



LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Wall Pack

Model: WL70301

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ170300900

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:

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: **WL70301**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
112.4	9734.8	86.63	0.9922
CCT (K)	CRI	BUG	Stabilization Time (Light & Power)
2977	73.0	B2-U1-G2	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 Wall Pack
Model	: WL70301
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°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)	0.728	0.320
Power Factor	0.9922	0.9608
Test Power (W)	86.63	85.16
THD A%	8.89	12.58
Luminous Efficacy (lm/W)	112.4	113.6
Total Luminous Flux (lm)	9734.8	9674.2
Color Rendering Index (CRI)	73.0	
R9	-26	
Correlated Color Temperature (CCT) (K)	2977	
Chromaticity (Chroma x, Chroma y)	(0.4412, 0.4100)	
Chromaticity (Chroma u, Chroma v)	(0.2508, 0.3495)	
Chromaticity (Chroma u', Chroma v')	(0.2508, 0.5243)	
Duv	0.0017	
Average Beam Angle (°)	88.5	
Center Beam Candle Power (cd)	2679	
Spacing Criteria	0.56 (0°-180°)/ 1.37 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	77.84%	
Zonal Lumens in the 60°-90°Zone	22.09%	
Zonal Lumens in the 90°-120°Zone	0.02%	
Zonal Lumens in the 120°-180°Zone	0.05%	

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	61
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

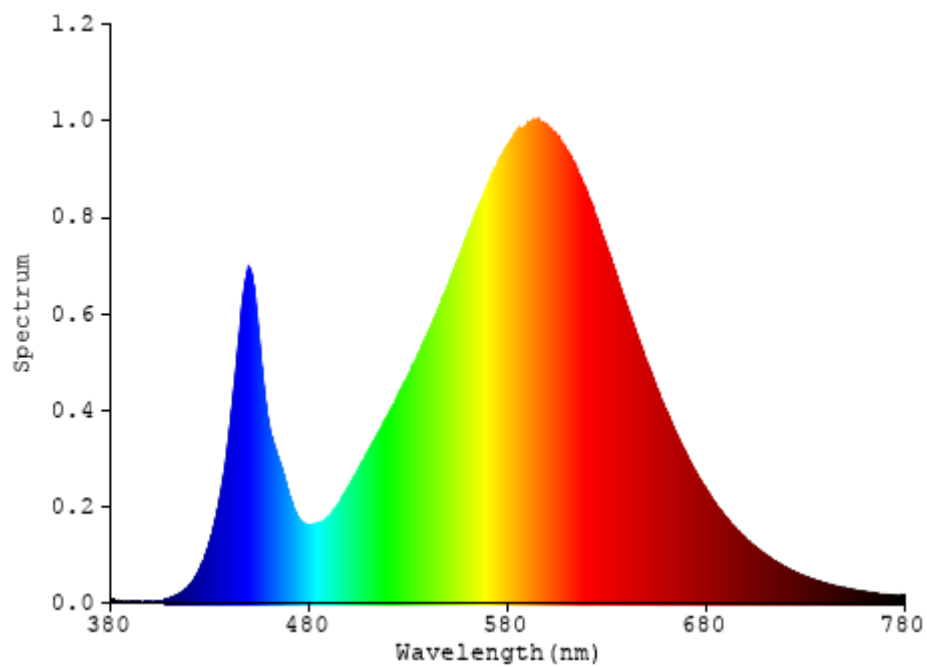


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	252.731	2.60%
10- 20	714.556	7.34%
20- 30	1174.523	12.07%
30- 40	1592.005	16.35%
40- 50	1925.254	19.78%
50- 60	1918.107	19.70%
60- 70	1545.534	15.88%
70- 80	574.867	5.91%
80- 90	30.05	0.31%
90-100	0.418	0.00%
100-110	0.706	0.01%
110-120	0.924	0.01%
120-130	1.082	0.01%
130-140	1.234	0.01%
140-150	1.179	0.01%
150-160	0.897	0.01%
160-170	0.565	0.01%
170-180	0.196	0.00%
Total	9734.8	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	7577.176	77.84%
60- 90	2150.451	22.09%
0-90	9727.627	99.93%
90- 180	7.201	0.07%
0- 180	9734.8	100%

Table 3: Zonal Lumen Data

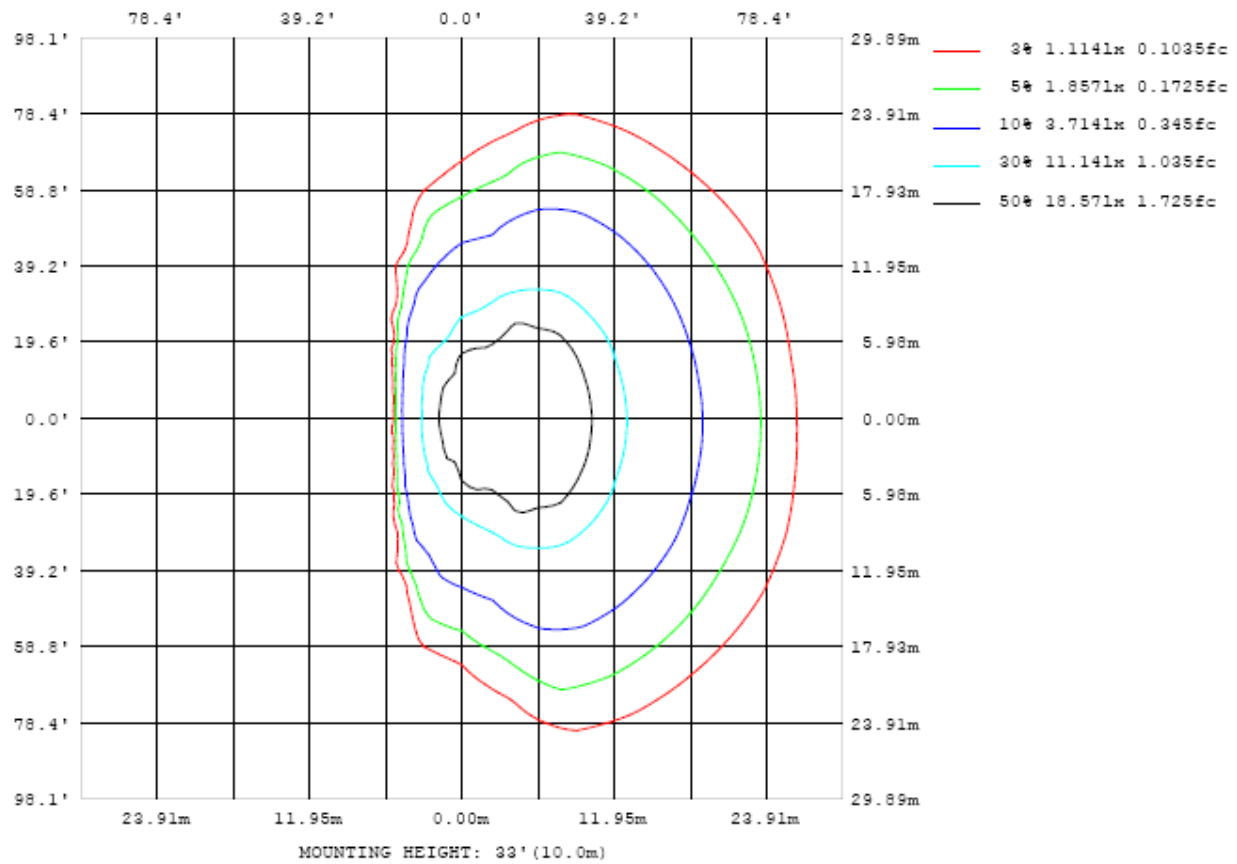


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

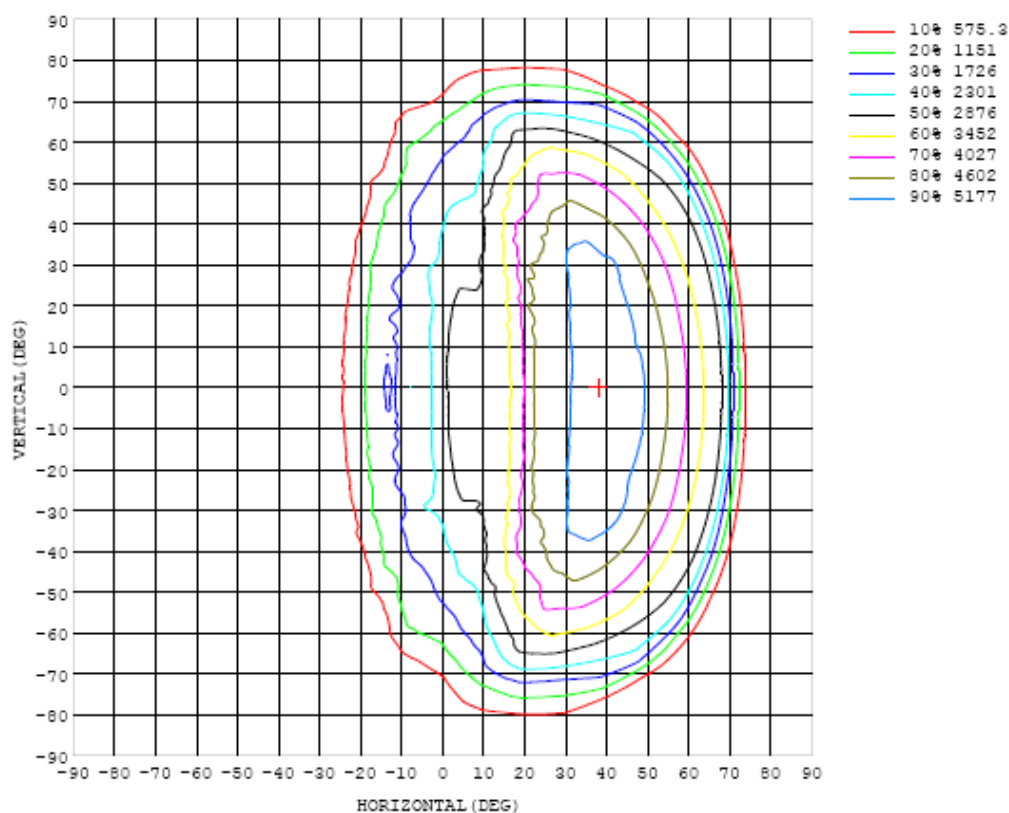


Chart 3: Isocandela Plot

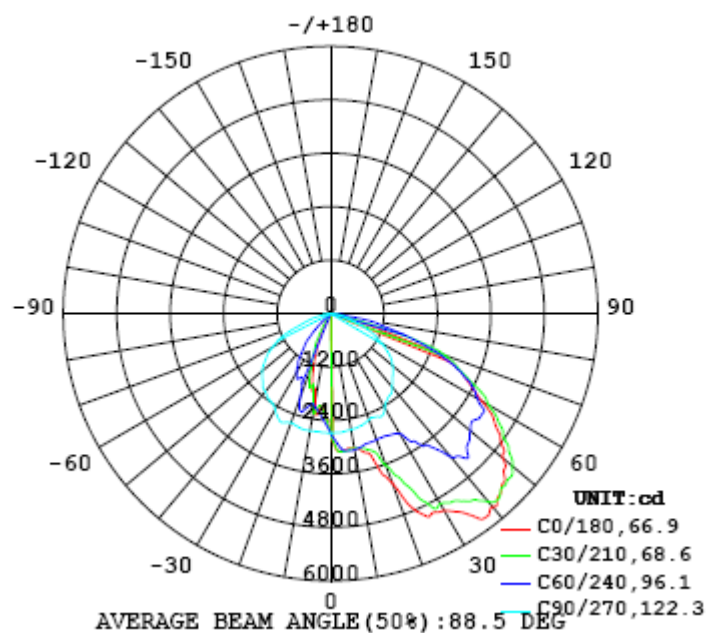


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679
5	3095	3104	3107	3110	3095	3100	3065	2955	2807	2677	2523	2406	2316	2248	2198	2157	2129	2113	2108
10	3070	3077	3074	3072	3061	3093	3101	3080	2946	2648	2403	2230	2090	2128	2238	2221	2101	2010	1987
15	3242	3236	3210	3157	3084	3056	3028	3053	2982	2609	2310	2107	2240	1952	1670	1714	1699	1612	1587
20	4039	4022	3889	3629	3230	3106	3013	2976	3001	2531	2157	2215	1875	1684	1477	1292	1139	1017	978
25	4992	4952	4805	4399	3864	3386	3020	2911	2943	2552	2082	2027	1681	1372	1065	798	640	559	518
30	5107	5090	5035	4920	4698	3853	3107	2883	2837	2435	2260	1646	1413	990	658	319	163	90.2	77.7
35	5533	5470	5315	5135	4885	4576	3629	2929	2696	2276	1989	1652	1187	626	183	75.6	74.3	75.1	70.3
40	5663	5635	5738	5515	5090	4646	4199	2996	2611	2151	1905	1363	818	186	90.3	80.0	83.6	86.0	84.5
45	5436	5463	5525	5487	5463	4772	4330	3232	2617	1975	1570	1210	338	87.1	97.3	95.7	97.2	96.8	96.9
50	5050	5129	5119	5332	5173	4974	4100	3166	2219	1817	1411	788	84.5	109	109	100	95.6	93.0	91.8
55	4589	4624	4725	4713	4732	4590	4079	3250	2054	1614	1382	347	104	123	105	94.5	90.3	86.1	84.5
60	3907	3969	4113	4099	4149	4100	3814	3061	1988	1313	1088	75.9	125	118	95.4	85.1	79.5	72.0	72.4
65	3310	3349	3354	3368	3488	3437	3289	2922	1710	1036	618	147	112	95.9	82.3	69.3	60.1	54.0	49.4
70	2181	2322	2568	2725	2681	2599	2519	2300	1462	622	123	153	93.3	70.8	62.1	44.5	34.3	28.7	24.3
75	289	397	551	991	1652	1735	1483	1390	940	385	44.2	83.1	63.5	42.8	26.7	19.5	14.2	12.0	10.8
80	16.4	18.4	22.1	45.0	73.3	372	785	632	465	180	17.5	39.5	24.7	14.1	9.21	7.23	6.10	5.10	4.03
85	0.22	0.22	0.29	1.94	4.82	7.91	35.7	88.1	54.5	23.9	8.10	7.35	6.17	3.81	2.95	2.21	1.06	0.32	0.21
90	0.13	0.14	0.14	0.14	0.13	0.12	0.13	0.15	0.17	0.26	0.48	0.71	0.85	0.81	0.62	0.38	0.27	0.25	0.41
95	0.06	0.07	0.07	0.07	0.07	0.09	0.12	0.17	0.22	0.28	0.33	0.39	0.45	0.49	0.49	0.49	0.48	0.47	0.79
100	0.06	0.06	0.06	0.07	0.08	0.10	0.16	0.22	0.30	0.38	0.46	0.53	0.62	0.71	0.72	0.71	0.70	0.70	1.23
105	0.06	0.06	0.06	0.07	0.09	0.13	0.20	0.29	0.39	0.49	0.61	0.71	0.80	0.88	0.93	0.94	0.93	0.93	1.62
110	0.06	0.06	0.06	0.07	0.11	0.17	0.25	0.36	0.47	0.62	0.77	0.91	1.00	1.12	1.17	1.21	1.20	1.20	1.90
115	0.06	0.06	0.07	0.09	0.13	0.21	0.29	0.44	0.56	0.75	0.96	1.14	1.25	1.39	1.43	1.46	1.46	1.44	2.18
120	0.07	0.07	0.08	0.12	0.16	0.27	0.36	0.47	0.66	0.85	1.09	1.27	1.40	1.57	1.65	1.74	1.74	1.76	2.47
125	0.08	0.09	0.12	0.17	0.22	0.33	0.46	0.54	0.77	1.01	1.28	1.50	1.64	1.81	1.93	2.03	2.10	2.14	2.74
130	0.12	0.14	0.20	0.27	0.27	0.39	0.56	0.69	0.85	1.13	1.45	1.73	1.93	2.09	2.20	2.42	2.46	2.55	3.10
135	0.20	0.24	0.31	0.38	0.40	0.48	0.64	0.83	0.97	1.32	1.60	1.88	2.04	2.30	2.57	2.68	2.77	2.87	3.31
140	0.29	0.33	0.42	0.50	0.49	0.61	0.76	0.90	1.13	1.41	1.70	2.02	2.23	2.55	2.72	2.84	2.95	3.03	3.45
145	0.39	0.46	0.56	0.60	0.61	0.68	0.84	1.00	1.31	1.53	1.82	2.15	2.34	2.54	2.72	2.83	2.95	2.94	3.50
150	0.53	0.63	0.73	0.78	0.76	0.80	0.84	1.09	1.26	1.48	1.73	2.00	2.17	2.39	2.57	2.66	2.71	2.64	3.33
155	0.71	0.82	0.90	1.03	0.95	0.89	0.94	1.13	1.28	1.40	1.64	1.90	2.07	2.27	2.41	2.52	2.49	2.40	3.10
160	0.95	1.04	1.12	1.26	1.24	1.09	1.01	1.21	1.35	1.29	1.66	1.93	2.10	2.26	2.37	2.37	2.30	2.24	2.85
165	1.14	1.24	1.35	1.45	1.51	1.34	1.27	1.38	1.44	1.50	1.77	2.06	2.19	2.29	2.32	2.28	2.21	2.11	2.42
170	1.35	1.42	1.55	1.66	1.70	1.51	1.41	1.44	1.66	1.69	1.72	2.09	2.26	2.30	2.30	2.25	2.17	2.07	2.09
175	1.57	1.71	1.81	1.90	1.99	1.89	1.76	1.83	1.87	1.80	2.02	2.18	2.36	2.40	2.44	2.41	2.35	2.26	2.03
180	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.75	1.75	1.75	1.75	1.75	1.75	1.75

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	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679	2679		
5	2116	2130	2156	2195	2259	2329	2422	2542	2670	2849	2967	3049	3102	3110	3104	3104	3096		
10	2019	2108	2242	2221	2073	2103	2261	2449	2672	2945	3075	3079	3080	3050	3058	3070	3070		
15	1632	1710	1700	1654	2076	2214	2092	2358	2658	2994	3018	3005	3038	3100	3177	3206	3230		
20	1015	1165	1274	1559	1680	1995	2090	2175	2615	2978	2934	2990	3107	3240	3740	3911	4022		
25	547	662	813	1073	1459	1576	2112	2194	2673	2869	2877	3022	3451	3985	4395	4768	4955		
30	81.3	155	347	669	1042	1529	1701	2140	2490	2775	2897	3216	3993	4732	4909	5041	5080		
35	67.9	66.3	75.8	196	632	1242	1541	1780	2380	2617	2943	3721	4561	4850	5114	5314	5435		
40	84.0	81.5	84.3	86.0	182	873	1437	1814	2285	2584	3077	4339	4622	5047	5513	5661	5609		
45	95.7	94.8	102	104	81.6	400	1189	1746	2158	2498	3393	4201	4723	5366	5461	5392	5370		
50	94.9	96.0	104	110	113	93.2	818	1455	2003	2198	3381	4009	4850	4976	5210	5068	5011		
55	85.5	89.4	94.3	105	122	102	393	1227	1778	2075	3182	4112	4408	4572	4620	4563	4550		
60	72.3	75.1	82.2	96.4	118	122	80.7	1082	1503	2015	3017	3717	3941	3971	3994	3941	3878		
65	50.6	53.2	70.8	80.6	91.6	115	161	749	1170	1819	2775	3106	3185	3244	3210	3253	3292		
70	25.9	29.5	40.3	48.8	59.4	103	145	271	679	1344	1981	2192	2332	2492	2541	2296	2179		
75	11.1	12.3	16.8	20.4	33.3	50.5	73.0	39.5	417	909	1149	1232	1383	1066	579	407	257		
80	3.96	4.72	5.85	7.48	10.1	17.9	22.5	13.7	157	349	446	386	154	26.5	22.7	19.9	18.9		
85	0.42	0.86	1.59	2.43	2.98	3.91	5.04	5.82	5.87	26.1	25.2	6.85	3.10	0.65	0.22	0.23	0.24		
90	0.43	0.47	0.54	0.60	0.64	0.63	0.53	0.39	0.25	0.16	0.11	0.10	0.10	0.11	0.13	0.14	0.15		
95	0.82	0.87	0.94	0.99	0.99	0.91	0.76	0.55	0.37	0.22	0.14	0.09	0.08	0.08	0.08	0.08	0.07		
100	1.25	1.29	1.34	1.35	1.31	1.18	0.96	0.71	0.50	0.33	0.20	0.11	0.09	0.09	0.08	0.08	0.07		
105	1.63	1.65	1.67	1.67	1.58	1.41	1.18	0.92	0.68	0.46	0.29	0.17	0.10	0.09	0.09	0.08	0.08		
110	1.92	1.94	1.97	1.94	1.84	1.65	1.42	1.14	0.86	0.60	0.39	0.23	0.14	0.10	0.10	0.09	0.08		
115	2.20	2.19	2.18	2.15	1.99	1.77	1.53	1.24	0.96	0.70	0.48	0.30	0.20	0.12	0.11	0.10	0.09		
120	2.46	2.42	2.37	2.29	2.08	1.84	1.60	1.35	1.06	0.81	0.58	0.39	0.28	0.17	0.14	0.12	0.10		
125	2.73	2.65	2.55	2.42	2.21	1.96	1.75	1.49	1.20	0.93	0.72	0.50	0.38	0.25	0.20	0.16	0.12		
130	3.10	2.95	2.87	2.69	2.49	2.26	2.01	1.74	1.43	1.10	0.92	0.69	0.52	0.39	0.32	0.25	0.20		
135	3.37	3.26	3.17	3.04	2.79	2.53	2.25	2.01	1.68	1.37	1.09	0.91	0.72	0.64	0.51	0.41	0.34		
140	3.53	3.46	3.37	3.26	3.05	2.80	2.49	2.19	1.82	1.57	1.25	1.12	0.94	0.83	0.72	0.58	0.48		
145	3.58	3.57	3.47	3.34	3.20	2.97	2.69	2.33	2.06	1.71	1.53	1.36	1.19	1.05	0.96	0.82	0.68		
150	3.43	3.47	3.43	3.34	3.18	2.97	2.76	2.41	2.10	1.84	1.70	1.49	1.41	1.31	1.25	1.11	0.95		
155	3.20	3.29	3.34	3.24	3.08	2.88	2.68	2.38	2.15	1.96	1.78	1.61	1.52	1.56	1.57	1.36	1.19		
160	2.94	3.00	3.08	3.10	2.98	2.81	2.65	2.41	2.10	2.03	1.88	1.75	1.72	1.81	1.84	1.70	1.54		
165	2.49	2.60	2.69	2.78	2.80	2.70	2.61	2.34	2.18	2.01	1.94	1.85	1.87	1.94	2.00	1.96	1.80		
170	2.12	2.27	2.41	2.52	2.57	2.55	2.49	2.24	2.12	2.08	2.04	1.96	1.92	2.14	2.23	2.18	2.03		
175	2.04	2.14	2.22	2.36	2.35	2.37	2.30	2.14	2.05	1.99	2.18	2.11	2.06	2.28	2.36	2.30	2.20		
180	1.75	1.75	1.75	1.75	1.75	1.75	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74		

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.

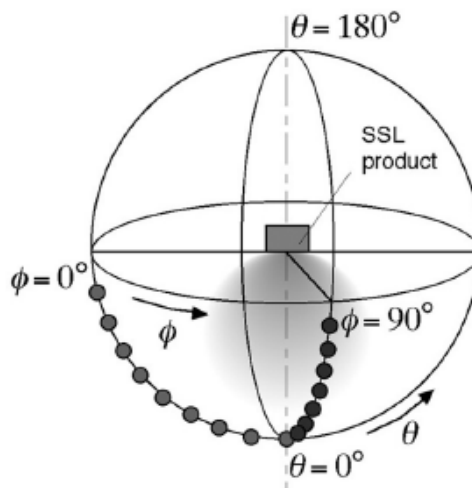
Color Characteristics Measurements

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 ($C=0^\circ/180^\circ$ 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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