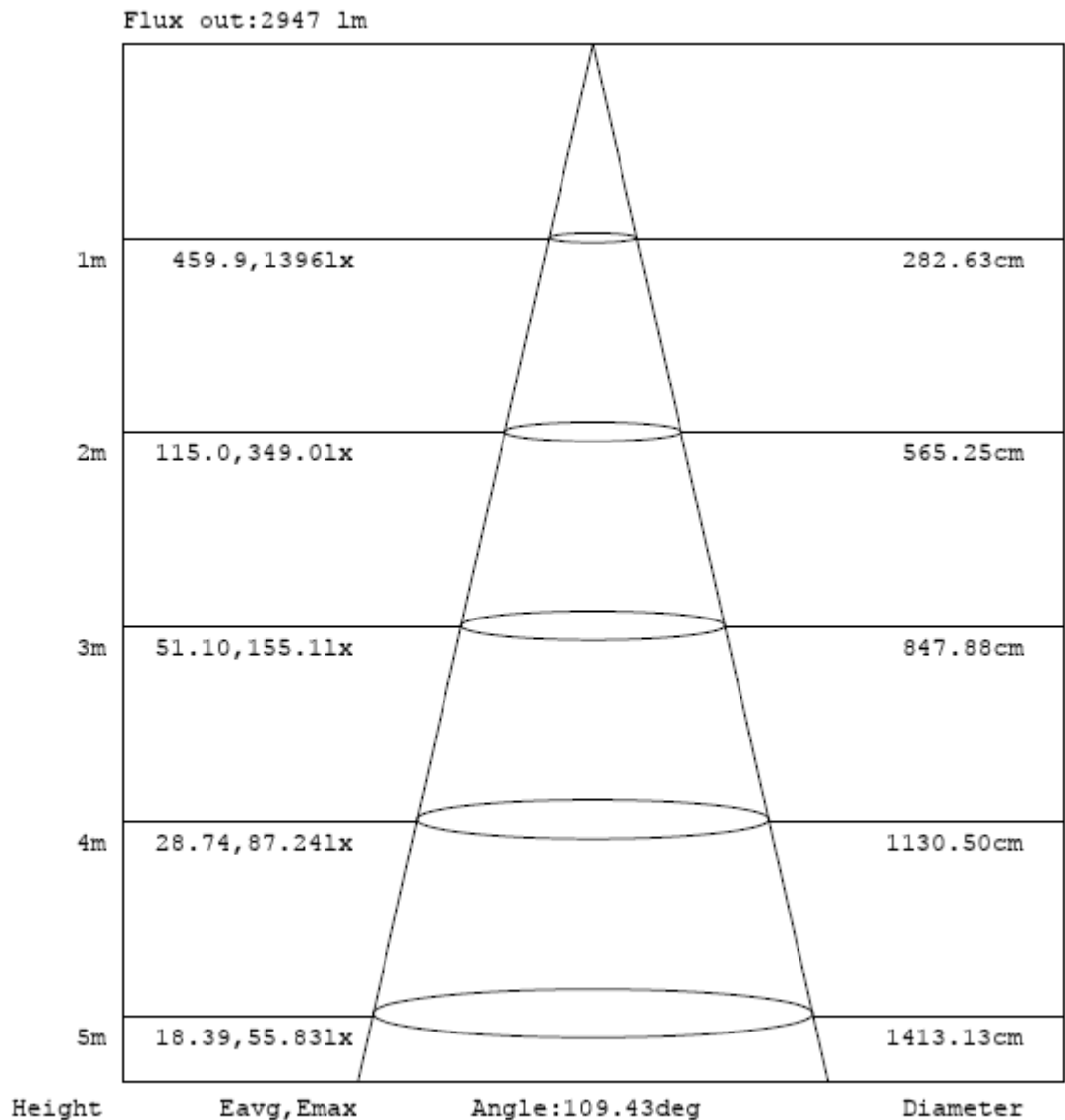
## Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	132.503	3.42%
10- 20	383.761	9.90%
20- 30	593.347	15.30%
30- 40	732.088	18.88%
40- 50	760.468	19.61%
50- 60	642.355	16.57%
60- 70	416.665	10.75%
70- 80	182.365	4.70%
80- 90	30.946	0.80%
90-100	0.33	0.01%
100-110	0.344	0.01%
110-120	0.359	0.01%
120-130	0.375	0.01%
130-140	0.416	0.01%
140-150	0.414	0.01%
150-160	0.348	0.01%
160-170	0.232	0.01%
170-180	0.084	0.00%
Total	3877.4	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	3244.522	83.68%
60- 90	629.976	16.25%
0-90	3874.498	99.93%
90- 180	2.902	0.07%
0- 180	3877.4	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



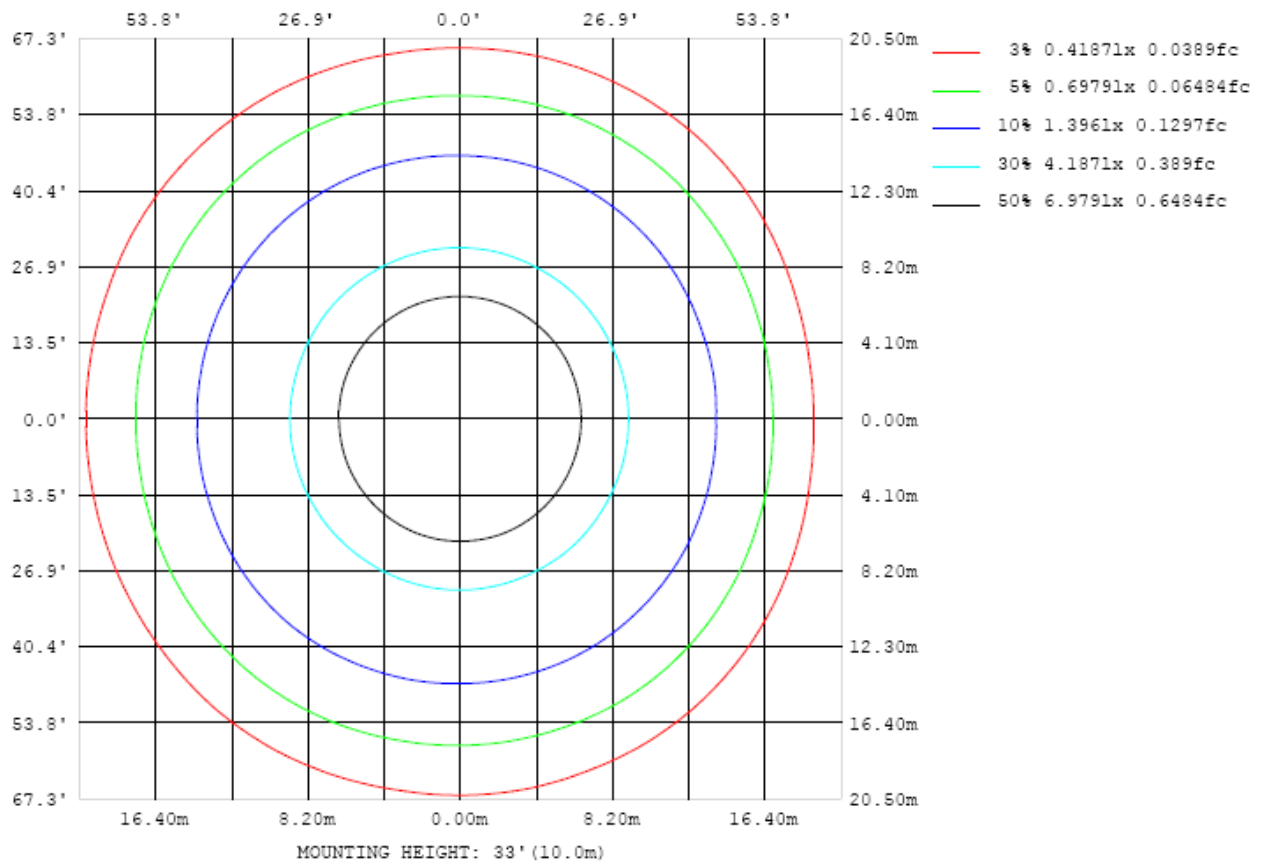


Chart 3: Illuminance Plot (Footcandles)

## Luminous Intensity Distribution Plots

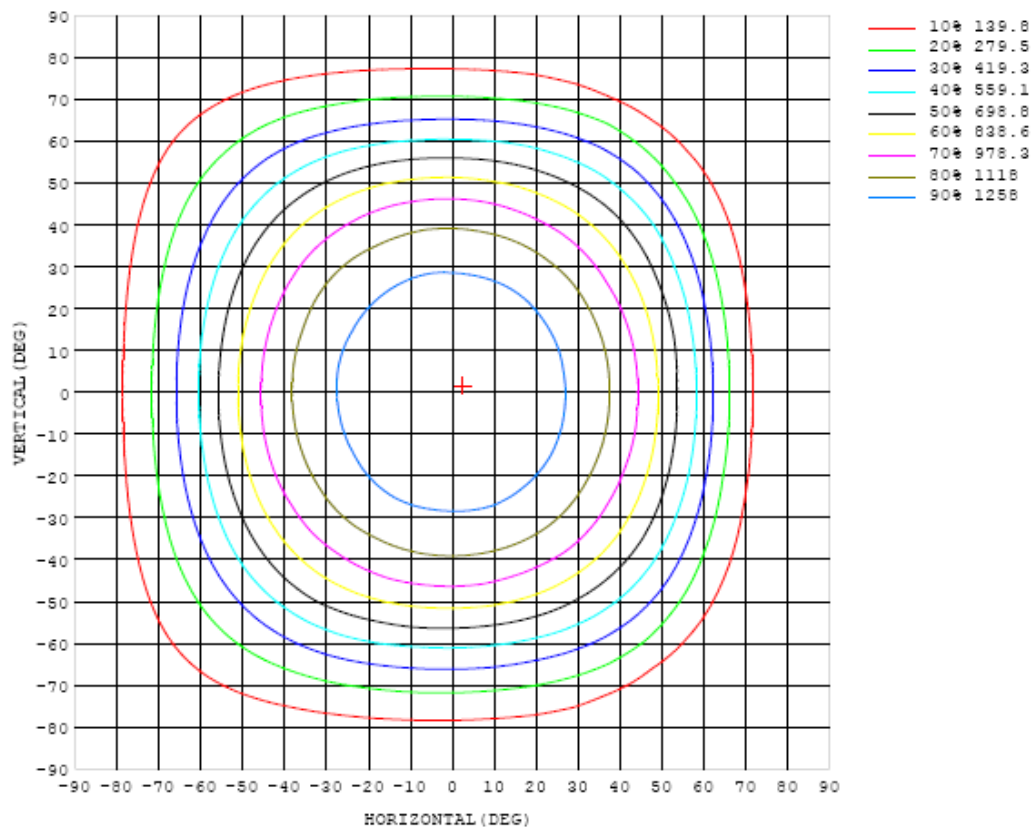


Chart 4: Isocandela Plot

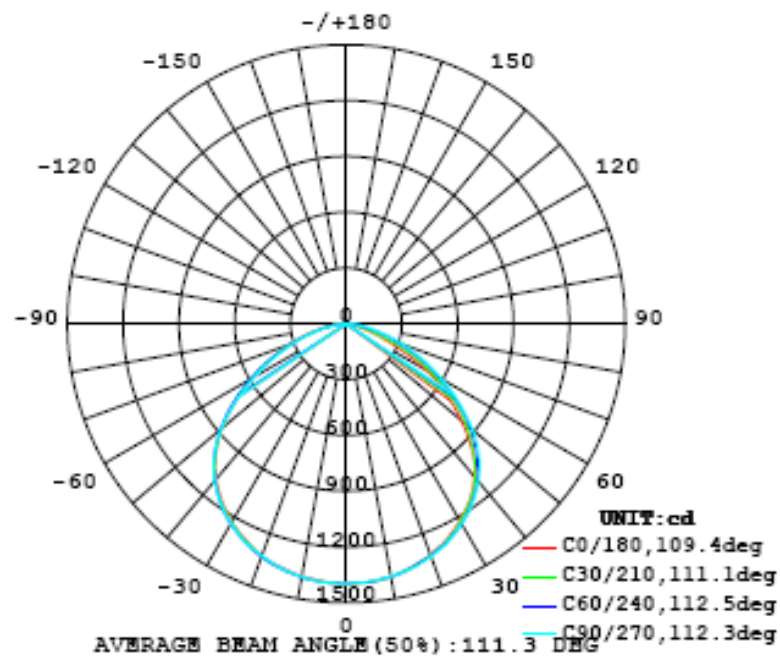


Chart 5: Polar Candela Distribution

## Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396
5	1394	1394	1395	1395	1395	1394	1393	1391	1390	1389	1389	1390	1390	1391	1390	1389	1389	1390	1391
10	1380	1379	1380	1379	1379	1380	1382	1382	1381	1380	1379	1376	1376	1376	1374	1375	1376	1375	1377
15	1356	1355	1355	1355	1357	1357	1358	1360	1361	1361	1359	1357	1357	1356	1354	1352	1352	1355	1355
20	1322	1322	1324	1325	1323	1324	1326	1329	1333	1331	1330	1328	1327	1324	1323	1321	1322	1323	1327
25	1279	1282	1283	1284	1286	1287	1290	1290	1292	1294	1293	1293	1291	1289	1286	1284	1282	1282	1281
30	1223	1224	1223	1228	1233	1236	1241	1244	1244	1242	1242	1243	1243	1238	1236	1232	1232	1230	1231
35	1157	1157	1158	1161	1167	1171	1176	1179	1181	1181	1183	1181	1177	1174	1171	1169	1168	1164	1166
40	1073	1074	1075	1079	1086	1094	1097	1100	1103	1105	1105	1102	1098	1098	1097	1092	1092	1092	1090
45	956	962	961	966	978	989	991	998	1006	1011	1012	1011	1007	1000	1002	996	998	996	993
50	808	817	827	840	852	862	872	878	886	887	889	892	890	888	882	879	875	874	873
55	658	666	678	695	705	717	728	734	737	740	746	749	756	758	753	745	734	729	722
60	499	507	518	539	556	571	581	584	588	593	597	605	611	612	604	597	584	577	574
65	313	321	349	383	407	425	436	441	450	452	454	459	465	464	457	449	445	442	441
70	175	179	193	217	258	287	302	313	319	323	328	328	330	327	325	321	318	318	319
75	74.9	79.7	89.3	102	122	158	186	199	204	209	211	212	210	209	210	210	209	207	209
80	7.41	7.45	16.1	26.9	40.2	56.7	81.6	102	108	112	113	115	115	115	116	117	116	115	117
85	0.16	0.17	0.20	0.26	0.98	4.17	10.4	22.4	32.7	35.7	37.7	41.1	43.1	44.9	45.6	46.4	45.8	44.6	44.7
90	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.29	1.70	3.25	3.21	3.32	3.25	2.88	2.39	2.99	1.07
95	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.28
100	0.16	0.16	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.17	0.15	0.14	0.14	0.35
105	0.20	0.20	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.21	0.21	0.21	0.21	0.21	0.20	0.19	0.18	0.17	0.42
110	0.25	0.25	0.24	0.24	0.23	0.24	0.24	0.25	0.24	0.24	0.24	0.24	0.23	0.23	0.22	0.21	0.21	0.20	0.46
115	0.31	0.31	0.30	0.29	0.29	0.29	0.29	0.30	0.29	0.29	0.29	0.29	0.28	0.27	0.26	0.26	0.25	0.25	0.45
120	0.39	0.38	0.36	0.35	0.35	0.36	0.36	0.36	0.35	0.35	0.35	0.35	0.33	0.32	0.32	0.32	0.32	0.32	0.43
125	0.45	0.44	0.43	0.42	0.42	0.44	0.44	0.41	0.41	0.41	0.41	0.41	0.39	0.39	0.39	0.40	0.39	0.39	0.43
130	0.52	0.51	0.50	0.49	0.48	0.50	0.51	0.49	0.48	0.48	0.48	0.47	0.47	0.46	0.46	0.47	0.46	0.46	0.45
135	0.57	0.57	0.56	0.55	0.54	0.55	0.56	0.55	0.54	0.55	0.55	0.54	0.53	0.52	0.52	0.54	0.53	0.53	0.51
140	0.63	0.63	0.62	0.60	0.60	0.61	0.59	0.58	0.58	0.59	0.58	0.57	0.57	0.57	0.57	0.58	0.58	0.58	0.57
145	0.69	0.70	0.69	0.66	0.64	0.64	0.63	0.62	0.63	0.63	0.62	0.61	0.62	0.62	0.61	0.62	0.63	0.63	0.64
150	0.75	0.75	0.75	0.72	0.68	0.67	0.67	0.67	0.68	0.68	0.67	0.66	0.66	0.67	0.67	0.68	0.70	0.69	0.71
155	0.79	0.78	0.78	0.75	0.70	0.68	0.68	0.69	0.69	0.70	0.70	0.70	0.71	0.73	0.74	0.75	0.74	0.74	0.77
160	0.81	0.81	0.80	0.78	0.73	0.69	0.69	0.70	0.68	0.70	0.72	0.72	0.74	0.77	0.80	0.80	0.78	0.77	0.81
165	0.85	0.85	0.84	0.82	0.76	0.74	0.74	0.72	0.71	0.74	0.75	0.77	0.79	0.82	0.82	0.81	0.81	0.80	0.84
170	0.88	0.86	0.86	0.80	0.76	0.76	0.79	0.77	0.75	0.78	0.81	0.83	0.85	0.85	0.85	0.85	0.85	0.84	0.85
175	0.95	0.91	0.87	0.86	0.86	0.84	0.82	0.81	0.81	0.82	0.83	0.84	0.85	0.85	0.85	0.84	0.84	0.84	0.85
180	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94

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	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396			
5	1392	1393	1393	1393	1394	1394	1395	1395	1395	1394	1393	1393	1395	1395	1394	1393	1393			
10	1380	1380	1381	1382	1382	1384	1383	1381	1381	1382	1383	1382	1383	1383	1383	1384	1382			
15	1358	1360	1362	1362	1362	1361	1362	1361	1360	1359	1359	1359	1360	1362	1360	1359	1357			
20	1328	1329	1329	1329	1331	1332	1331	1330	1327	1327	1327	1328	1330	1329	1327	1322	1322			
25	1286	1287	1287	1287	1289	1293	1294	1294	1292	1290	1289	1289	1287	1284	1279	1278	1277			
30	1234	1234	1234	1236	1240	1242	1244	1243	1239	1238	1238	1235	1233	1229	1226	1224	1222			
35	1170	1171	1173	1177	1178	1179	1178	1180	1178	1175	1173	1170	1165	1164	1161	1157	1156			
40	1090	1089	1096	1101	1101	1098	1101	1104	1102	1099	1094	1088	1085	1080	1074	1072	1073			
45	994	993	993	1000	1001	1004	1007	1007	1004	1001	989	979	971	963	954	954	957			
50	873	870	875	880	881	884	884	880	877	868	861	852	845	835	825	818	813			
55	724	730	734	739	741	742	738	732	725	723	719	711	704	695	682	669	667			
60	578	584	589	594	595	592	584	575	569	571	570	563	557	542	530	512	499			
65	442	444	450	452	451	444	435	426	423	423	421	417	410	390	360	333	316			
70	319	318	318	320	317	310	304	297	294	290	288	281	266	226	200	187	178			
75	208	207	204	204	201	196	191	186	182	178	173	159	127	106	91.2	82.8	77.4			
80	115	115	112	109	106	102	97.8	93.1	89.3	85.3	76.7	54.1	38.7	26.1	16.1	9.59	5.69			
85	43.5	42.3	40.3	37.7	34.7	30.3	27.4	23.9	21.6	18.0	7.43	0.49	0.39	0.32	0.29	0.28	0.28			
90	1.02	0.92	0.90	0.82	0.72	0.52	0.36	0.31	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.29	0.29			
95	0.29	0.30	0.31	0.33	0.35	0.36	0.36	0.37	0.37	0.37	0.37	0.37	0.37	0.36	0.36	0.36	0.35	0.35		
100	0.36	0.37	0.40	0.43	0.45	0.46	0.46	0.44	0.44	0.43	0.43	0.42	0.42	0.42	0.42	0.41	0.41			
105	0.44	0.45	0.46	0.48	0.50	0.51	0.50	0.49	0.48	0.48	0.46	0.46	0.45	0.44	0.43	0.43	0.43			
110	0.47	0.47	0.48	0.49	0.50	0.50	0.50	0.48	0.48	0.47	0.46	0.45	0.44	0.43	0.42	0.42	0.42			
115	0.46	0.46	0.46	0.46	0.46	0.47	0.46	0.46	0.45	0.44	0.43	0.41	0.40	0.40	0.40	0.41	0.41			
120	0.44	0.43	0.43	0.42	0.42	0.42	0.42	0.42	0.40	0.40	0.40	0.39	0.38	0.38	0.38	0.40	0.41			
125	0.43	0.43	0.42	0.41	0.41	0.41	0.42	0.42	0.42	0.41	0.41	0.40	0.41	0.40	0.42	0.43	0.44			
130	0.45	0.45	0.45	0.44	0.44	0.45	0.46	0.47	0.47	0.47	0.48	0.46	0.46	0.48	0.49	0.50	0.51			
135	0.52	0.52	0.53	0.53	0.53	0.53	0.53	0.55	0.55	0.54	0.52	0.54	0.54	0.55	0.55	0.56	0.56			
140	0.59	0.60	0.61	0.62	0.62	0.61	0.61	0.62	0.62	0.60	0.60	0.61	0.62	0.62	0.62	0.63	0.63			
145	0.66	0.72	0.73	0.66	0.68	0.69	0.68	0.69	0.70	0.66	0.66	0.68	0.69	0.69	0.70	0.71	0.70			
150	0.73	0.74	0.74	0.74	0.75	0.74	0.73	0.73	0.72	0.72	0.73	0.72	0.74	0.76	0.80	0.78	0.77			
155	0.79	0.79	0.80	0.81	0.80	0.78	0.76	0.77	0.76	0.75	0.76	0.76	0.77	0.81	0.85	0.84	0.83			
160	0.83	0.84	0.85	0.86	0.86	0.84	0.81	0.80	0.79	0.76	0.78	0.77	0.80	0.84	0.86	0.86	0.84			
165	0.87	0.86	0.86	0.87	0.88	0.89	0.88	0.86	0.83	0.82	0.83	0.83	0.83	0.86	0.89	0.90	0.87			
170	0.88	0.88	0.89	0.90	0.91	0.92	0.92	0.92	0.89	0.85	0.86	0.89	0.87	0.88	0.94	0.94	0.91			
175	0.89	0.93	0.93	0.93	0.94	0.94	0.95	0.95	0.93	0.92	0.90	0.87	0.86	0.85	0.91	0.92	0.95			
180	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			

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  $10^\circ$  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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