



LM-79-08 Test Report

for

ABBlighting, Inc.

3 Adams St Belvidere, NJ 07823.

55W PKG

Model: ABBPKG55501

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ15050026b

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

Reviewed by:

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May 26, 2015



Jim Zhang

Manager: Jim Zhang
May 26, 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: **ABBPKG55501**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
96.0	4754.6	49.55	0.9957
CCT (K)	CRI	Stabilization Time (Light & Power)	
4947	78.4	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : May 21, 2015

Date of Test : May 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

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Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: 55W PKG
Model	: ABBPKG55501
Electrical Ratings	: 100~277VAC, 50/60Hz, 55W
Product Description	: 5000K, Parking Garage Luminaires, Plastic Light Cover Manufacturer of light source: Philips Lumileds Model of light source: LUXEON 3030 2D Quantity of light source: 60 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 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 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		
Test Voltage (V)	120.0	100.0	277.0
Voltage frequency (Hz)	60	60	60
Test Current (A)	0.415	0.502	0.187
Power Factor	0.9957	0.9970	0.9540
Test Power (W)	49.55	50.00	49.44
THD A%	6.03	5.23	15.46
Luminous Efficacy (lm/W)	96.0	94.7	95.7
Total Luminous Flux (lm)	4754.6	4734.1	4732.7
Color Rendering Index (CRI)	78.4		
R9	-3		
Correlated Color Temperature (CCT) (K)	4947		
Chromaticity (Chroma x, Chroma y)	(0.3468, 0.3549)		
Chromaticity (Chroma u, Chroma v)	(0.2113, 0.3243)		
Chromaticity (Chroma u', Chroma v')	(0.2113, 0.4865)		
Duv	0.0010		
Average Beam Angle (°)	172.9		
Center Beam Candle Power (cd)	489		
Spacing Criteria	2.00 (0°-180°)/ 1.89 (90°-270°)		
Zonal Lumens in the 0°-60°Zone	46.97%		
Zonal Lumens in the 60°-90°Zone	45.29%		
Zonal Lumens in the 90°-120°Zone	5.28%		
Zonal Lumens in the 120°-180°Zone	2.46%		

Special Color Rendering Indices	
R1	77
R2	85
R3	87
R4	76
R5	76
R6	77
R7	85
R8	64
R9	-3
R10	60
R11	72
R12	50
R13	79
R14	93

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

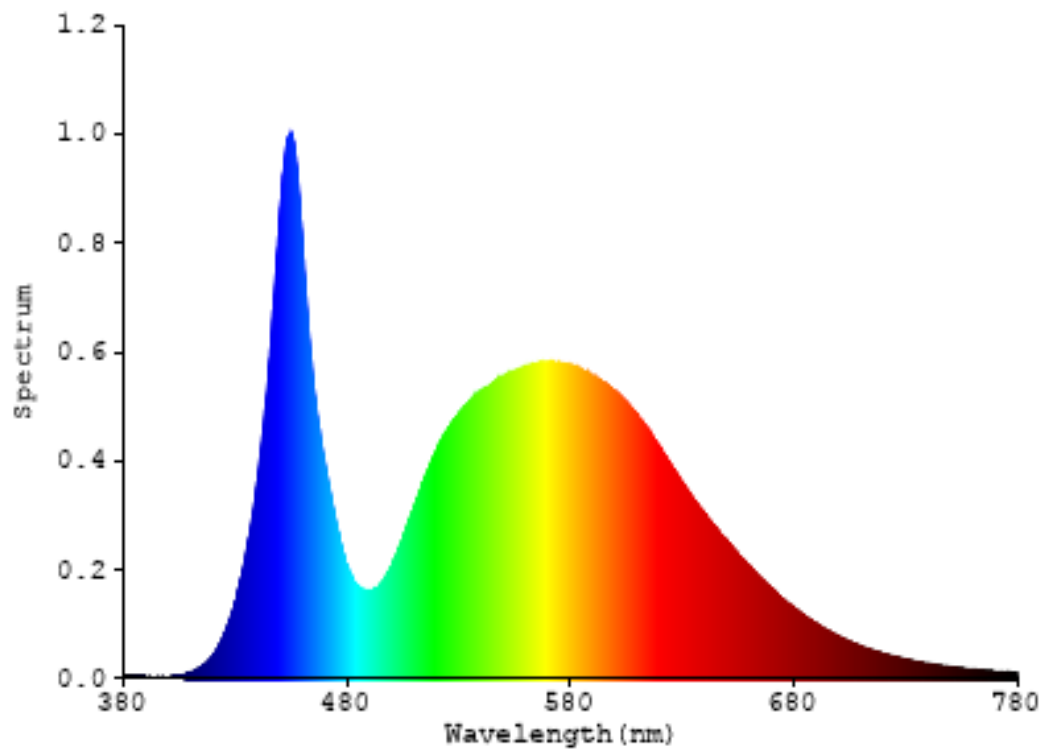


Chart 1: Spectral Power Distribution

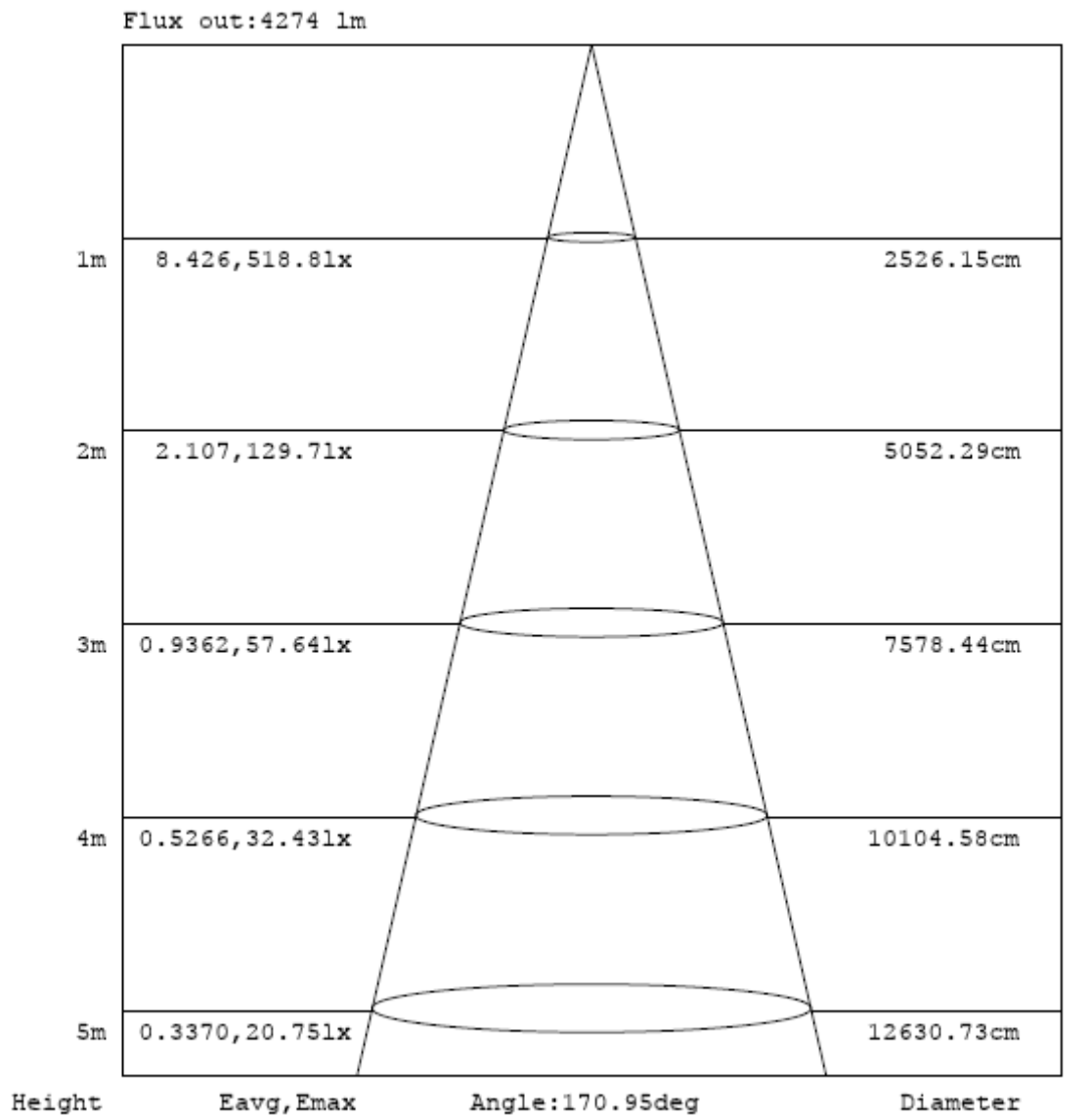
Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	48.304	1.02%
10- 20	155.173	3.26%
20- 30	286.03	6.02%
30- 40	433.976	9.13%
40- 50	537.756	11.31%
50- 60	771.921	16.24%
60- 70	896.443	18.85%
70- 80	815.052	17.14%
80- 90	441.704	9.29%
90-100	108.246	2.28%
100-110	70.451	1.48%
110-120	72.558	1.53%
120-130	66.74	1.40%
130-140	35.684	0.75%
140-150	12.359	0.26%
150-160	1.911	0.04%
160-170	0.209	0.00%
170-180	0.072	0.00%
Total	4754.6	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	2233.16	46.97%
60- 90	2153.199	45.29%
0-90	4386.359	92.26%
90- 180	368.23	7.74%
0- 180	4754.6	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

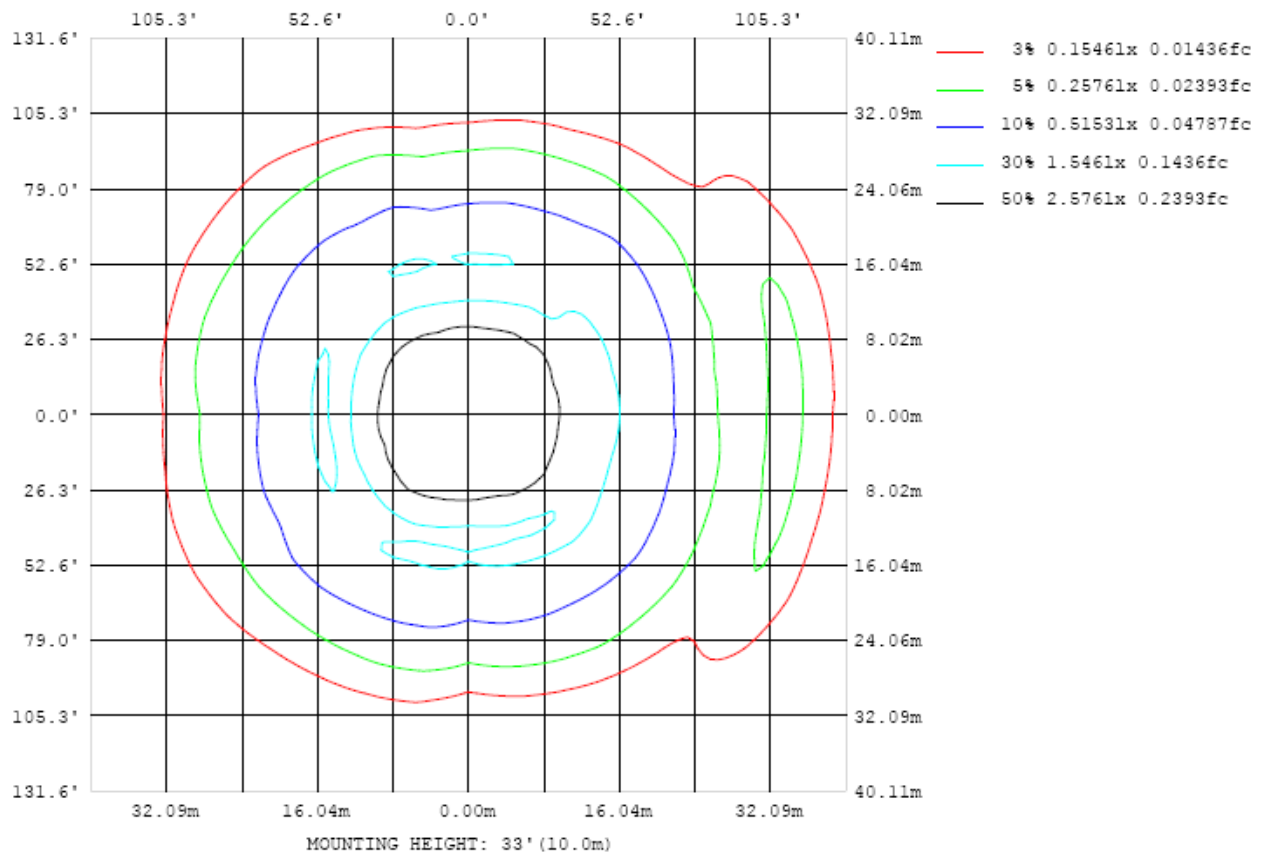


Chart 3: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

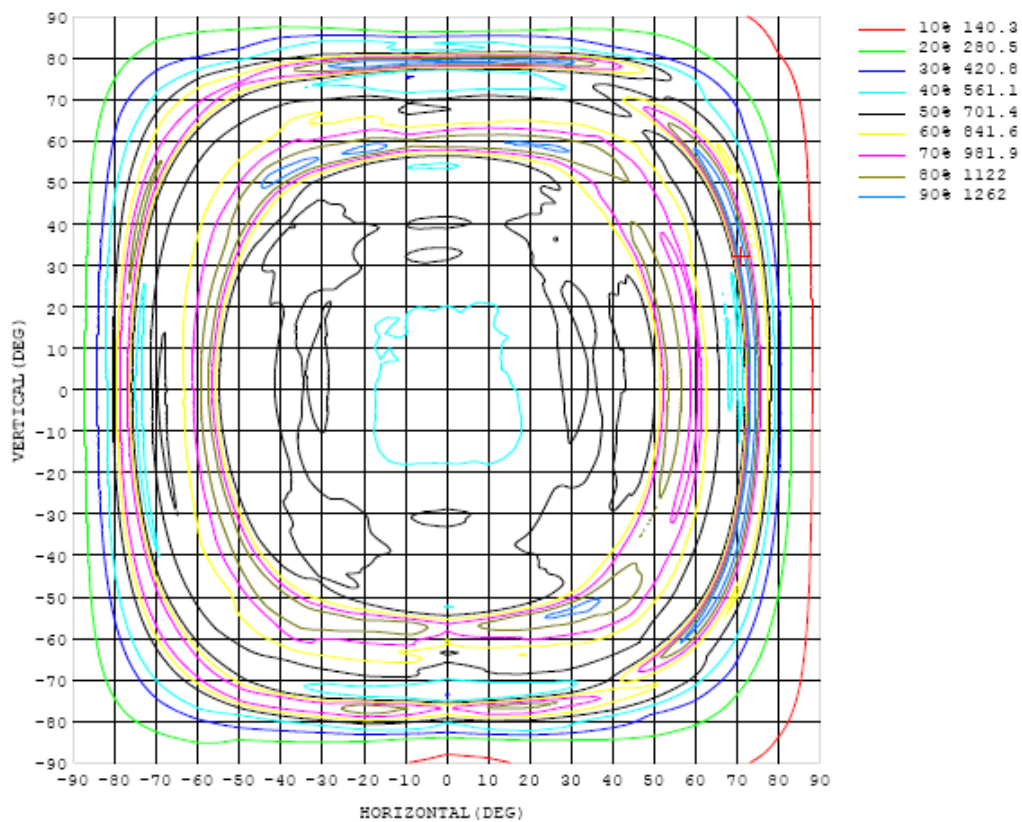


Chart 4: Isocandela Plot

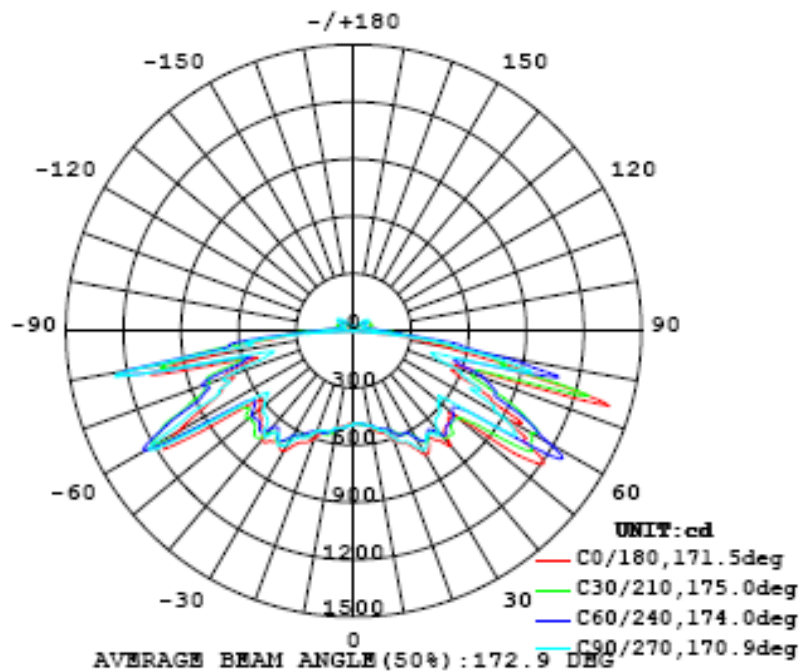


Chart 5: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489
5	496	491	492	495	497	490	486	489	492	491	489	487	487	493	500	501	502	500	502
10	519	512	509	505	503	510	505	502	510	507	498	509	510	508	517	523	528	529	529
15	554	553	550	538	533	524	529	538	539	541	536	537	535	532	531	541	543	546	546
20	599	589	568	554	551	548	554	581	579	589	585	570	557	545	549	556	582	594	597
25	650	631	612	596	588	595	600	613	632	641	625	611	587	590	590	603	619	640	644
30	749	726	674	644	645	636	651	671	702	722	706	668	636	632	650	659	681	715	726
35	681	657	658	681	706	683	667	639	650	665	655	662	696	696	695	671	659	690	707
40	787	759	720	723	750	743	712	680	675	683	692	693	722	740	727	720	712	725	737
45	697	691	694	718	750	733	695	649	633	626	645	678	716	760	723	705	687	691	690
50	697	689	694	712	731	737	677	634	583	572	604	650	702	709	707	672	675	673	656
55	1211	1190	1102	1084	954	803	765	830	822	770	809	791	735	717	689	674	722	735	708
60	951	941	971	1071	1207	1289	1174	1095	1001	872	1081	1124	1243	1162	1177	1170	1141	1072	1056
65	733	785	816	904	1010	952	818	840	823	730	900	922	916	1041	988	905	864	804	767
70	561	607	648	668	704	722	723	685	621	549	673	728	714	743	761	718	747	751	709
75	1141	1122	1139	1188	1038	724	604	617	602	532	623	546	546	572	607	582	599	581	544
80	479	510	577	668	711	743	743	753	716	613	770	930	922	986	1079	987	884	799	767
85	215	233	266	301	320	323	301	274	236	209	239	296	324	349	386	400	404	371	367
90	118	130	145	154	158	154	153	150	130	120	142	162	168	178	182	176	170	152	156
95	62.1	62.5	64.1	75.4	90.9	101	105	101	83.5	80.9	92.7	104	106	107	98.8	82.7	68.3	68.7	71.7
100	46.3	49.8	63.6	66.8	63.8	66.3	69.3	66.4	62.8	64.6	66.5	69.5	69.9	66.9	61.8	58.3	53.5	38.6	42.4
105	92.3	79.5	82.2	94.7	69.4	59.5	56.5	52.0	54.9	56.4	54.8	54.0	55.7	57.8	63.0	88.3	69.2	69.2	83.5
110	92.6	78.5	79.7	99.0	88.4	67.9	53.8	42.3	45.6	45.5	46.4	44.1	55.3	65.2	83.1	91.7	68.7	70.1	83.5
115	90.3	74.0	71.4	92.3	95.4	85.9	61.8	53.3	48.6	47.0	51.0	54.2	68.7	86.2	87.3	83.8	62.8	68.8	82.7
120	86.8	69.6	66.4	87.9	89.7	83.6	80.0	85.5	84.4	81.4	82.4	81.4	80.5	83.5	83.2	78.4	58.5	67.4	80.2
125	78.4	61.3	55.2	75.6	74.1	68.5	80.6	96.1	100	99.8	96.1	89.6	75.5	67.7	71.5	66.7	47.6	58.2	71.4
130	34.4	48.0	36.8	49.9	47.8	57.8	74.0	87.2	91.2	91.7	88.1	81.5	67.8	51.3	45.7	44.4	37.0	43.6	31.8
135	30.5	30.6	19.0	18.8	29.9	47.4	62.2	70.6	74.3	75.4	71.7	67.4	56.6	40.3	22.4	10.9	18.2	27.0	26.9
140	10.0	7.09	2.15	1.10	19.3	35.0	47.8	54.8	58.4	59.8	56.5	51.6	42.3	28.2	11.1	1.04	2.98	6.47	7.89
145	0.99	0.96	0.96	0.97	5.97	20.3	31.1	38.5	42.1	43.1	40.5	35.1	26.7	14.4	0.90	0.95	0.95	0.95	1.05
150	0.91	0.91	0.84	0.90	0.89	5.20	14.4	20.7	24.9	25.8	23.5	18.3	11.1	0.83	0.86	0.87	0.81	0.89	0.93
155	0.85	0.86	0.78	0.83	0.81	0.79	0.76	3.42	6.86	7.21	5.68	2.05	0.76	0.80	0.83	0.80	0.75	0.82	0.84
160	0.82	0.82	0.81	0.74	0.77	0.75	0.72	0.67	0.67	0.68	0.72	0.71	0.74	0.79	0.79	0.73	0.80	0.79	0.81
165	0.81	0.81	0.81	0.80	0.73	0.69	0.65	0.63	0.63	0.64	0.66	0.68	0.74	0.75	0.75	0.82	0.81	0.79	0.81
170	0.81	0.81	0.79	0.77	0.76	0.71	0.64	0.60	0.64	0.65	0.61	0.64	0.73	0.81	0.82	0.82	0.81	0.81	0.82
175	0.81	0.81	0.80	0.79	0.80	0.78	0.71	0.67	0.72	0.71	0.69	0.69	0.76	0.81	0.83	0.84	0.83	0.82	0.82
180	0.77	0.78	0.79	0.81	0.81	0.81	0.77	0.74	0.75	0.77	0.73	0.73	0.78	0.82	0.81	0.80	0.76	0.72	0.76

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	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489	489		
5	510	512	509	506	503	506	507	507	505	503	503	503	509	504	500	501	497		
10	539	539	539	534	539	537	527	526	519	523	530	530	524	519	521	520	520		
15	559	558	563	551	554	557	554	556	547	554	553	538	541	549	563	565	557		
20	603	591	559	561	562	561	553	567	560	567	548	553	568	563	584	606	606		
25	650	630	609	579	574	598	616	624	618	614	588	582	579	616	633	645	658		
30	722	679	644	624	625	636	656	684	683	657	621	619	644	638	680	735	761		
35	695	678	704	697	703	694	669	678	677	656	677	679	694	715	694	676	693		
40	736	712	714	767	723	665	680	720	723	697	663	693	768	738	723	750	789		
45	683	692	728	740	733	691	636	640	641	625	660	723	719	779	717	683	695		
50	645	666	717	706	717	689	632	600	607	615	673	690	721	743	717	678	683		
55	687	659	700	705	667	638	592	575	577	595	622	679	783	900	1140	1179	1206		
60	1098	1153	1190	1097	1153	1255	1319	1145	1230	1255	1240	1124	1087	1075	1014	947	923		
65	840	923	976	1089	1030	936	884	731	769	817	903	1015	1124	1053	913	844	760		
70	765	784	804	792	856	839	839	694	716	771	769	782	763	744	642	653	586		
75	574	584	602	611	601	584	524	424	432	483	514	559	699	988	1213	1234	1190		
80	851	914	964	981	1098	1189	1224	1083	1131	1247	1316	1278	942	668	610	578	508		
85	442	488	426	420	478	546	499	428	448	466	490	434	391	358	319	273	229		
90	170	188	196	189	191	185	175	143	141	161	173	182	179	173	165	146	123		
95	79.1	86.3	97.2	111	117	117	109	91.6	89.6	104	116	120	121	107	89.5	73.1	63.0		
100	45.5	49.4	57.0	63.1	71.1	75.8	74.4	69.0	67.8	72.3	78.3	76.8	71.7	65.3	56.2	52.0	39.0		
105	73.2	75.2	83.6	61.5	55.5	55.6	54.6	56.2	56.3	54.9	56.2	57.5	61.3	68.1	98.6	84.5	78.9		
110	70.4	74.4	91.0	77.7	61.9	54.0	45.9	46.5	47.0	46.4	49.3	60.4	71.0	91.6	101	81.2	79.2		
115	64.8	69.5	86.0	87.5	84.9	66.2	58.0	52.4	50.2	53.7	57.8	76.8	93.4	93.3	90.3	70.3	76.0		
120	62.4	66.7	82.7	85.6	86.2	85.8	90.7	89.0	86.9	87.2	82.9	83.3	90.2	91.4	83.4	62.1	73.0		
125	53.7	58.1	75.4	75.9	75.4	88.5	100.0	106	107	100	89.5	74.7	75.7	80.8	74.2	51.6	66.4		
130	41.7	39.5	53.1	54.3	65.8	81.4	92.2	97.5	98.8	93.2	84.2	68.5	54.4	55.6	54.7	40.3	43.1		
135	23.6	15.3	23.8	37.6	55.8	68.4	76.7	82.7	84.4	78.9	72.6	59.1	41.7	27.1	21.4	23.1	33.2		
140	4.81	1.81	9.46	27.3	42.6	55.0	62.0	66.8	67.8	63.8	57.8	46.3	31.4	14.0	1.23	5.10	8.79		
145	0.87	1.02	1.03	14.8	28.5	39.4	45.5	50.2	51.0	47.3	41.9	32.1	18.4	1.72	0.95	0.94	0.98		
150	0.91	0.91	0.93	0.91	13.3	22.8	28.3	32.3	33.0	29.9	24.9	16.0	3.74	0.86	0.87	0.75	0.88		
155	0.84	0.72	0.82	0.85	0.83	3.85	10.8	13.9	14.6	12.4	7.24	0.76	0.78	0.80	0.81	0.71	0.82		
160	0.82	0.82	0.71	0.81	0.80	0.77	0.74	0.73	0.69	0.66	0.67	0.74	0.76	0.77	0.72	0.80	0.81		
165	0.81	0.81	0.83	0.72	0.73	0.75	0.68	0.65	0.62	0.63	0.61	0.66	0.69	0.70	0.73	0.81	0.81		
170	0.82	0.83	0.84	0.85	0.84	0.75	0.66	0.61	0.62	0.63	0.58	0.60	0.67	0.73	0.79	0.80	0.81		
175	0.82	0.83	0.82	0.83	0.80	0.77	0.70	0.65	0.67	0.69	0.66	0.64	0.70	0.75	0.77	0.77	0.78		
180	0.76	0.78	0.79	0.81	0.81	0.81	0.77	0.74	0.74	0.77	0.73	0.72	0.77	0.82	0.81	0.79	0.76		

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 ***

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