LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Wall Pack

Model: WL100401

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17030090p

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: **WL100401**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
120.4	11979.0	99.50	0.9947
CCT (K)	**CRI**	**BUG**	**Stabilization Time (Light & Power)**
3845	66.8	B2-U1-G2	60

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Mar. 24, 2017

Date of Test : Apr. 24, 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	: WL100401
Electrical Ratings	: 120~277Vac, 50/60Hz
Product Description	: 4000K 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 24.7℃.

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)	0.833	0.380
Power Factor	0.9947	0.9361
Test Power (W)	99.50	98.54
THD A%	7.62	14.94
Luminous Efficacy (lm/W)	120.4	121.2
Total Luminous Flux (lm)	11979.0	11940.0
Color Rendering Index (CRI)	66.8	
R9	-47	
Correlated Color Temperature (CCT) (K)	3845	
Chromaticity (Chroma x, Chroma y)	(0.3923, 0.3969)	
Chromaticity (Chroma u, Chroma v)	(0.2249, 0.3413)	
Chromaticity (Chroma u', Chroma v')	(0.2249, 0.5119)	
Duv	0.0058	
Average Beam Angle (°)	88.2	
Center Beam Candle Power (cd)	3232	
Spacing Criteria	0.55 (0°-180°)/ 1.36 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	78.05%	
Zonal Lumens in the 60°-90°Zone	21.88%	
Zonal Lumens in the 90°-120°Zone	0.02%	
Zonal Lumens in the 120°-180°Zone	0.05%	

Special Color Rendering Indices	
R1	62
R2	74
R3	83
R4	65
R5	62
R6	62
R7	79
R8	46
R9	-47
R10	38
R11	58
R12	32
R13	64
R14	90

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

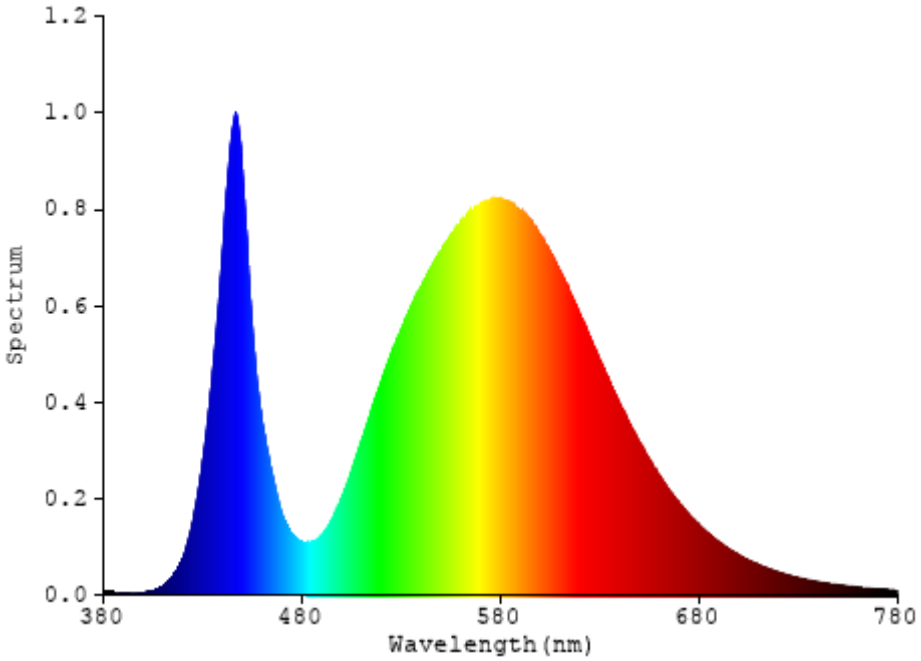


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

γ(°)	Lumens	% Total
0- 10	311.036	2.60%
10- 20	871.12	7.27%
20- 30	1424.787	11.89%
30- 40	1970.803	16.45%
40- 50	2382.178	19.89%
50- 60	2389.064	19.94%
60- 70	1911.615	15.96%
70- 80	676.399	5.65%
80- 90	32.488	0.27%
90-100	0.547	0.00%
100-110	0.963	0.01%
110-120	1.224	0.01%
120-130	1.361	0.01%
130-140	1.532	0.01%
140-150	1.473	0.01%
150-160	1.131	0.01%
160-170	0.711	0.01%
170-180	0.245	0.00%
Total	11978.7	100%

γ(°)	Lumens	% Total
0- 60	9348.988	78.05%
60- 90	2620.502	21.88%
0-90	11969.49	99.92%
90- 180	9.187	0.08%
0- 180	11978.7	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.

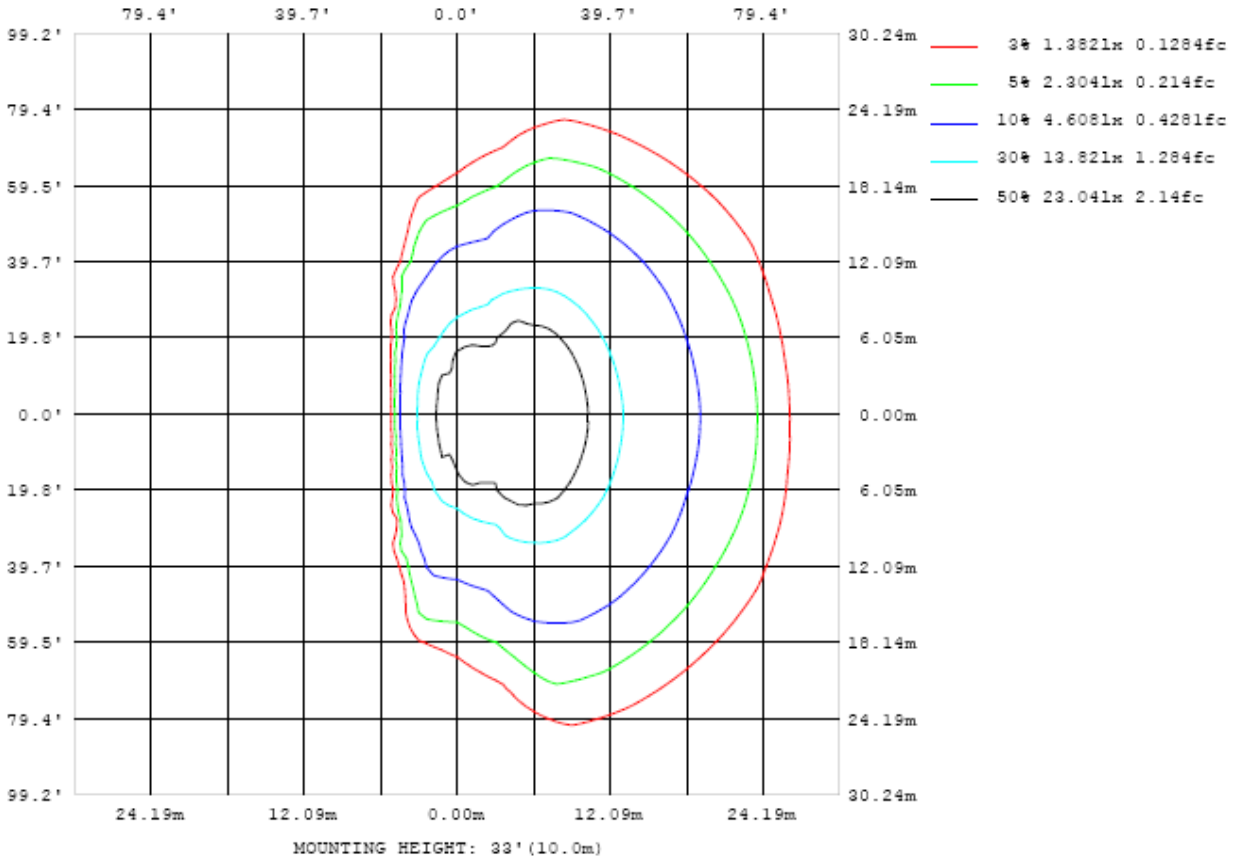


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

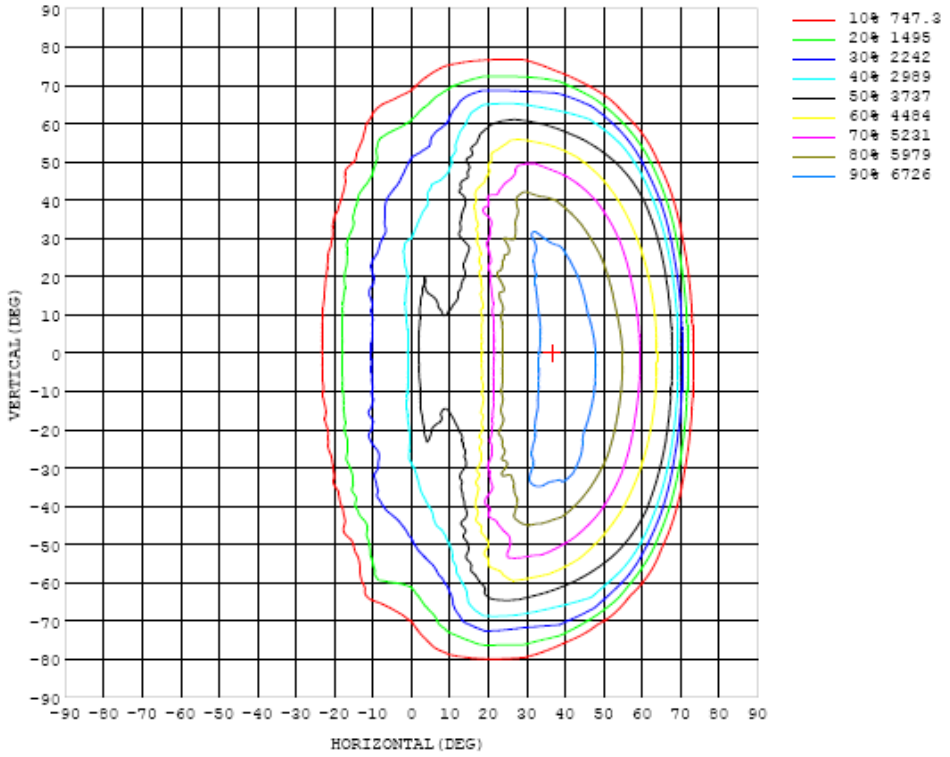


Chart 3: Isocandela Plot

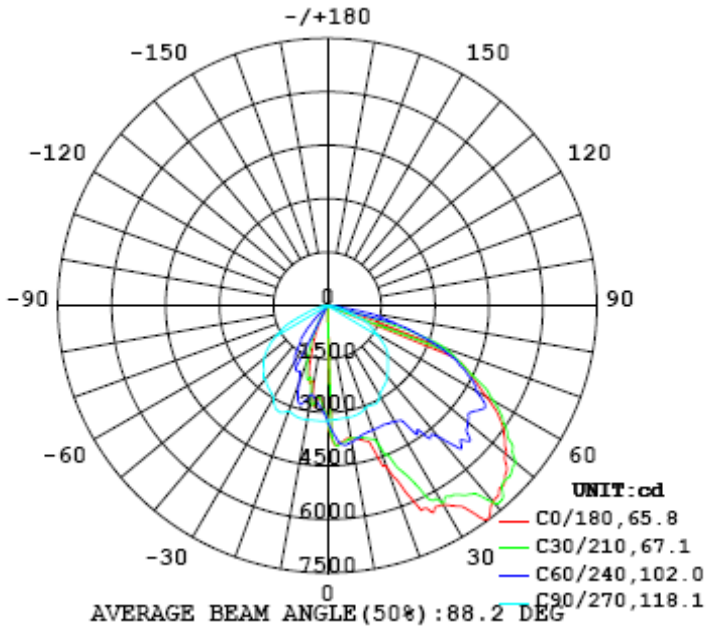


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: cd

γ (DEG) \ C (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232
5	3860	3866	3883	3904	3955	3927	3860	3674	3450	3206	3006	2860	2754	2671	2602	2556	2536	2529	2538
10	3781	3794	3787	3774	3807	3862	3897	3904	3657	3193	2865	2645	2540	2729	2819	2650	2468	2362	2327
15	3916	3918	3878	3836	3795	3757	3752	3868	3784	3175	2765	2604	2808	2326	2104	2181	2045	1974	1980
20	4806	4768	4577	4109	3905	3782	3715	3717	3786	3078	2596	2828	2262	2126	1918	1623	1335	1206	1159
25	6300	6330	5942	5257	4550	3886	3689	3587	3698	3065	2523	2465	2109	1712	1216	956	685	526	473
30	6458	6443	6358	6390	5921	4746	3781	3540	3556	2915	2712	2094	1825	1154	621	216	94.7	75.3	75.1
35	7117	6957	6706	6486	6152	5768	4381	3511	3400	2751	2532	2063	1292	586	122	76.1	72.2	80.6	78.7
40	7190	7175	7416	7242	6420	5839	4815	3583	3173	2587	2371	1767	798	106	93.9	92.9	97.8	102	103
45	6987	7002	7012	6955	7025	5957	5333	3743	3064	2378	1989	1343	235	92.5	115	117	117	113	114
50	6481	6498	6632	6843	6540	6372	5102	3977	2674	2196	1996	923	94.2	127	127	116	111	109	110
55	5968	6003	6072	6104	6003	5739	5126	4171	2433	1947	1907	219	143	143	118	112	107	105	105
60	5106	5156	5331	5335	5281	5210	4780	3794	2269	1566	1448	74.8	166	133	116	103	96.8	90.3	92.8
65	4307	4352	4339	4309	4415	4399	4174	3655	1927	1305	838	199	142	118	104	85.8	72.5	63.1	62.0
70	2557	2877	3149	3459	3403	3307	3208	2966	1804	764	83.2	187	121	88.8	72.8	47.7	35.8	27.2	25.5
75	256	385	645	1222	2044	2289	2006	1965	1191	450	37.5	107	78.2	47.8	27.2	14.3	10.4	9.07	8.31
80	12.9	13.7	16.9	36.8	75.0	526	1038	840	632	201	14.3	50.6	27.2	13.1	7.60	6.67	6.19	5.97	5.67
85	0.40	0.37	0.48	0.67	3.41	7.66	29.5	73.3	48.7	24.2	6.63	5.75	4.75	3.96	3.40	3.21	3.17	3.09	3.03
90	0.26	0.23	0.28	0.30	0.24	0.22	0.22	0.23	0.24	0.26	0.46	0.72	0.73	0.71	0.60	0.41	0.34	0.32	0.50
95	0.13	0.13	0.13	0.14	0.14	0.16	0.18	0.23	0.28	0.35	0.40	0.47	0.54	0.58	0.60	0.60	0.59	0.59	0.98
100	0.11	0.11	0.11	0.12	0.13	0.15	0.20	0.27	0.37	0.46	0.55	0.64	0.74	0.85	0.87	0.88	0.88	0.87	1.55
105	0.10	0.10	0.11	0.11	0.14	0.17	0.24	0.34	0.46	0.59	0.73	0.85	0.96	1.07	1.12	1.16	1.16	1.17	2.06
110	0.09	0.10	0.10	0.11	0.15	0.21	0.31	0.60	0.82	0.83	0.94	1.10	1.19	1.34	1.43	1.50	1.50	1.49	2.39
115	0.09	0.09	0.10	0.13	0.17	0.26	0.35	0.62	0.84	0.95	1.16	1.36	1.51	1.68	1.75	1.80	1.81	1.79	2.73
120	0.10	0.10	0.11	0.15	0.20	0.33	0.45	0.63	0.89	1.06	1.31	1.53	1.69	1.90	2.02	2.15	2.16	2.18	3.09
125	0.11	0.11	0.15	0.22	0.26	0.40	0.56	0.71	0.98	1.22	1.54	1.80	1.97	2.19	2.36	2.51	2.60	2.64	3.40
130	0.15	0.17	0.24	0.33	0.34	0.48	0.69	0.85	1.03	1.35	1.74	2.09	2.34	2.54	2.71	2.99	3.06	3.15	3.84
135	0.25	0.29	0.37	0.47	0.49	0.59	0.80	1.01	1.18	1.59	1.96	2.30	2.51	2.82	3.17	3.32	3.43	3.54	4.11
140	0.35	0.39	0.50	0.62	0.62	0.75	0.93	1.10	1.42	1.72	2.10	2.50	2.76	3.14	3.36	3.53	3.66	3.75	4.27
145	0.47	0.54	0.68	0.74	0.76	0.84	1.03	1.23	1.62	1.87	2.24	2.67	2.91	3.14	3.37	3.50	3.65	3.62	4.32
150	0.64	0.75	0.89	0.97	0.95	1.00	1.04	1.34	1.56	1.83	2.16	2.51	2.74	2.99	3.20	3.31	3.36	3.23	4.10
155	0.87	1.00	1.10	1.27	1.18	1.11	1.17	1.41	1.60	1.75	2.08	2.40	2.64	2.86	3.02	3.13	3.08	2.96	3.85
160	1.16	1.28	1.38	1.55	1.55	1.36	1.26	1.53	1.70	1.63	2.10	2.46	2.67	2.83	2.96	2.94	2.84	2.75	3.53
165	1.41	1.51	1.65	1.80	1.90	1.66	1.57	1.72	1.81	1.87	2.24	2.62	2.80	2.89	2.90	2.83	2.72	2.60	2.98
170	1.66	1.73	1.91	2.07	2.13	1.91	1.77	1.82	2.10	2.10	2.17	2.65	2.87	2.90	2.87	2.80	2.68	2.54	2.60
175	1.91	2.07	2.22	2.35	2.50	2.39	2.21	2.29	2.37	2.23	2.52	2.73	2.95	3.01	3.04	2.99	2.91	2.80	2.53
180	2.38	2.38	2.38	2.38	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39

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	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232	3232		
5	2544	2556	2587	2624	2693	2793	2889	3020	3244	3459	3691	3849	3899	3933	3892	3867	3846		
10	2360	2452	2673	2814	2692	2537	2717	2933	3253	3682	3880	3845	3802	3762	3748	3756	3761		
15	1975	2048	2141	2041	2396	2869	2549	2831	3239	3752	3779	3715	3730	3765	3820	3860	3897		
20	1204	1373	1616	1842	2107	2302	2739	2583	3167	3740	3633	3662	3761	3869	4111	4641	4820		
25	534	692	975	1241	1750	2031	2512	2660	3265	3607	3532	3650	3829	4658	5328	5989	6220		
30	74.9	103	282	688	1202	1824	1965	2711	2991	3442	3512	3662	4830	6112	6314	6325	6405		
35	80.2	72.4	77.6	155	633	1404	1933	2332	2846	3248	3541	4257	5809	6081	6421	6702	6925		
40	101	92.9	90.5	85.4	130	942	1773	2260	2702	3136	3507	5042	5711	6263	7136	7195	7093		
45	114	115	113	101	83.1	270	1346	1908	2502	3036	3865	5381	5892	6614	6788	6855	6879		
50	110	115	116	120	116	86.3	990	1648	2298	2571	3748	4863	5959	6227	6419	6363	6377		
55	105	106	111	117	128	114	323	1603	1984	2412	3886	4939	5453	5633	5749	5810	5857		
60	93.1	95.5	105	118	126	121	92.7	1161	1559	2236	3574	4431	4737	4950	5050	5097	5034		
65	61.4	68.9	89.2	104	106	121	200	688	1179	1852	3154	3638	3866	4026	4102	4213	4285		
70	25.4	29.9	45.3	60.4	62.6	109	149	86.9	645	1397	2202	2528	2837	3078	3139	2828	2588		
75	8.41	9.54	13.5	17.5	33.9	50.4	66.7	39.8	366	812	1195	1387	1579	1202	576	400	227		
80	5.54	5.53	5.76	5.67	7.52	14.8	24.2	10.6	124	266	368	365	86.1	23.9	18.9	15.3	13.6		
85	2.94	2.92	2.85	2.69	2.66	2.71	2.95	4.93	3.78	4.95	6.57	3.66	1.15	0.39	0.33	0.34	0.39		
90	0.53	0.59	0.68	0.78	0.86	0.86	0.75	0.56	0.40	0.29	0.19	0.17	0.18	0.19	0.21	0.22	0.25		
95	1.02	1.09	1.18	1.26	1.27	1.18	0.98	0.73	0.51	0.33	0.21	0.16	0.15	0.14	0.14	0.14	0.14		
100	1.58	1.63	1.69	1.71	1.67	1.49	1.22	0.93	0.66	0.45	0.29	0.18	0.14	0.14	0.13	0.13	0.12		
105	2.07	2.10	2.13	2.13	2.02	1.82	1.57	1.25	1.14	1.91	1.77	0.27	0.15	0.15	0.14	0.13	0.12		
110	2.41	2.45	2.50	2.47	2.34	2.11	1.85	1.53	1.35	1.82	1.86	0.45	0.20	0.15	0.15	0.13	0.12		
115	2.75	2.75	2.75	2.71	2.52	2.24	1.97	1.63	1.40	1.57	1.51	0.69	0.28	0.17	0.16	0.14	0.12		
120	3.08	3.05	2.98	2.87	2.60	2.30	2.04	1.75	1.46	1.43	1.27	0.72	0.38	0.23	0.18	0.16	0.13		
125	3.40	3.32	3.19	3.03	2.75	2.44	2.21	1.91	1.60	1.40	1.15	0.69	0.49	0.33	0.26	0.21	0.15		
130	3.84	3.67	3.58	3.35	3.09	2.81	2.52	2.20	1.83	1.46	1.22	0.90	0.67	0.50	0.40	0.32	0.25		
135	4.17	4.05	3.95	3.79	3.47	3.16	2.83	2.54	2.10	1.73	1.39	1.16	0.92	0.81	0.65	0.51	0.41		
140	4.36	4.29	4.19	4.08	3.83	3.53	3.16	2.77	2.31	1.98	1.59	1.43	1.19	1.06	0.91	0.73	0.60		
145	4.41	4.43	4.32	4.23	4.05	3.77	3.43	2.97	2.62	2.16	1.93	1.72	1.53	1.35	1.23	1.03	0.85		
150	4.22	4.31	4.31	4.24	4.06	3.81	3.54	3.09	2.68	2.33	2.17	1.89	1.80	1.69	1.61	1.42	1.20		
155	3.97	4.11	4.21	4.13	3.95	3.71	3.46	3.06	2.76	2.52	2.28	2.06	1.93	1.99	2.00	1.74	1.52		
160	3.66	3.75	3.88	3.95	3.82	3.63	3.42	3.12	2.70	2.60	2.39	2.21	2.19	2.30	2.35	2.17	1.96		
165	3.08	3.23	3.36	3.50	3.55	3.46	3.34	2.99	2.78	2.57	2.47	2.33	2.37	2.47	2.57	2.49	2.30		
170	2.63	2.80	2.99	3.17	3.26	3.26	3.19	2.87	2.70	2.65	2.59	2.48	2.41	2.72	2.83	2.76	2.56		
175	2.55	2.67	2.78	2.97	2.98	3.01	2.94	2.72	2.60	2.51	2.75	2.67	2.59	2.86	2.98	2.88	2.76		
180	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.38	2.38	2.38		

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

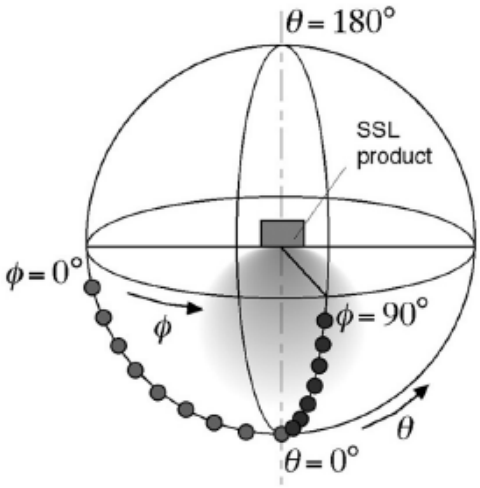
An EVERFINE Type C Model GO-R5000 Goniophotometer was used to measure the intensity at each angle of distribution for each sample. The photometric distance is 2.475m for near-field measurement or 30m for far-field measurement. Bandwidth of spectroradiometer is 380nm-780nm.
Ambient temperature was measured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