LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Flood Light

Model: FL26301

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17030090a

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

Reviewed by: April Zou

Engineer: April Zou

Apr. 13, 2017

Approved by: Jim Zhang

Manager: Jim Zhang

Apr. 13, 2017

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: **FL26301**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
108.1	2781.2	25.72	0.9917
CCT (K)	**CRI**	**BUG**	**Stabilization Time (Light & Power)**
2972	72.9	B1-U1-G0	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Mar. 24, 2017

Date of Test : Apr. 01, 2017

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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Sample Photo

Figure 1- Overview of the sample

Equipment Under Test (EUT)	
Name	: V-Line Flood Light
Model	: FL26301
Electrical Ratings	: 120~277Vac, 50/60Hz
Product Description	: 3000K Manufacturer of light source: Samsung Model of light source: LH351B
Manufacturer	: ABOVE ALL LIGHTING (SHANGHAI) Co., Ltd.
Address	: Room 1012, North Minch Fortune 108 Plaza, # 1839 Qixin road, Shanghai

TEST RESULTS

Test ambient temperature was 24.6℃.

Base orientation was Base up. 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 2.47 m.

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

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.216	0.101
Power Factor	0.9917	0.9352
Test Power (W)	25.72	26.07
THD A%	6.67	8.24
Luminous Efficacy (lm/W)	108.1	107.1
Total Luminous Flux (lm)	2781.2	2792.1
Color Rendering Index (CRI)	72.9	
R9	-26	
Correlated Color Temperature (CCT) (K)	2972	
Chromaticity (Chroma x, Chroma y)	(0.4416, 0.4101)	
Chromaticity (Chroma u, Chroma v)	(0.2510, 0.3496)	
Chromaticity (Chroma u', Chroma v')	(0.2510, 0.5244)	
Duv	0.0017	
Average Beam Angle (°)	81.7	
Center Beam Candle Power (cd)	1395	
Spacing Criteria	0.71 (0°-180°)/ 1.30 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	95.04%	
Zonal Lumens in the 60°-90°Zone	4.88%	
Zonal Lumens in the 90°-120°Zone	0.01%	
Zonal Lumens in the 120°-180°Zone	0.06%	

Special Color Rendering Indices	
R1	69
R2	83
R3	95
R4	68
R5	68
R6	76
R7	79
R8	46
R9	-26
R10	61
R11	62
R12	51
R13	71
R14	97

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

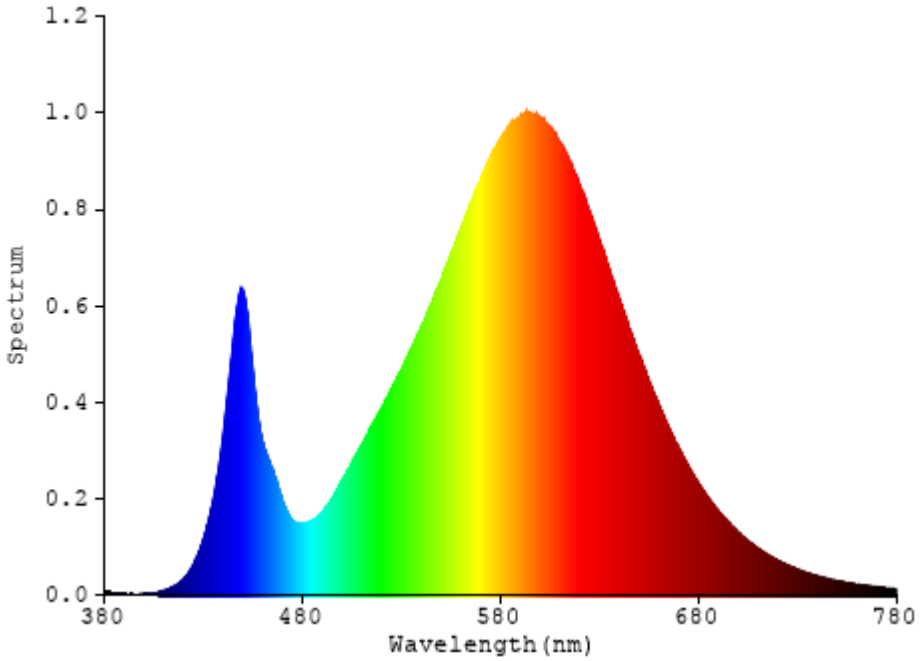


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	132.578	4.77%
10- 20	377.565	13.58%
20- 30	560.281	20.15%
30- 40	618.392	22.23%
40- 50	582.855	20.96%
50- 60	371.704	13.36%
60- 70	119.551	4.30%
70- 80	15.242	0.55%
80- 90	1.004	0.04%
90-100	0.043	0.00%
100-110	0.111	0.00%
110-120	0.191	0.01%
120-130	0.279	0.01%
130-140	0.385	0.01%
140-150	0.415	0.01%
150-160	0.341	0.01%
160-170	0.217	0.01%
170-180	0.076	0.00%
Total	2781.2	100%

γ(°)	Lumens	% Total
0- 60	2643.375	95.04%
60- 90	135.797	4.88%
0-90	2779.172	99.93%
90- 180	2.058	0.07%
0- 180	2781.2	100%

Table 3: Zonal Lumen Data

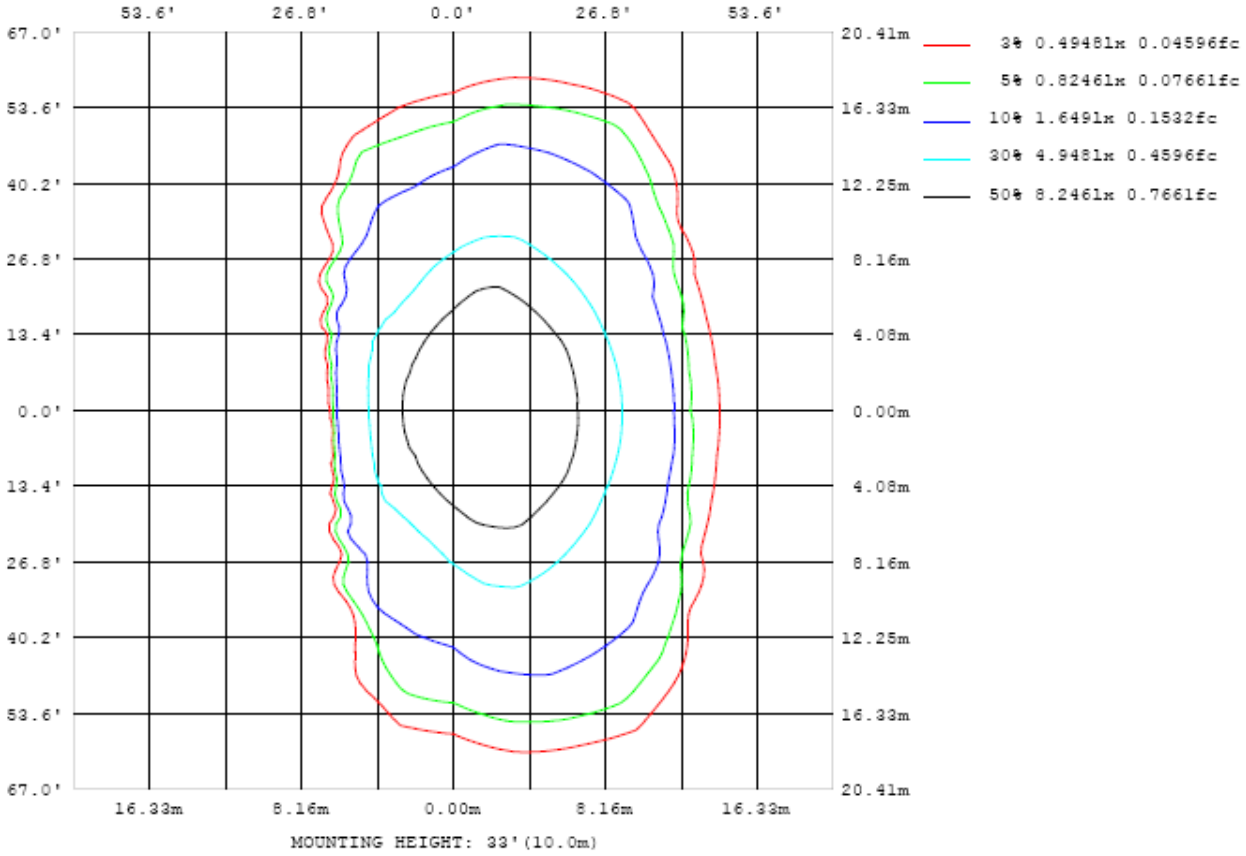


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

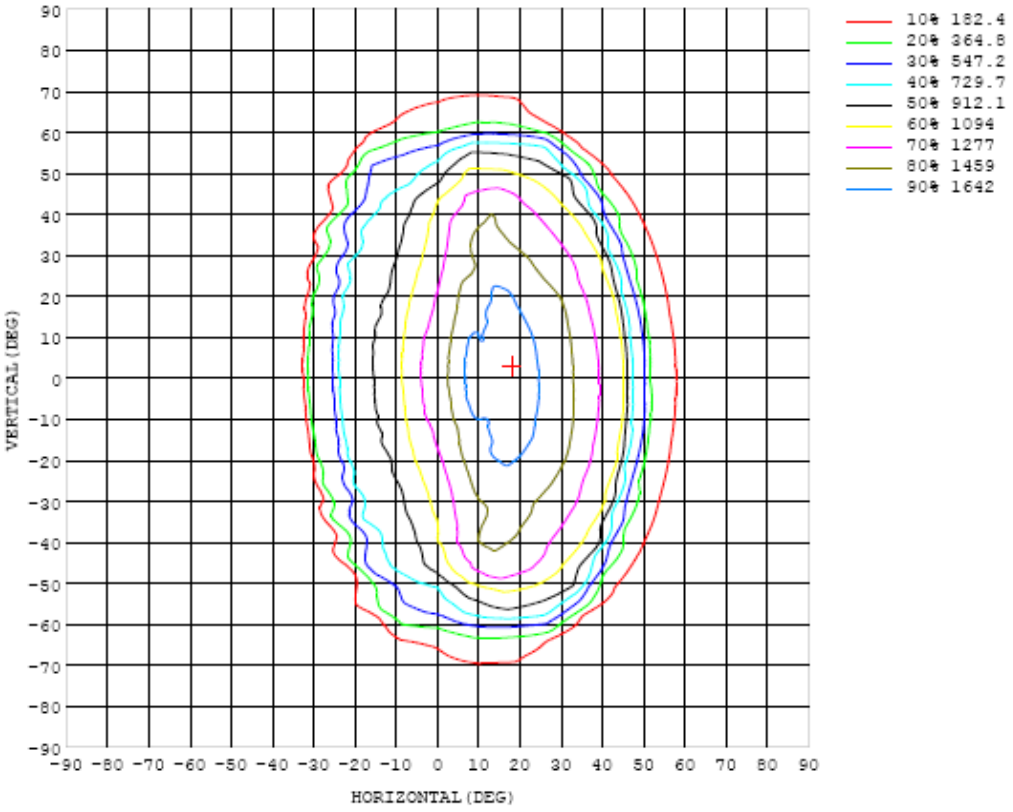


Chart 3: Isocandela Plot

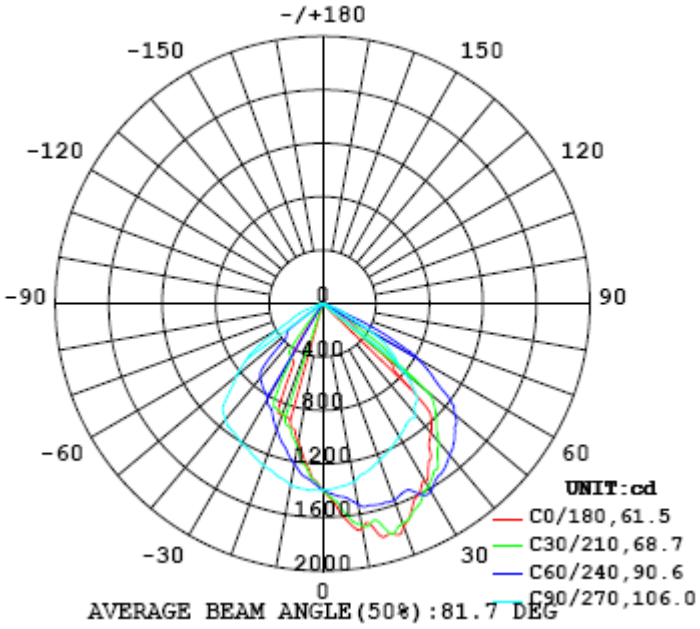


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395
5	1581	1570	1549	1522	1488	1469	1448	1428	1403	1377	1351	1322	1308	1300	1272	1245	1239	1236	1234
10	1708	1713	1712	1684	1642	1603	1523	1444	1405	1357	1298	1261	1203	1157	1108	1076	1056	1053	1053
15	1804	1809	1791	1717	1639	1623	1558	1458	1364	1297	1220	1157	1084	1030	969	955	959	939	931
20	1776	1784	1783	1751	1743	1617	1565	1493	1339	1246	1155	1065	980	930	882	877	883	884	883
25	1622	1638	1657	1677	1686	1671	1538	1485	1325	1203	1076	964	889	848	850	842	708	604	584
30	1534	1539	1563	1582	1586	1613	1621	1472	1318	1146	1001	870	818	812	603	473	473	471	468
35	1413	1422	1453	1504	1496	1510	1550	1446	1322	1096	931	815	779	500	447	268	47.5	49.6	50.4
40	1262	1270	1288	1354	1410	1438	1478	1548	1347	1079	869	755	597	433	47.9	43.9	34.5	33.8	32.5
45	1110	1151	1172	1200	1254	1337	1400	1438	1267	1003	815	704	396	39.3	40.4	34.5	24.0	30.3	33.0
50	589	674	687	1014	1109	1192	1294	1309	1106	788	678	501	119	23.6	29.7	31.0	34.4	36.8	34.9
55	264	270	302	471	699	1017	1054	1048	872	618	549	319	15.2	19.6	36.7	38.8	37.3	34.5	31.7
60	54.6	89.7	159	209	262	664	813	742	602	408	383	51.4	13.1	23.8	29.8	46.1	39.7	39.6	39.0
65	55.4	51.7	47.5	34.0	123	142	380	330	322	203	141	8.29	15.0	30.8	42.7	45.0	45.6	43.5	43.5
70	29.2	30.1	29.3	29.6	24.1	26.0	69.9	197	172	113	68.9	7.56	18.2	34.9	39.4	29.2	26.5	25.6	25.3
75	10.2	10.7	11.1	11.7	13.6	5.54	6.91	8.27	7.49	6.92	3.94	3.94	15.2	15.9	17.5	12.9	6.57	4.05	3.72
80	2.60	2.87	3.29	3.37	3.03	3.39	3.70	4.64	5.40	4.49	2.79	2.15	1.53	2.35	2.66	3.31	1.35	0.63	0.56
85	0.18	0.30	0.46	0.66	0.93	1.27	1.88	2.64	2.77	2.20	1.47	1.01	0.78	0.61	0.46	0.33	0.23	0.13	0.07
90	0.03	0.05	0.08	0.10	0.12	0.10	0.07	0.07	0.04	0.04	0.04	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.01
95	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.07	0.08	0.08	0.07	0.06	0.07	0.03	0.02	0.02	0.02
100	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.12	0.15	0.16	0.15	0.13	0.10	0.07	0.05	0.04	0.04
105	0.01	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.07	0.19	0.22	0.24	0.23	0.21	0.17	0.13	0.10	0.08	0.08
110	0.01	0.01	0.01	0.02	0.03	0.05	0.07	0.09	0.10	0.24	0.28	0.30	0.31	0.29	0.25	0.21	0.17	0.15	0.15
115	0.01	0.01	0.02	0.04	0.06	0.08	0.11	0.13	0.14	0.29	0.33	0.36	0.36	0.35	0.33	0.30	0.26	0.24	0.23
120	0.02	0.02	0.04	0.06	0.09	0.12	0.15	0.18	0.19	0.36	0.39	0.41	0.42	0.43	0.41	0.39	0.36	0.34	0.34
125	0.03	0.05	0.07	0.10	0.13	0.17	0.21	0.25	0.26	0.43	0.46	0.47	0.49	0.51	0.51	0.50	0.49	0.47	0.47
130	0.07	0.09	0.11	0.14	0.18	0.23	0.28	0.32	0.34	0.52	0.56	0.57	0.60	0.63	0.66	0.66	0.66	0.65	0.64
135	0.12	0.14	0.17	0.20	0.25	0.31	0.37	0.41	0.45	0.61	0.67	0.69	0.73	0.78	0.82	0.84	0.84	0.85	0.84
140	0.18	0.20	0.23	0.26	0.32	0.37	0.42	0.47	0.52	0.70	0.76	0.80	0.85	0.91	0.96	0.98	0.99	1.00	0.99
145	0.24	0.26	0.30	0.33	0.37	0.43	0.46	0.51	0.56	0.78	0.83	0.89	0.93	0.99	1.05	1.09	1.10	1.10	1.10
150	0.31	0.34	0.37	0.40	0.44	0.48	0.50	0.54	0.58	0.81	0.86	0.91	0.97	1.03	1.07	1.12	1.14	1.15	1.10
155	0.38	0.42	0.46	0.47	0.51	0.53	0.56	0.58	0.61	0.82	0.85	0.90	0.97	1.01	1.04	1.08	1.11	1.12	1.11
160	0.44	0.51	0.54	0.55	0.58	0.61	0.61	0.62	0.65	0.83	0.85	0.87	0.91	0.97	1.00	1.02	1.05	1.07	1.02
165	0.54	0.59	0.64	0.65	0.67	0.68	0.67	0.68	0.69	0.82	0.84	0.85	0.87	0.90	0.93	0.95	0.98	0.98	0.98
170	0.61	0.63	0.70	0.71	0.71	0.72	0.72	0.73	0.75	0.83	0.83	0.85	0.86	0.87	0.88	0.89	0.91	0.90	0.90
175	0.70	0.76	0.79	0.80	0.80	0.82	0.82	0.84	0.85	0.84	0.85	0.86	0.86	0.86	0.85	0.85	0.86	0.87	0.85
180	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79

Table 4: Luminous Intensity Data

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395	1395		
5	1237	1241	1256	1285	1306	1313	1331	1363	1396	1417	1438	1454	1484	1512	1546	1572	1580		
10	1054	1064	1094	1121	1181	1217	1277	1319	1378	1410	1469	1556	1623	1659	1695	1704	1706		
15	946	956	956	998	1040	1105	1173	1250	1331	1378	1513	1594	1633	1646	1752	1801	1812		
20	882	878	875	906	930	1003	1097	1185	1292	1398	1529	1541	1695	1732	1763	1783	1777		
25	646	788	859	843	848	896	1010	1121	1245	1409	1496	1632	1668	1659	1652	1641	1623		
30	471	472	477	770	802	828	922	1055	1209	1396	1478	1594	1568	1555	1557	1532	1534		
35	48.7	125	436	445	735	774	837	996	1169	1404	1525	1495	1470	1454	1465	1424	1415		
40	32.3	42.7	47.7	297	423	727	783	927	1130	1362	1478	1400	1371	1351	1300	1271	1262		
45	25.6	26.8	37.9	35.8	325	512	721	826	1029	1287	1380	1320	1258	1197	1175	1151	1134		
50	36.4	31.9	25.6	25.3	19.7	348	604	661	846	1144	1188	1208	1108	1062	742	662	618		
55	34.1	39.2	30.9	21.8	12.5	52.1	515	546	662	939	991	981	952	598	315	280	264		
60	38.2	38.5	32.6	25.1	15.9	8.29	194	311	370	542	643	751	492	218	180	112	67.6		
65	45.0	44.8	44.6	32.3	16.4	7.94	66.6	177	229	326	300	198	109	65.5	36.5	51.1	54.4		
70	25.7	26.2	35.4	34.1	19.7	6.87	3.74	93.6	98.1	152	156	38.7	11.8	29.3	25.9	28.1	29.2		
75	4.55	9.85	17.0	14.9	14.0	3.93	2.03	3.04	4.14	4.52	4.86	5.01	3.98	14.7	8.74	10.4	10.4		
80	0.91	2.85	2.62	2.18	0.99	0.89	1.32	1.71	2.34	2.50	1.87	2.18	2.16	2.60	2.85	2.92	2.63		
85	0.11	0.14	0.18	0.24	0.31	0.42	0.54	0.73	0.87	0.95	0.78	0.59	0.45	0.37	0.29	0.24	0.19		
90	0.01	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.03	0.04	0.03	0.06	0.07	0.06	0.06	0.04	0.03		
95	0.02	0.03	0.03	0.05	0.08	0.09	0.09	0.09	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01		
100	0.05	0.06	0.08	0.11	0.15	0.17	0.17	0.15	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.01	0.01		
105	0.09	0.11	0.15	0.20	0.24	0.27	0.26	0.23	0.08	0.07	0.05	0.03	0.02	0.01	0.01	0.01	0.01		
110	0.16	0.19	0.24	0.29	0.33	0.33	0.31	0.28	0.11	0.09	0.07	0.05	0.03	0.01	0.01	0.01	0.01		
115	0.25	0.29	0.34	0.38	0.39	0.38	0.35	0.32	0.14	0.13	0.09	0.07	0.05	0.02	0.01	0.01	0.01		
120	0.36	0.39	0.43	0.45	0.45	0.43	0.40	0.37	0.18	0.17	0.13	0.10	0.07	0.04	0.02	0.02	0.02		
125	0.49	0.51	0.53	0.54	0.53	0.49	0.46	0.43	0.24	0.21	0.17	0.13	0.10	0.07	0.05	0.04	0.03		
130	0.65	0.66	0.67	0.67	0.64	0.60	0.55	0.53	0.30	0.26	0.23	0.18	0.14	0.10	0.09	0.07	0.07		
135	0.83	0.83	0.82	0.80	0.78	0.72	0.68	0.64	0.39	0.34	0.29	0.24	0.20	0.15	0.13	0.12	0.11		
140	0.97	0.95	0.93	0.91	0.87	0.81	0.77	0.74	0.46	0.40	0.35	0.30	0.25	0.21	0.19	0.18	0.17		
145	1.06	1.05	1.03	1.01	0.94	0.89	0.86	0.82	0.50	0.45	0.39	0.35	0.31	0.27	0.25	0.24	0.24		
150	1.11	1.11	1.07	1.05	0.98	0.97	0.93	0.90	0.53	0.49	0.45	0.40	0.36	0.33	0.32	0.30	0.31		
155	1.12	1.08	1.05	1.00	0.99	0.99	0.93	0.91	0.55	0.53	0.50	0.47	0.43	0.40	0.38	0.38	0.39		
160	1.03	1.01	1.00	0.97	0.97	0.98	0.96	0.95	0.58	0.57	0.54	0.53	0.50	0.48	0.46	0.47	0.47		
165	0.95	0.95	0.94	0.92	0.92	0.93	0.94	0.92	0.61	0.62	0.60	0.59	0.58	0.57	0.56	0.56	0.55		
170	0.89	0.90	0.88	0.85	0.89	0.91	0.92	0.91	0.66	0.66	0.66	0.66	0.64	0.62	0.61	0.60	0.62		
175	0.82	0.88	0.88	0.84	0.86	0.90	0.90	0.91	0.76	0.77	0.76	0.75	0.75	0.73	0.73	0.74	0.73		
180	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 27, 2016	Jul. 26, 2017
Digital Power Meter	PF2010A	HZTE028-01	Jul. 27, 2016	Jul. 26, 2017
AC Power Supply	PCR 500L	HZTE001-08	Jul. 27, 2016	Jul. 26, 2017
DC Power Supply	WY12010	HZTE004-03	Jul. 27, 2016	Jul. 26, 2017
Temperature Meter	TES1310	HZTE017-01	Jul. 27, 2016	Jul. 26, 2017
Standard Source	D908	HZTE012-01	Jul. 27, 2016	Jul. 26, 2017
Standard source	SCL-1400	HZTE012-02	Jul. 27, 2016	Jul. 26, 2017

Table 8: 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

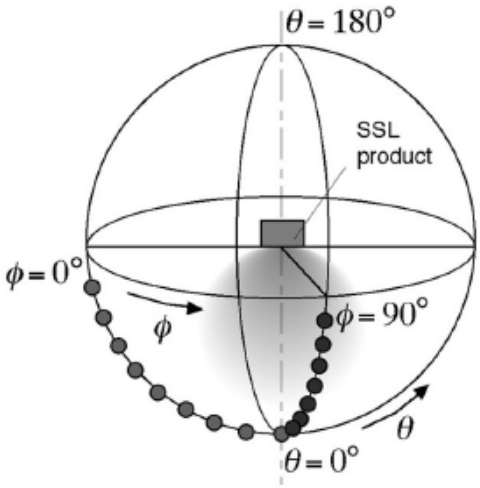
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured 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°/180° and C=90°/270°) 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, Δu'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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