



LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Flood Light

Model: FL38501

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17030090d

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

Reviewed by:

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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: **FL38501**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
125.5	5100.5	40.65	0.9964
CCT (K)	CRI	BUG	Stabilization Time (Light & Power)
4884	67.5	B2-U1-G0	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Mar. 24, 2017
Date of Test	: Apr. 09, 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

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
Luminous Intensity Distribution Plots	9
Luminous Intensity Data.....	10
EQUIPMENT LIST	12
TEST METHODS.....	12
Seasoning of SSL Product.....	12
Goniophotometer Method	12
Photometric and Electrical Measurements.....	12
Color Characteristics Measurements	13
Color Spatial Uniformity	13

Sample Photo



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: V-Line Flood Light
Model	: FL38501
Electrical Ratings	: 120~277Vac, 50/60Hz
Product Description	: 5000K 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°C.

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)	0.340	0.153
Power Factor	0.9964	0.9560
Test Power (W)	40.65	40.64
THD A%	4.79	9.61
Luminous Efficacy (lm/W)	125.5	124.7
Total Luminous Flux (lm)	5100.5	5067.7
Color Rendering Index (CRI)	67.5	
R9	-36	
Correlated Color Temperature (CCT) (K)	4884	
Chromaticity (Chroma x, Chroma y)	(0.3489, 0.3585)	
Chromaticity (Chroma u, Chroma v)	(0.2113, 0.3257)	
Chromaticity (Chroma u', Chroma v')	(0.2113, 0.4886)	
Duv	0.0020	
Average Beam Angle (°)	85.5	
Center Beam Candle Power (cd)	2499	
Spacing Criteria	0.69 (0°-180°)/ 1.35 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	94.62%	
Zonal Lumens in the 60°-90°Zone	5.31%	
Zonal Lumens in the 90°-120°Zone	0.01%	
Zonal Lumens in the 120°-180°Zone	0.06%	

Special Color Rendering Indices	
R1	66
R2	71
R3	75
R4	69
R5	66
R6	61
R7	77
R8	55
R9	-36
R10	32
R11	66
R12	36
R13	65
R14	85

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

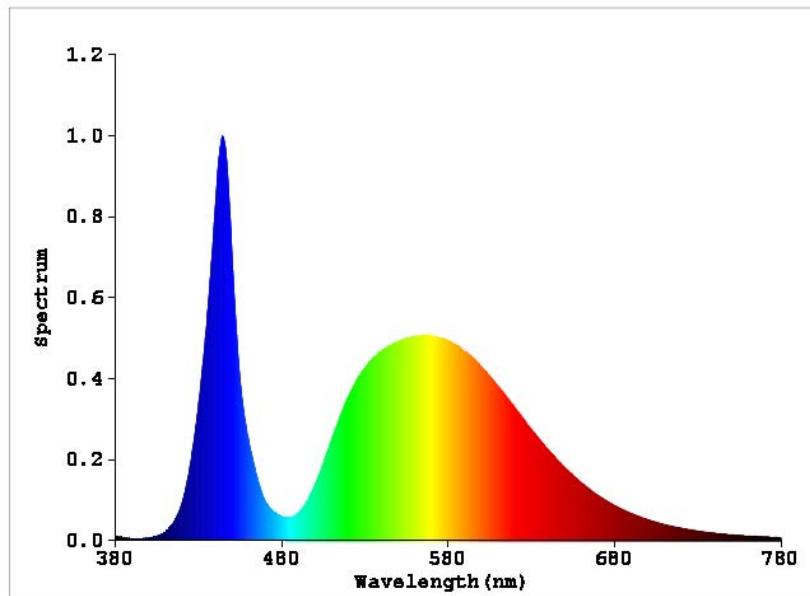


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	233.626	4.58%
10- 20	665.731	13.05%
20- 30	999.371	19.59%
30- 40	1123.137	22.02%
40- 50	1085.923	21.29%
50- 60	718.294	14.08%
60- 70	239.369	4.69%
70- 80	30.646	0.60%
80- 90	0.82	0.02%
90-100	0.068	0.00%
100-110	0.185	0.00%
110-120	0.311	0.01%
120-130	0.458	0.01%
130-140	0.654	0.01%
140-150	0.744	0.01%
150-160	0.636	0.01%
160-170	0.424	0.01%
170-180	0.152	0.00%
Total	5100.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4826.082	94.62%
60- 90	270.835	5.31%
0-90	5096.917	99.93%
90- 180	3.632	0.07%
0- 180	5100.5	100%

Table 3: Zonal Lumen Data

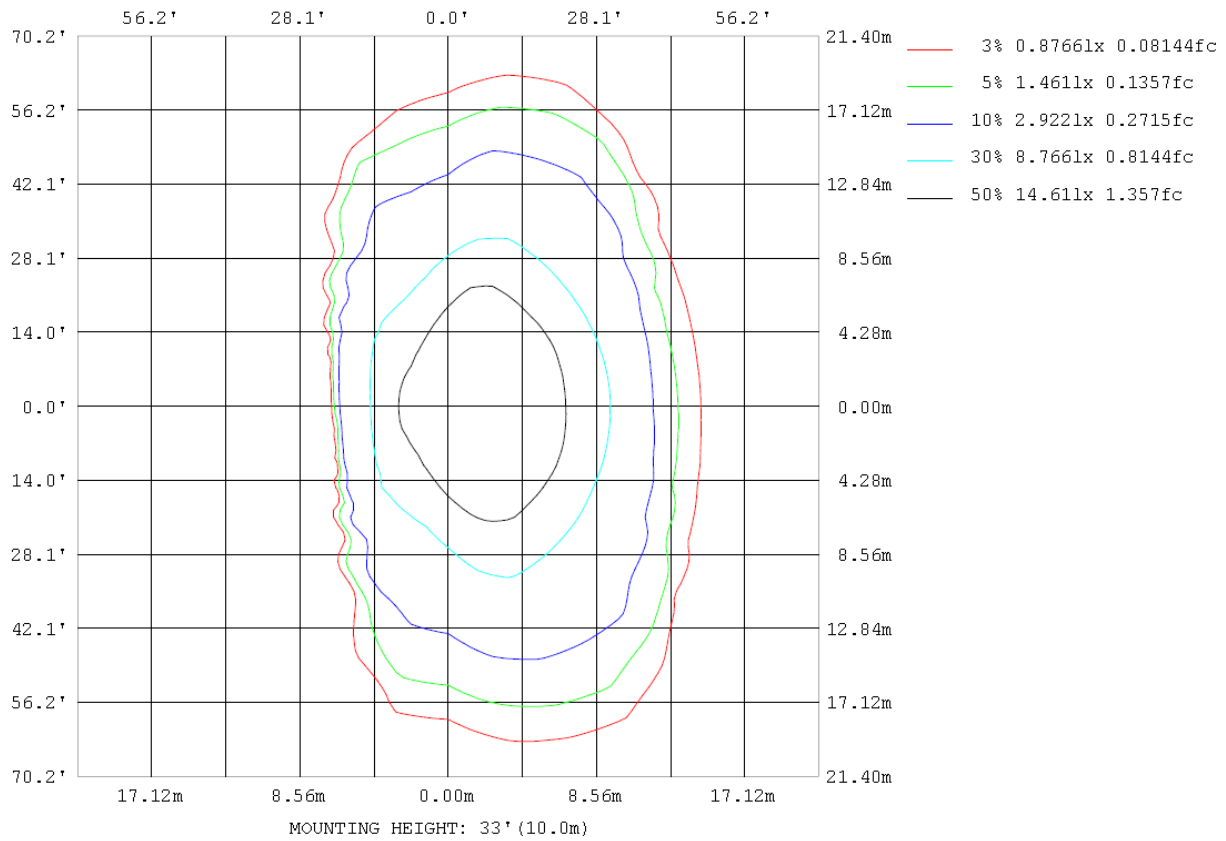


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

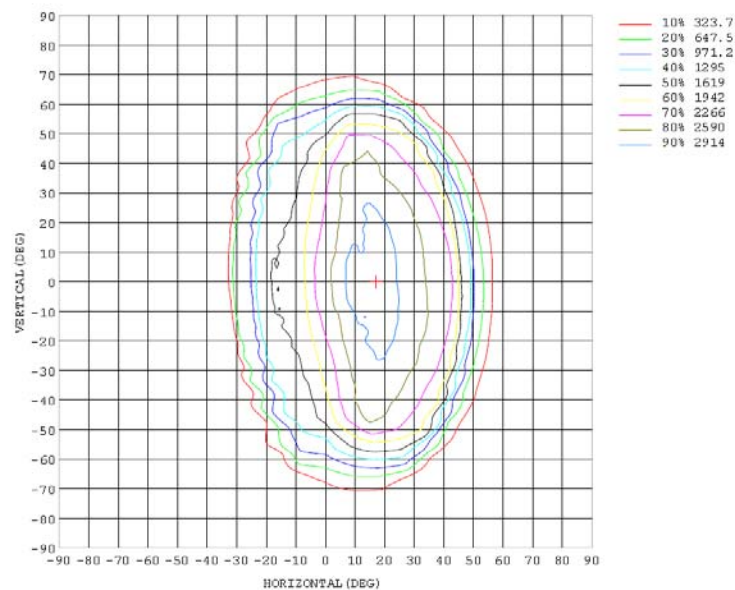


Chart 3: Isocandela Plot

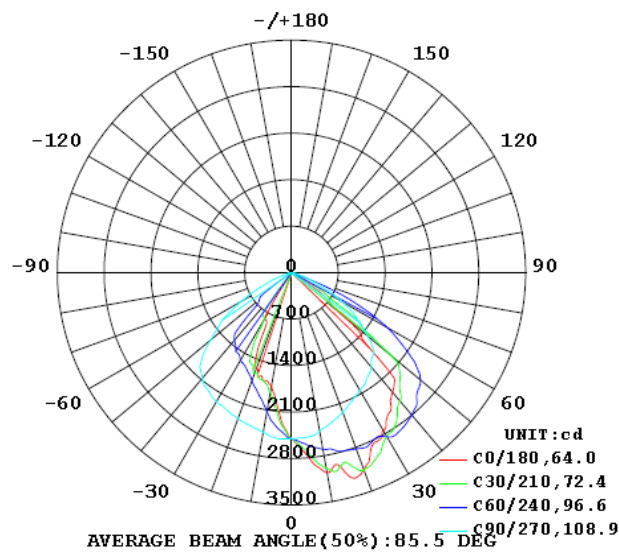


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) γ (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499
5	2770	2768	2741	2705	2667	2635	2603	2555	2519	2491	2439	2379	2329	2283	2230	2176	2138	2122	2119
10	3060	3059	3038	2990	2934	2822	2701	2593	2488	2424	2301	2197	2055	1941	1854	1797	1758	1742	1738
15	3118	3089	3023	2971	2986	2889	2782	2594	2448	2331	2155	1966	1826	1719	1678	1671	1682	1668	1668
20	3153	3177	3196	3162	3017	2889	2825	2658	2422	2235	1999	1812	1676	1652	1599	1622	1539	1537	1532
25	2861	2918	2988	3041	3072	3011	2823	2680	2385	2138	1850	1650	1601	1574	1499	1450	1177	1005	987
30	2742	2798	2854	2852	2917	2960	2854	2681	2373	2050	1721	1557	1516	1452	978	815	809	801	800
35	2563	2587	2655	2734	2740	2818	2872	2688	2388	1964	1617	1478	1406	831	778	394	82.3	79.8	81.8
40	2351	2372	2417	2525	2621	2649	2797	2740	2403	1857	1514	1393	978	761	89.6	76.4	64.4	61.8	60.1
45	1918	2179	2232	2293	2424	2524	2648	2723	2327	1735	1467	1303	706	66.7	74.8	65.7	49.5	52.8	52.5
50	1006	1279	1363	1952	2158	2317	2523	2549	2054	1490	1337	836	150	46.1	56.6	58.3	64.9	67.4	67.0
55	534	572	652	1017	1506	2062	2159	2055	1686	1178	1074	607	25.1	32.2	66.5	73.5	65.2	60.2	60.6
60	62.8	58.9	71.3	441	609	1417	1659	1523	1221	861	816	65.2	20.6	46.2	55.6	71.4	69.5	68.1	66.4
65	64.4	64.1	58.3	44.2	142	417	969	891	750	497	313	12.3	27.6	46.3	71.2	80.4	76.7	75.5	76.6
70	22.9	32.2	43.1	37.8	36.9	21.2	189	417	378	257	133	12.1	32.9	60.5	79.2	53.8	44.3	42.9	42.3
75	4.50	5.38	6.74	12.5	21.0	8.06	10.9	72.1	54.9	42.2	4.05	10.7	33.3	38.1	42.7	19.5	7.47	7.13	6.74
80	0.25	0.26	0.29	0.41	3.36	3.23	3.98	3.51	5.03	4.34	2.69	3.27	12.9	5.37	2.21	1.47	1.46	1.37	1.35
85	0.06	0.05	0.06	0.07	0.08	0.13	0.31	0.90	1.76	1.52	1.06	0.71	0.65	0.76	0.97	1.17	1.22	1.17	1.13
90	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.07	0.08	0.07	0.05	0.03	0.02	0.02	0.02	0.01
95	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.08	0.06	0.04	0.03	0.02	0.02	0.02
100	0.02	0.02	0.02	0.02	0.03	0.04	0.06	0.07	0.09	0.11	0.12	0.13	0.14	0.11	0.09	0.06	0.04	0.03	0.06
105	0.02	0.02	0.02	0.03	0.05	0.06	0.09	0.12	0.15	0.17	0.18	0.19	0.19	0.18	0.16	0.12	0.08	0.07	0.14
110	0.02	0.02	0.02	0.04	0.06	0.10	0.14	0.18	0.21	0.24	0.25	0.25	0.26	0.24	0.22	0.19	0.15	0.13	0.25
115	0.03	0.03	0.04	0.06	0.09	0.14	0.18	0.25	0.28	0.32	0.33	0.32	0.33	0.32	0.29	0.26	0.22	0.21	0.40
120	0.04	0.04	0.06	0.09	0.13	0.20	0.26	0.31	0.37	0.42	0.43	0.43	0.43	0.42	0.39	0.37	0.34	0.35	0.57
125	0.06	0.08	0.11	0.15	0.19	0.27	0.35	0.37	0.48	0.55	0.56	0.55	0.55	0.54	0.51	0.51	0.49	0.50	0.78
130	0.13	0.15	0.19	0.23	0.26	0.35	0.45	0.52	0.60	0.68	0.70	0.71	0.71	0.68	0.66	0.69	0.68	0.69	1.04
135	0.22	0.25	0.30	0.34	0.36	0.45	0.54	0.68	0.73	0.86	0.89	0.89	0.89	0.90	0.92	0.91	0.91	0.93	1.34
140	0.31	0.35	0.40	0.44	0.48	0.58	0.66	0.78	0.85	0.96	1.02	1.06	1.10	1.14	1.11	1.10	1.12	1.12	1.62
145	0.41	0.46	0.50	0.51	0.57	0.67	0.79	0.86	1.02	1.11	1.18	1.24	1.25	1.26	1.26	1.25	1.28	1.26	1.87
150	0.54	0.60	0.65	0.66	0.69	0.73	0.81	0.93	1.02	1.11	1.18	1.24	1.27	1.33	1.37	1.37	1.39	1.38	2.03
155	0.70	0.77	0.81	0.87	0.80	0.79	0.87	0.95	1.01	1.07	1.14	1.22	1.27	1.34	1.41	1.48	1.47	1.46	2.08
160	0.90	0.97	0.98	1.02	0.97	0.92	0.94	0.97	1.04	1.03	1.18	1.27	1.32	1.39	1.47	1.49	1.51	1.51	2.06
165	1.06	1.13	1.15	1.16	1.16	1.09	1.07	1.10	1.12	1.15	1.28	1.39	1.41	1.47	1.51	1.53	1.56	1.54	1.90
170	1.23	1.29	1.32	1.33	1.28	1.16	1.17	1.19	1.27	1.29	1.33	1.46	1.49	1.52	1.55	1.58	1.59	1.56	1.76
175	1.47	1.54	1.53	1.51	1.52	1.42	1.43	1.42	1.42	1.40	1.54	1.62	1.65	1.69	1.73	1.77	1.77	1.73	1.69
180	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46

Table 4: Luminous Intensity Data

Table--2

UNIT: cd

C (DEG) γ (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499	2499		
5	2130	2155	2204	2256	2305	2355	2402	2472	2507	2541	2585	2617	2648	2697	2729	2753	2766		
10	1749	1793	1836	1902	2012	2124	2246	2361	2439	2523	2597	2738	2865	2951	3009	3039	3053		
15	1684	1686	1674	1702	1783	1899	2065	2238	2385	2496	2672	2840	2945	2922	2949	3043	3109		
20	1535	1568	1604	1629	1641	1734	1893	2121	2337	2495	2764	2868	2873	3112	3147	3157	3168		
25	1116	1298	1480	1501	1544	1595	1742	2002	2284	2534	2801	2824	3025	3022	2988	2927	2878		
30	802	803	817	1304	1440	1525	1610	1901	2241	2602	2625	2922	2891	2807	2840	2799	2740		
35	83.6	274	752	768	1308	1454	1521	1770	2169	2638	2794	2782	2683	2678	2650	2580	2556		
40	61.4	72.7	88.8	520	740	1329	1436	1634	2080	2565	2732	2590	2550	2490	2417	2356	2345		
45	46.2	58.9	68.0	54.0	583	934	1363	1532	1913	2388	2611	2482	2361	2248	2217	2175	1952		
50	63.7	61.1	52.9	46.7	35.7	632	1197	1294	1580	2262	2337	2251	2101	2029	1349	1296	1055		
55	62.0	69.8	64.7	39.7	21.9	188	973	1050	1277	1820	1910	1934	1720	1135	636	560	538		
60	65.9	71.6	56.1	46.6	26.6	14.6	377	701	864	1237	1393	1345	661	409	192	61.1	55.2		
65	75.8	80.0	73.1	60.3	30.0	13.2	133	379	488	658	726	361	168	35.6	45.5	62.6	66.1		
70	42.9	44.6	67.5	66.6	45.1	13.8	6.62	184	242	309	172	50.5	22.5	39.7	41.8	31.9	25.0		
75	6.63	11.6	26.1	31.9	30.0	17.1	3.43	5.26	16.8	27.5	11.6	5.43	13.1	9.71	6.62	5.01	4.74		
80	1.21	1.02	0.88	1.76	2.93	1.92	2.12	2.91	4.42	3.35	2.60	2.67	2.71	0.34	0.28	0.27	0.25		
85	0.98	0.77	0.60	0.48	0.40	0.39	0.59	1.01	1.19	0.77	0.19	0.09	0.07	0.06	0.06	0.06	0.06		
90	0.01	0.02	0.02	0.03	0.05	0.08	0.09	0.08	0.07	0.05	0.03	0.02	0.02	0.02	0.02	0.02	0.03		
95	0.03	0.04	0.06	0.10	0.16	0.20	0.20	0.18	0.14	0.10	0.06	0.03	0.02	0.03	0.03	0.03	0.02		
100	0.07	0.10	0.15	0.23	0.31	0.37	0.37	0.32	0.25	0.17	0.11	0.06	0.03	0.03	0.03	0.03	0.03		
105	0.16	0.21	0.31	0.41	0.49	0.54	0.53	0.47	0.37	0.27	0.18	0.10	0.05	0.03	0.04	0.03	0.03		
110	0.29	0.36	0.46	0.56	0.65	0.69	0.68	0.62	0.50	0.37	0.25	0.15	0.08	0.04	0.04	0.04	0.04		
115	0.43	0.50	0.60	0.70	0.76	0.78	0.76	0.69	0.57	0.44	0.32	0.21	0.13	0.07	0.05	0.04	0.04		
120	0.61	0.67	0.75	0.82	0.86	0.86	0.83	0.77	0.66	0.53	0.40	0.28	0.21	0.13	0.08	0.07	0.06		
125	0.81	0.86	0.91	0.96	0.99	0.98	0.94	0.89	0.77	0.65	0.51	0.38	0.30	0.22	0.16	0.13	0.12		
130	1.07	1.10	1.14	1.16	1.19	1.19	1.13	1.08	0.97	0.81	0.69	0.53	0.45	0.35	0.29	0.25	0.23		
135	1.36	1.39	1.44	1.47	1.46	1.41	1.36	1.31	1.18	1.04	0.85	0.74	0.64	0.56	0.48	0.40	0.38		
140	1.65	1.66	1.70	1.74	1.71	1.64	1.58	1.50	1.37	1.22	1.10	0.94	0.84	0.74	0.66	0.57	0.53		
145	1.90	1.91	1.91	1.92	1.89	1.83	1.74	1.63	1.55	1.34	1.30	1.17	1.06	0.93	0.85	0.78	0.71		
150	2.04	2.05	2.03	2.02	1.96	1.89	1.81	1.72	1.56	1.51	1.45	1.32	1.23	1.12	1.09	1.01	0.93		
155	2.10	2.11	2.10	2.03	1.94	1.86	1.76	1.72	1.64	1.61	1.48	1.44	1.36	1.32	1.31	1.19	1.12		
160	2.10	2.07	2.06	2.02	1.93	1.85	1.77	1.71	1.61	1.56	1.56	1.50	1.49	1.51	1.50	1.47	1.39		
165	1.93	1.97	1.96	1.94	1.91	1.85	1.79	1.69	1.64	1.54	1.55	1.56	1.52	1.60	1.61	1.63	1.59		
170	1.79	1.86	1.89	1.87	1.85	1.80	1.76	1.68	1.62	1.62	1.61	1.59	1.57	1.66	1.76	1.77	1.72		
175	1.70	1.77	1.79	1.79	1.74	1.73	1.68	1.62	1.57	1.56	1.66	1.66	1.64	1.74	1.81	1.83	1.85		
180	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46		

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 expanded uncertainty is 1.94% with a coverage factor k=2.

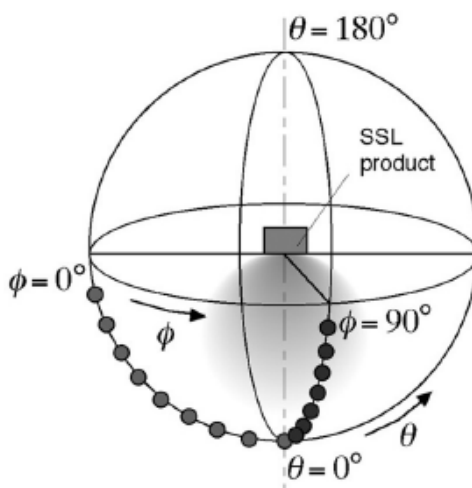
Color Characteristics Measurements

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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Page 13 of 13