LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Wall Pack

Model: WL70501

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17030090r

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: **WL70501**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
125.2	10166.0	81.18	0.9923
CCT (K)	**CRI**	**BUG**	**Stabilization Time (Light & Power)**
5248	67.7	B2-U1-G2	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Mar. 24, 2017
Date of Test	: Apr. 11, 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 Wall Pack
Model	: WL70501
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℃.

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)	0.682	0.301
Power Factor	0.9923	0.9597
Test Power (W)	81.18	79.88
THD A%	8.71	12.78
Luminous Efficacy (lm/W)	125.2	126.46
Total Luminous Flux (lm)	10166.0	10101.0
Color Rendering Index (CRI)	67.7	
R9	-33.5	
Correlated Color Temperature (CCT) (K)	5248	
Chromaticity (Chroma x, Chroma y)	(0.3384, 0.3420)	
Chromaticity (Chroma u, Chroma v)	(0.2106, 0.3193)	
Chromaticity (Chroma u', Chroma v')	(0.2106, 0.4789)	
Duv	0.0021	
Average Beam Angle (°)	91.0	
Center Beam Candle Power (cd)	2535	
Spacing Criteria	0.54 (0°-180°)/ 1.49 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	76.64%	
Zonal Lumens in the 60°-90°Zone	23.29%	
Zonal Lumens in the 90°-120°Zone	0.02%	
Zonal Lumens in the 120°-180°Zone	0.05%	

Special Color Rendering Indices	
R1	66.3
R2	69.8
R3	71.4
R4	70.9
R5	70.1
R6	63
R7	74.4
R8	55.3
R9	-33.5
R10	28.5
R11	77.7
R12	39.8
R13	63.9
R14	83.1

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

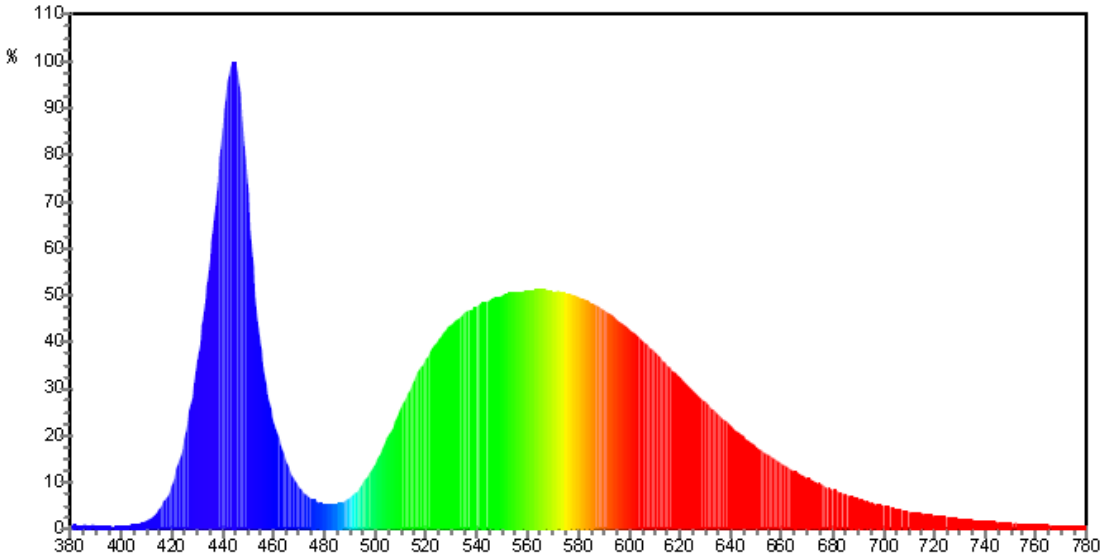


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	254.612	2.50%
10- 20	708.028	6.96%
20- 30	1135.574	11.17%
30- 40	1596.662	15.71%
40- 50	2003.56	19.71%
50- 60	2092.014	20.58%
60- 70	1726.463	16.98%
70- 80	610.526	6.01%
80- 90	30.609	0.30%
90-100	0.451	0.00%
100-110	0.794	0.01%
110-120	1.005	0.01%
120-130	1.149	0.01%
130-140	1.292	0.01%
140-150	1.22	0.01%
150-160	0.919	0.01%
160-170	0.57	0.01%
170-180	0.196	0.00%
Total	10165.6	100%

γ(°)	Lumens	% Total
0- 60	7790.45	76.64%
60- 90	2367.598	23.29%
0-90	10158.05	99.93%
90- 180	7.596	0.07%
0- 180	10165.6	100%

Table 3: Zonal Lumen Data

Note: The Flux in this table might be a little different from the total flux in Table 2 due to rounding.

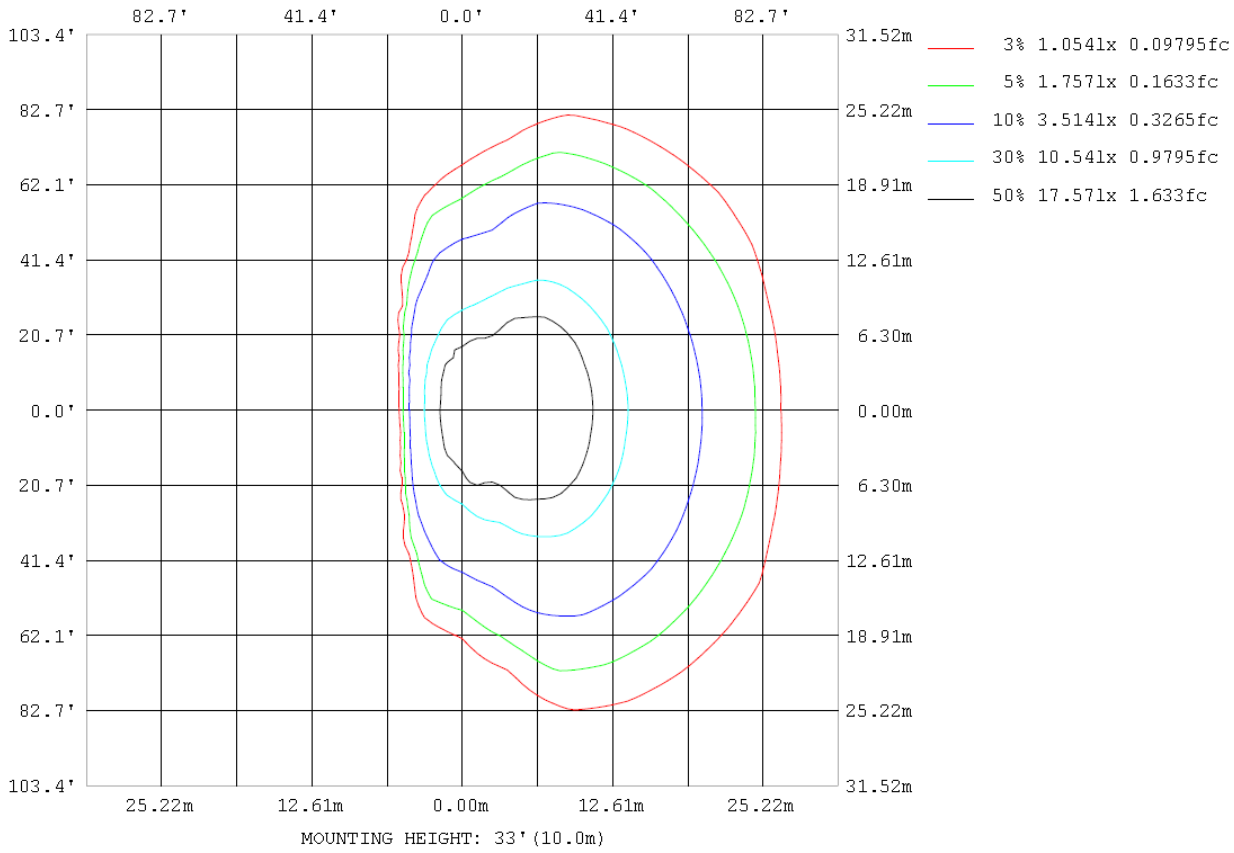


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

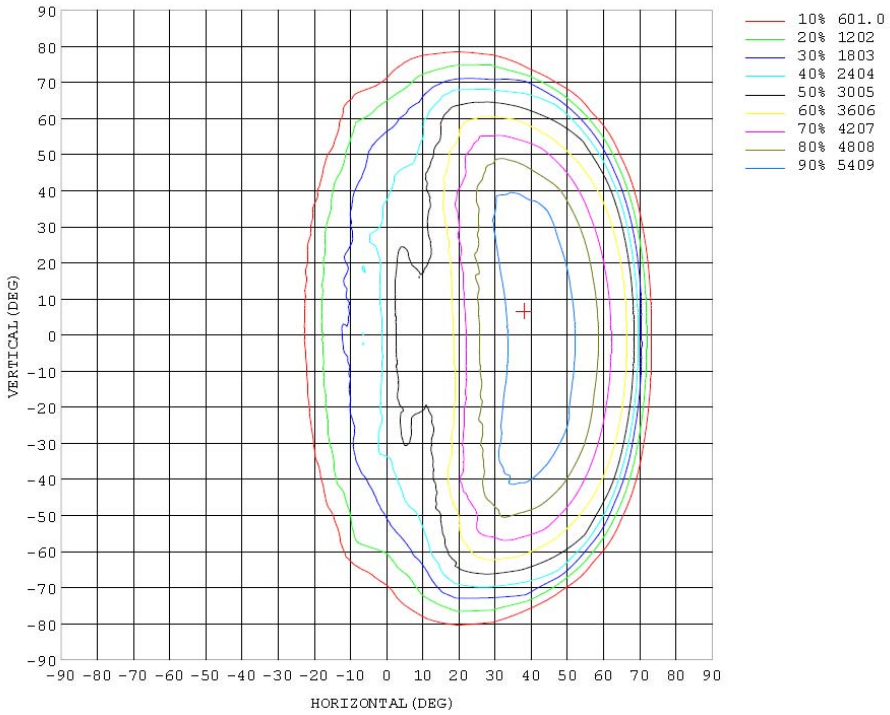


Chart 3: Isocandela Plot

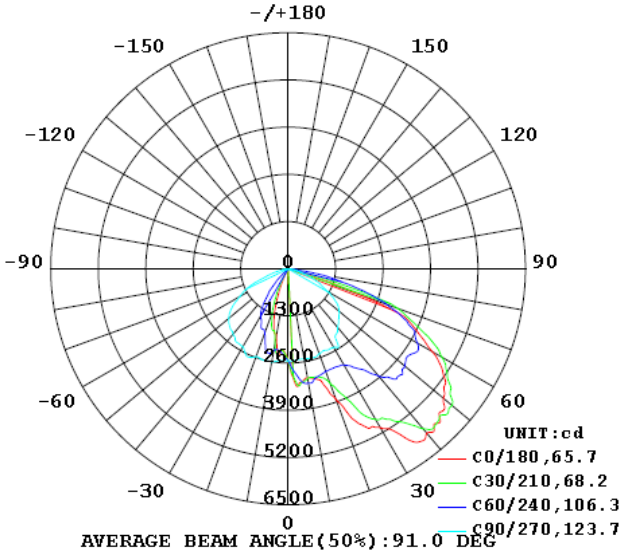


Chart 4: Polar Candela Distribution

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	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535
5	3227	3221	3234	3233	3187	3098	2973	2823	2662	2525	2434	2362	2312	2269	2271	2285	2289	2286	2292
10	3056	3047	3049	3066	3117	3152	3199	3122	2802	2523	2356	2267	2322	2339	2205	2060	1960	1905	1892
15	3161	3144	3120	3088	3064	3042	3084	3191	2941	2549	2305	2349	2194	1847	1750	1689	1588	1530	1519
20	3827	3754	3623	3344	3143	3054	3010	3067	2997	2497	2315	2339	1801	1633	1415	1227	1050	963	915
25	4728	4718	4519	4050	3588	3181	3001	2973	3062	2476	2294	1893	1593	1317	955	645	457	372	354
30	5053	4993	4906	4787	4455	3587	3054	2908	3046	2518	2265	1728	1410	883	454	187	88.2	61.6	52.4
35	5749	5604	5350	5130	4810	4298	3359	2908	2918	2252	2038	1580	1047	421	103	54.0	48.6	53.0	54.2
40	5907	5955	5978	5752	5093	4632	3861	2976	2763	2110	1769	1431	615	94.8	63.2	71.0	72.9	80.0	83.9
45	5894	5906	5910	5850	5678	4805	4226	3010	2622	1960	1591	1024	197	63.4	92.2	95.0	97.2	95.5	101
50	5557	5581	5685	5856	5501	5172	4169	3122	2333	1821	1474	661	54.3	100	104	99.7	98.4	93.2	94.7
55	5224	5241	5356	5345	5290	4930	4106	3119	2133	1614	1342	195	95.7	112	103	99.5	87.0	83.5	83.5
60	4549	4634	4824	4861	4795	4638	4088	3137	1947	1240	963	46.6	126	106	94.8	79.5	77.7	74.5	68.8
65	3797	3853	3910	4041	4161	3983	3646	2909	1577	947	511	138	104	92.4	74.9	68.3	53.9	51.0	48.7
70	2094	2400	2778	3188	3143	3069	2867	2407	1305	541	80.5	150	87.6	59.6	54.2	36.9	30.0	25.1	21.8
75	143	284	474	913	1644	2032	1801	1588	864	310	33.3	78.6	56.9	32.5	22.3	17.3	13.5	11.6	11.2
80	4.18	4.27	4.53	5.51	66.8	399	846	746	449	115	8.09	37.2	19.6	12.4	9.92	10.2	10.4	10.4	10.2
85	0.13	0.13	0.13	0.15	0.52	0.95	2.45	87.1	80.3	10.1	5.40	7.05	7.58	7.06	7.31	7.35	7.06	6.76	6.76
90	0.07	0.07	0.07	0.07	0.08	0.08	0.10	0.13	0.17	0.21	0.29	0.41	0.59	0.77	0.93	1.31	1.48	1.29	1.76
95	0.05	0.05	0.06	0.06	0.07	0.08	0.12	0.17	0.23	0.30	0.35	0.42	0.49	0.53	0.54	0.54	0.52	0.51	0.84
100	0.05	0.05	0.06	0.06	0.08	0.10	0.16	0.23	0.35	0.46	0.61	0.76	0.90	0.98	0.95	0.88	0.82	0.79	1.34
105	0.05	0.06	0.06	0.07	0.10	0.14	0.21	0.34	0.50	0.63	0.83	0.98	1.06	1.10	1.10	1.08	1.05	1.04	1.79
110	0.06	0.06	0.07	0.08	0.13	0.18	0.28	0.58	0.61	0.76	0.95	1.12	1.20	1.30	1.34	1.36	1.34	1.32	2.07
115	0.06	0.07	0.07	0.10	0.15	0.23	0.36	0.62	0.68	0.87	1.13	1.34	1.46	1.60	1.63	1.63	1.62	1.58	2.35
120	0.07	0.07	0.09	0.14	0.19	0.30	0.46	0.61	0.76	0.95	1.22	1.44	1.59	1.77	1.84	1.91	1.91	1.90	2.62
125	0.09	0.09	0.13	0.19	0.25	0.38	0.54	0.63	0.87	1.09	1.40	1.66	1.82	2.01	2.13	2.24	2.27	2.27	2.84
130	0.12	0.14	0.20	0.28	0.32	0.46	0.65	0.77	0.96	1.21	1.55	1.89	2.13	2.30	2.43	2.60	2.65	2.72	3.18
135	0.20	0.24	0.32	0.41	0.44	0.57	0.74	0.93	1.08	1.40	1.71	2.02	2.22	2.50	2.75	2.89	2.99	3.09	3.39
140	0.29	0.34	0.45	0.54	0.54	0.68	0.84	0.98	1.22	1.51	1.79	2.15	2.39	2.71	2.93	3.03	3.11	3.17	3.48
145	0.41	0.48	0.60	0.65	0.65	0.76	0.90	1.05	1.38	1.63	1.90	2.28	2.54	2.76	2.94	3.05	3.16	3.07	3.50
150	0.55	0.66	0.78	0.84	0.83	0.84	0.93	1.15	1.33	1.62	1.82	2.11	2.33	2.55	2.72	2.82	2.86	2.75	3.30
155	0.76	0.87	0.97	1.07	0.99	0.91	0.98	1.22	1.35	1.53	1.71	1.95	2.17	2.38	2.54	2.60	2.54	2.40	2.97
160	0.99	1.09	1.20	1.30	1.22	1.06	1.11	1.33	1.47	1.41	1.72	1.97	2.17	2.32	2.43	2.43	2.34	2.21	2.67
165	1.21	1.31	1.42	1.51	1.46	1.29	1.29	1.46	1.50	1.48	1.75	2.03	2.20	2.30	2.34	2.30	2.22	2.09	2.25
170	1.41	1.53	1.67	1.75	1.67	1.46	1.44	1.59	1.75	1.73	1.78	2.07	2.30	2.37	2.36	2.30	2.21	2.10	2.05
175	1.72	1.82	1.93	2.02	1.95	1.79	1.76	1.86	1.91	1.84	1.97	2.09	2.26	2.38	2.41	2.43	2.39	2.32	2.24
180	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83

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	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535	2535		
5	2286	2268	2250	2241	2261	2305	2372	2458	2542	2727	2879	3003	3121	3221	3255	3259	3226		
10	1897	1951	2076	2267	2365	2288	2268	2409	2591	2905	3156	3159	3115	3087	3064	3058	3063		
15	1541	1630	1720	1769	1926	2336	2327	2335	2607	3043	3110	3049	3035	3067	3104	3141	3165		
20	949	1082	1271	1471	1727	1874	2424	2222	2577	3086	3010	2999	3058	3172	3460	3691	3819		
25	381	477	716	1002	1398	1763	1969	2318	2663	3002	2926	2997	3280	3807	4285	4569	4702		
30	58.1	98.0	243	513	954	1516	1762	2260	2492	2865	2916	3168	3839	4619	4839	4933	5022		
35	53.5	51.4	58.3	129	514	1180	1705	2138	2470	2755	2982	3688	4457	4871	5212	5482	5685		
40	79.6	76.2	74.9	60.8	132	791	1516	2016	2350	2675	3064	4194	4681	5356	5869	6003	5905		
45	97.2	100	98.8	90.4	63.9	286	1195	1775	2263	2599	3333	4249	5117	5666	5872	5878	5896		
50	92.2	97.8	106	108	90.5	71.4	775	1648	2128	2332	3355	4299	5165	5539	5683	5558	5570		
55	84.3	88.5	92.6	105	115	92.8	347	1431	1890	2170	3228	4349	4946	5079	5228	5249	5206		
60	69.1	75.6	88.0	91.6	109	113	80.7	1117	1534	2203	3296	4067	4402	4642	4721	4655	4556		
65	48.1	52.5	60.3	76.2	76.9	110	162	712	1187	1795	2958	3449	3750	3826	3802	3790	3789		
70	22.7	24.9	30.6	38.8	53.2	84.0	130	203	679	1402	2181	2574	2768	2907	2956	2510	2272		
75	11.3	11.5	13.6	16.8	26.0	40.2	66.6	26.5	379	887	1310	1460	1662	1177	559	343	248		
80	10.0	9.58	9.42	9.18	9.43	13.8	16.9	6.01	145	358	499	386	90.2	17.1	4.57	4.65	4.69		
85	6.65	6.32	6.09	5.89	5.49	4.94	4.43	3.73	2.18	35.8	18.1	0.98	0.42	0.16	0.13	0.13	0.13		
90	1.44	1.02	0.79	0.78	0.79	0.71	0.55	0.38	0.23	0.14	0.09	0.08	0.08	0.08	0.08	0.08	0.08		
95	0.88	0.95	1.03	1.09	1.08	0.97	0.77	0.55	0.36	0.21	0.12	0.08	0.08	0.07	0.07	0.06	0.06		
100	1.39	1.45	1.51	1.53	1.46	1.28	1.01	0.73	0.50	0.32	0.19	0.10	0.08	0.08	0.08	0.07	0.06		
105	1.83	1.86	1.89	1.87	1.74	1.52	1.24	0.95	0.69	0.46	0.28	0.15	0.10	0.10	0.09	0.08	0.07		
110	2.10	2.13	2.15	2.09	1.95	1.72	1.45	1.16	0.87	0.59	0.37	0.22	0.14	0.11	0.10	0.09	0.08		
115	2.38	2.36	2.33	2.27	2.08	1.83	1.58	1.27	0.97	0.69	0.47	0.30	0.20	0.13	0.12	0.10	0.08		
120	2.63	2.56	2.49	2.36	2.14	1.90	1.68	1.38	1.08	0.80	0.58	0.39	0.28	0.18	0.14	0.11	0.09		
125	2.87	2.78	2.63	2.50	2.27	2.03	1.84	1.53	1.24	0.93	0.73	0.51	0.39	0.26	0.20	0.15	0.11		
130	3.21	3.06	2.96	2.76	2.54	2.32	2.07	1.77	1.46	1.13	0.91	0.70	0.55	0.40	0.31	0.24	0.18		
135	3.47	3.36	3.26	3.13	2.88	2.60	2.30	2.05	1.68	1.39	1.11	0.94	0.76	0.66	0.50	0.39	0.31		
140	3.60	3.53	3.42	3.33	3.14	2.87	2.53	2.23	1.90	1.56	1.28	1.14	0.97	0.85	0.71	0.55	0.44		
145	3.64	3.61	3.53	3.41	3.27	3.03	2.74	2.35	2.13	1.66	1.55	1.37	1.24	1.09	0.96	0.78	0.63		
150	3.48	3.50	3.46	3.38	3.24	3.00	2.76	2.40	2.10	1.91	1.72	1.50	1.48	1.39	1.27	1.10	0.89		
155	3.19	3.26	3.34	3.29	3.14	2.93	2.69	2.43	2.18	2.06	1.78	1.68	1.58	1.63	1.61	1.39	1.14		
160	2.91	2.96	3.06	3.10	3.02	2.88	2.68	2.44	2.10	2.12	1.93	1.79	1.76	1.93	1.88	1.71	1.43		
165	2.41	2.49	2.60	2.72	2.81	2.78	2.67	2.38	2.18	2.09	2.05	1.94	1.94	2.07	2.08	1.99	1.66		
170	2.09	2.16	2.32	2.47	2.57	2.59	2.57	2.27	2.14	2.17	2.17	1.99	2.07	2.30	2.28	2.17	1.73		
175	2.04	2.01	2.10	2.19	2.33	2.33	2.35	2.20	2.01	2.11	2.15	2.08	2.30	2.39	2.31	2.16	1.60		
180	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83		

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

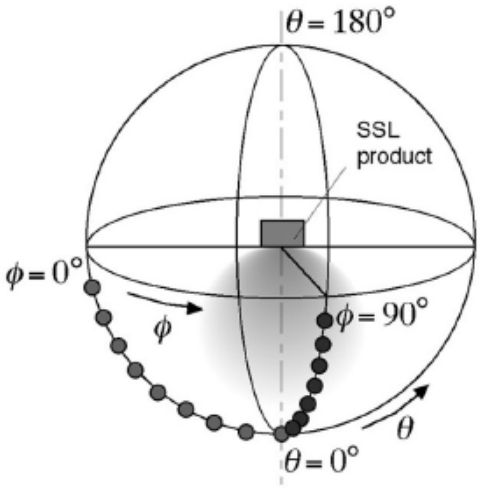
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured 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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