



LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Wall Pack

Model: WL52301

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, Yuhang Dist,
Hangzhou, Zhejiang Province, China 311100

Tel: +86 571 86376106

www.ledtestlab.com

Report No.: HZ17030090m

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: **WL52301**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
114.4	5933.9	51.88	0.9948
CCT (K)	CRI	BUG	Stabilization Time (Light & Power)
2957	72.8	B1-U1-G1	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

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

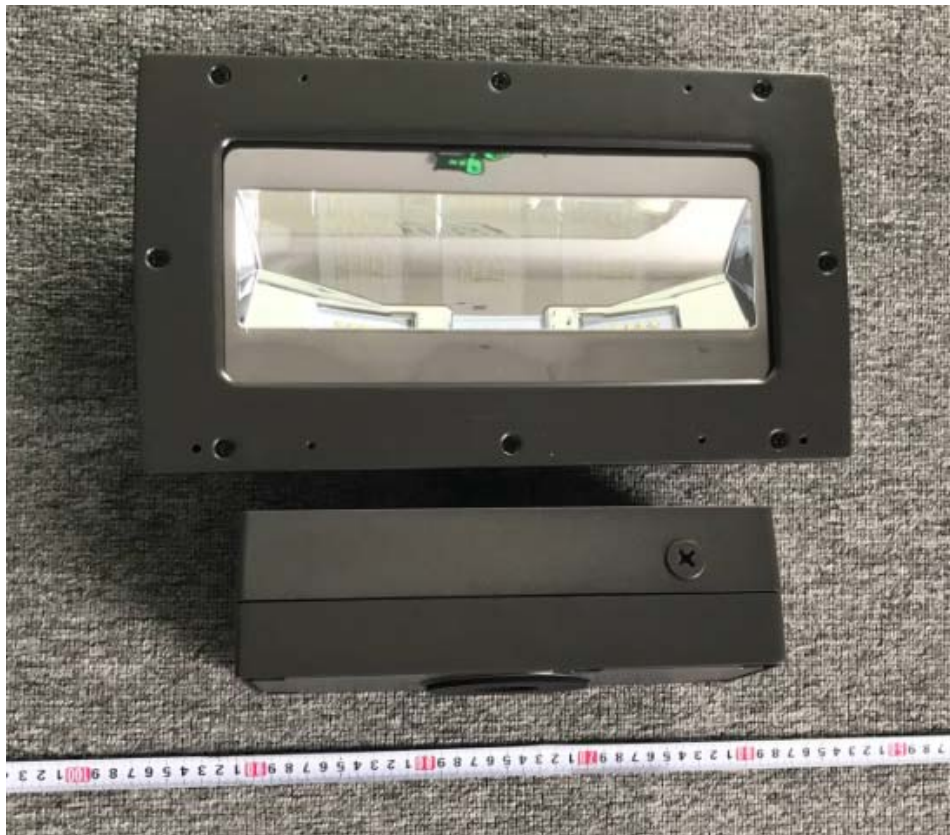


Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: V-Line Wall Pack
Model	: WL52301
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)	0.435	0.197
Power Factor	0.9948	0.9505
Test Power (W)	51.88	51.74
THD A%	5.52	9.24
Luminous Efficacy (lm/W)	114.4	114.9
Total Luminous Flux (lm)	5933.9	5943.7
Color Rendering Index (CRI)	72.8	
R9	-27	
Correlated Color Temperature (CCT) (K)	2957	
Chromaticity (Chroma x, Chroma y)	(0.4432, 0.4116)	
Chromaticity (Chroma u, Chroma v)	(0.2514, 0.3502)	
Chromaticity (Chroma u', Chroma v')	(0.2514, 0.5253)	
Duv	0.0022	
Average Beam Angle (°)	90.4	
Center Beam Candle Power (cd)	1770	
Spacing Criteria	0.54 (0°-180°)/ 1.34 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	78.40%	
Zonal Lumens in the 60°-90°Zone	21.53%	
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	-27
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

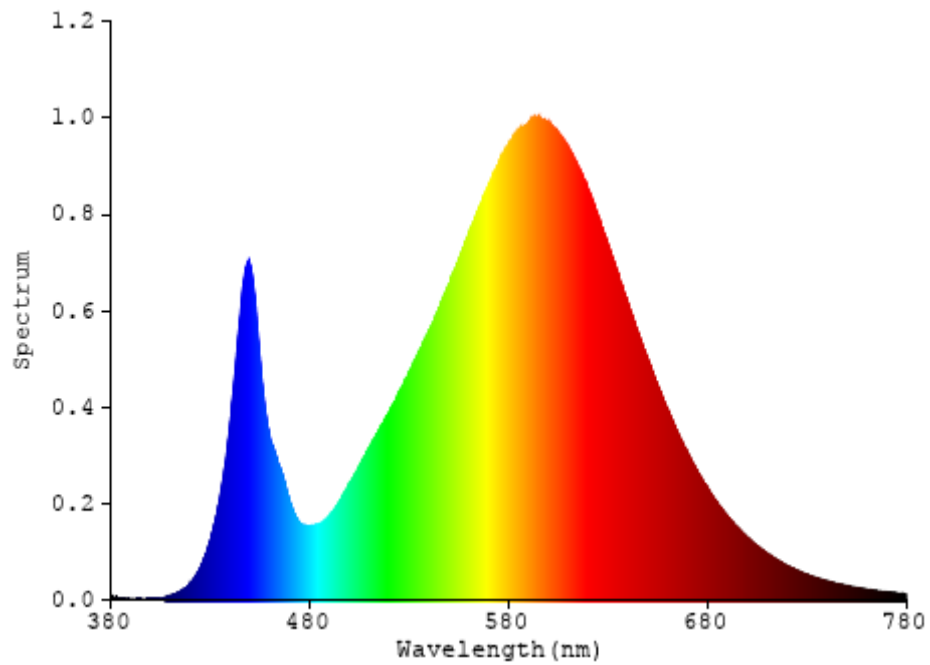


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	155.772	2.63%
10- 20	436.848	7.36%
20- 30	714.151	12.04%
30- 40	977.687	16.48%
40- 50	1189.873	20.05%
50- 60	1177.861	19.85%
60- 70	937.731	15.80%
70- 80	323.662	5.45%
80- 90	15.925	0.27%
90-100	0.241	0.00%
100-110	0.423	0.01%
110-120	0.557	0.01%
120-130	0.655	0.01%
130-140	0.749	0.01%
140-150	0.718	0.01%
150-160	0.546	0.01%
160-170	0.343	0.01%
170-180	0.118	0.00%
Total	5933.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	4652.192	78.40%
60- 90	1277.318	21.53%
0-90	5929.51	99.93%
90- 180	4.35	0.07%
0- 180	5933.9	100%

Table 3: Zonal Lumen Data

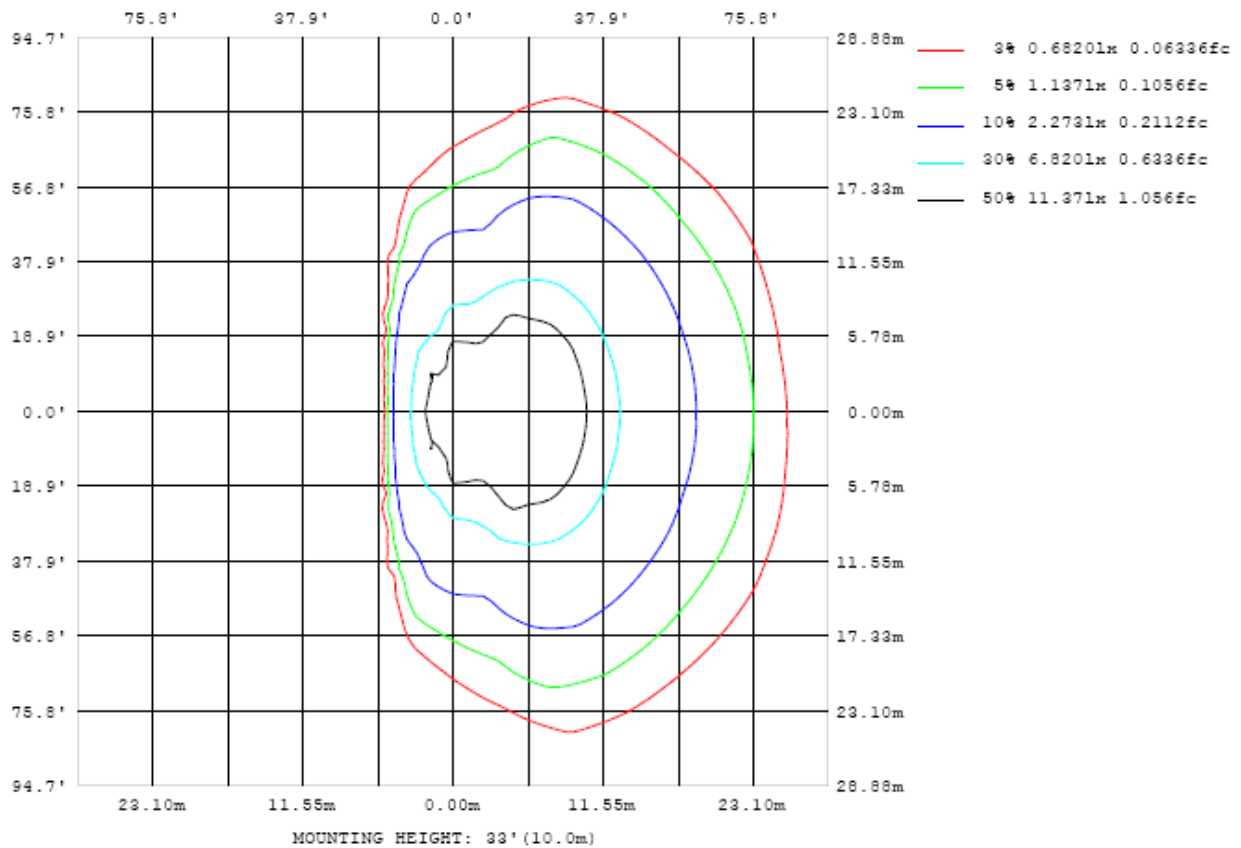


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

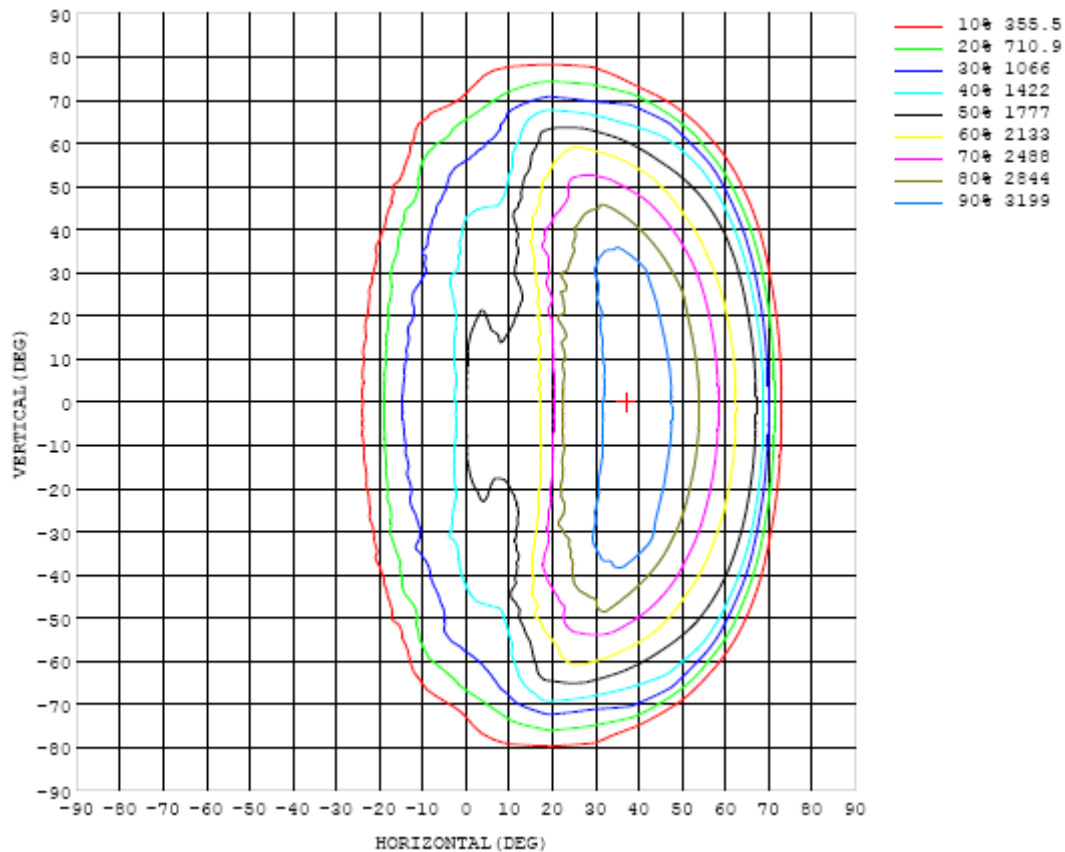


Chart 3: Isocandela Plot

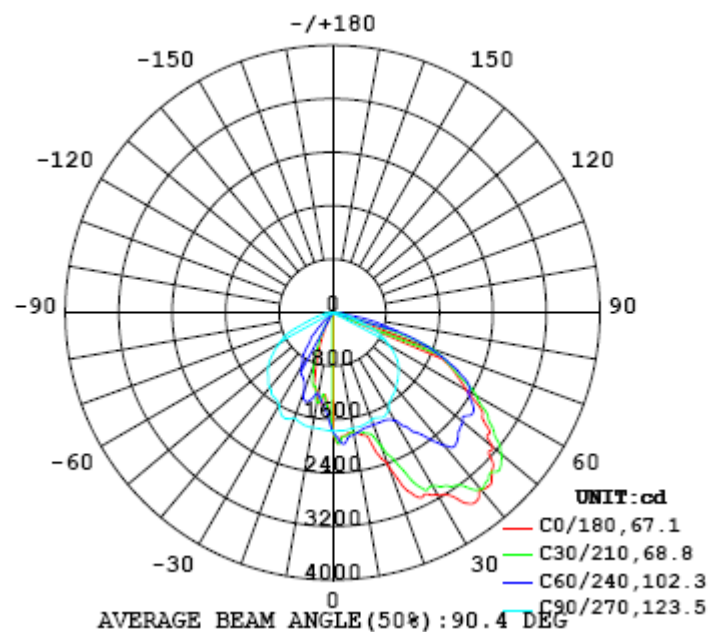


Chart 4: Polar Candela Distribution

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	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
5	1857	1857	1855	1857	1867	1927	1974	1938	1855	1773	1637	1502	1416	1365	1323	1292	1269	1253	1249
10	1822	1823	1819	1817	1812	1839	1854	1887	1933	1760	1504	1350	1249	1274	1361	1360	1334	1299	1294
15	1904	1912	1887	1867	1829	1813	1794	1818	1892	1745	1441	1258	1362	1291	1126	1129	1107	1049	1029
20	2434	2372	2313	2116	1902	1837	1786	1759	1821	1707	1323	1326	1291	1104	942	813	725	649	593
25	3049	3029	2932	2734	2321	1976	1793	1728	1753	1734	1289	1297	1103	879	680	484	392	308	293
30	3150	3126	3085	2996	2918	2364	1862	1711	1685	1679	1305	1121	906	624	385	178	76.1	55.9	34.3
35	3486	3443	3279	3167	3010	2882	2183	1751	1609	1544	1160	1086	776	373	85.4	33.1	30.7	34.5	36.4
40	3450	3431	3504	3448	3166	2879	2601	1812	1555	1471	1152	869	480	94.1	44.1	42.2	49.3	53.1	54.3
45	3365	3376	3444	3370	3351	2976	2651	2010	1579	1384	1034	768	217	40.1	61.7	63.2	58.8	57.3	59.1
50	3123	3127	3094	3299	3228	3048	2545	2063	1323	1285	950	474	49.4	69.4	67.3	60.8	58.5	56.2	56.7
55	2731	2746	2827	2872	2906	2883	2573	2004	1239	1163	956	218	59.0	77.8	64.8	57.2	54.1	50.3	49.7
60	2309	2326	2400	2484	2519	2515	2352	1907	1255	974	690	45.1	80.3	74.8	58.0	51.4	46.0	45.4	46.2
65	1961	1978	1979	1995	2044	2077	2070	1826	1151	796	406	91.7	68.1	58.7	50.6	43.1	33.9	30.3	30.7
70	1024	1165	1393	1578	1578	1544	1556	1490	942	478	183	101	59.7	39.7	39.8	25.1	18.4	14.1	13.0
75	61.7	82.1	135	410	794	1034	885	871	632	295	29.6	49.7	39.9	22.4	13.3	8.70	6.03	4.87	4.73
80	3.50	3.96	4.48	5.51	21.8	120	419	383	301	128	6.48	21.0	13.7	6.70	3.76	3.56	3.44	3.32	3.20
85	0.12	0.11	0.12	0.15	0.51	1.44	3.75	51.8	41.1	8.01	3.34	3.53	2.65	2.20	1.91	1.62	1.03	0.56	0.54
90	0.07	0.07	0.07	0.08	0.07	0.07	0.07	0.09	0.11	0.14	0.31	0.47	0.56	0.52	0.39	0.23	0.15	0.13	0.20
95	0.03	0.03	0.04	0.04	0.04	0.05	0.07	0.10	0.13	0.17	0.20	0.23	0.27	0.29	0.29	0.28	0.27	0.26	0.43
100	0.03	0.03	0.03	0.04	0.04	0.06	0.09	0.13	0.18	0.23	0.27	0.31	0.37	0.43	0.43	0.42	0.41	0.40	0.70
105	0.03	0.03	0.03	0.04	0.05	0.07	0.12	0.17	0.24	0.30	0.37	0.43	0.48	0.53	0.55	0.55	0.54	0.54	0.96
110	0.03	0.03	0.04	0.04	0.07	0.10	0.15	0.22	0.29	0.38	0.47	0.55	0.59	0.66	0.69	0.71	0.70	0.70	1.13
115	0.03	0.03	0.04	0.05	0.07	0.13	0.17	0.26	0.35	0.46	0.59	0.70	0.75	0.83	0.85	0.87	0.86	0.85	1.31
120	0.04	0.04	0.05	0.07	0.09	0.16	0.22	0.28	0.40	0.52	0.67	0.77	0.84	0.94	0.99	1.04	1.04	1.05	1.50
125	0.04	0.05	0.07	0.10	0.13	0.19	0.27	0.33	0.46	0.61	0.78	0.91	0.99	1.09	1.16	1.22	1.26	1.28	1.66
130	0.07	0.08	0.12	0.16	0.16	0.23	0.34	0.42	0.51	0.68	0.88	1.05	1.17	1.26	1.32	1.45	1.48	1.54	1.89
135	0.12	0.14	0.18	0.23	0.24	0.28	0.38	0.50	0.58	0.80	0.98	1.14	1.24	1.39	1.56	1.62	1.68	1.73	2.02
140	0.17	0.20	0.25	0.31	0.29	0.37	0.45	0.54	0.70	0.85	1.04	1.23	1.36	1.54	1.65	1.73	1.80	1.84	2.10
145	0.24	0.28	0.35	0.37	0.37	0.41	0.51	0.61	0.79	0.93	1.12	1.31	1.43	1.55	1.66	1.73	1.81	1.80	2.13
150	0.32	0.38	0.45	0.48	0.46	0.48	0.50	0.66	0.75	0.89	1.06	1.22	1.33	1.45	1.57	1.63	1.67	1.62	2.02
155	0.44	0.51	0.55	0.63	0.58	0.54	0.56	0.68	0.77	0.84	1.00	1.16	1.27	1.39	1.47	1.54	1.52	1.47	1.89
160	0.58	0.64	0.69	0.77	0.75	0.66	0.61	0.73	0.81	0.78	1.01	1.18	1.28	1.38	1.45	1.45	1.41	1.37	1.74
165	0.70	0.75	0.82	0.88	0.91	0.80	0.76	0.83	0.86	0.90	1.07	1.25	1.33	1.39	1.41	1.39	1.35	1.29	1.48
170	0.82	0.86	0.94	1.01	1.03	0.91	0.85	0.87	1.00	1.01	1.04	1.27	1.37	1.40	1.40	1.37	1.33	1.27	1.28
175	0.95	1.03	1.10	1.16	1.21	1.15	1.07	1.11	1.13	1.07	1.22	1.32	1.42	1.45	1.48	1.46	1.43	1.38	1.24
180	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15

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	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770		
5	1260	1270	1292	1323	1367	1415	1498	1633	1754	1851	1935	1947	1921	1876	1852	1854	1852		
10	1299	1323	1358	1360	1272	1248	1360	1514	1747	1920	1871	1839	1833	1810	1811	1815	1816		
15	1053	1088	1136	1128	1296	1375	1256	1432	1728	1874	1802	1790	1800	1825	1859	1886	1897		
20	628	730	786	951	1096	1253	1300	1302	1680	1800	1746	1767	1826	1893	2215	2349	2369		
25	309	381	479	646	894	1057	1280	1304	1729	1731	1703	1774	2000	2349	2670	2899	3007		
30	34.9	71.6	178	370	623	898	1086	1287	1599	1649	1701	1864	2372	2858	2967	3100	3124		
35	35.2	29.0	32.3	88.0	349	758	1037	1118	1536	1564	1750	2212	2774	2988	3148	3264	3430		
40	54.6	49.1	46.8	43.5	93.4	505	909	1147	1466	1507	1811	2655	2853	3130	3392	3496	3428		
45	59.4	60.3	64.4	61.8	38.1	186	730	1062	1366	1481	2010	2588	2940	3288	3408	3396	3357		
50	58.1	60.0	61.3	66.9	68.2	39.2	464	932	1261	1268	2028	2476	3003	3135	3202	3052	3084		
55	50.0	54.7	57.8	64.5	74.5	62.7	189	936	1099	1194	1940	2510	2781	2780	2768	2801	2708		
60	47.7	48.3	49.0	60.2	68.3	77.7	43.5	663	925	1202	1878	2325	2375	2424	2436	2322	2304		
65	30.9	31.7	41.5	52.1	58.3	70.7	113	422	744	1095	1748	1932	1937	1910	1914	1940	1952		
70	13.6	16.8	24.9	33.0	34.3	58.0	91.3	129	414	855	1298	1380	1414	1477	1421	1203	1047		
75	4.89	5.27	7.14	9.30	18.6	30.6	43.7	14.3	250	548	740	764	837	543	273	97.5	69.2		
80	3.22	3.32	3.40	3.47	4.48	8.51	13.5	4.39	99.3	218	274	256	48.3	4.94	4.17	3.60	3.48		
85	0.76	1.17	1.63	1.77	1.86	2.13	2.34	3.03	2.27	4.29	17.2	1.35	0.40	0.12	0.11	0.12	0.13		
90	0.21	0.24	0.28	0.33	0.36	0.36	0.32	0.23	0.15	0.09	0.06	0.05	0.05	0.06	0.06	0.07	0.08		
95	0.44	0.48	0.52	0.56	0.58	0.54	0.46	0.34	0.23	0.14	0.08	0.05	0.05	0.04	0.04	0.04	0.04		
100	0.72	0.75	0.78	0.80	0.79	0.72	0.59	0.44	0.31	0.20	0.12	0.07	0.05	0.05	0.04	0.04	0.04		
105	0.97	0.98	1.01	1.02	0.97	0.87	0.73	0.57	0.42	0.29	0.18	0.10	0.06	0.05	0.05	0.05	0.04		
110	1.14	1.16	1.19	1.18	1.13	1.01	0.87	0.70	0.53	0.37	0.24	0.14	0.08	0.06	0.06	0.05	0.04		
115	1.32	1.32	1.32	1.30	1.21	1.08	0.94	0.76	0.59	0.43	0.30	0.19	0.12	0.07	0.07	0.06	0.05		
120	1.49	1.47	1.44	1.39	1.26	1.12	0.98	0.83	0.65	0.50	0.36	0.24	0.17	0.10	0.08	0.07	0.05		
125	1.66	1.61	1.55	1.47	1.34	1.19	1.07	0.91	0.74	0.57	0.45	0.31	0.23	0.15	0.12	0.10	0.07		
130	1.89	1.80	1.74	1.62	1.50	1.37	1.23	1.07	0.87	0.68	0.57	0.43	0.32	0.24	0.19	0.15	0.12		
135	2.06	1.99	1.93	1.84	1.68	1.54	1.37	1.23	1.03	0.84	0.67	0.56	0.44	0.39	0.32	0.25	0.20		
140	2.15	2.10	2.05	1.97	1.84	1.70	1.53	1.34	1.11	0.96	0.76	0.69	0.58	0.51	0.45	0.36	0.30		
145	2.17	2.17	2.10	2.03	1.94	1.81	1.65	1.43	1.26	1.04	0.93	0.83	0.73	0.65	0.59	0.51	0.42		
150	2.08	2.11	2.08	2.03	1.93	1.81	1.68	1.47	1.28	1.11	1.03	0.91	0.86	0.80	0.77	0.69	0.59		
155	1.94	2.00	2.03	1.97	1.87	1.76	1.64	1.44	1.30	1.18	1.07	0.97	0.92	0.95	0.97	0.85	0.74		
160	1.79	1.83	1.88	1.89	1.82	1.71	1.61	1.47	1.27	1.22	1.13	1.06	1.03	1.09	1.13	1.05	0.95		
165	1.53	1.59	1.65	1.70	1.71	1.65	1.58	1.43	1.32	1.21	1.16	1.12	1.13	1.17	1.21	1.19	1.10		
170	1.30	1.39	1.47	1.54	1.57	1.56	1.52	1.37	1.29	1.25	1.23	1.18	1.15	1.29	1.34	1.32	1.23		
175	1.24	1.31	1.36	1.44	1.43	1.44	1.41	1.31	1.24	1.19	1.31	1.28	1.23	1.36	1.42	1.39	1.33		
180	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15		

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.

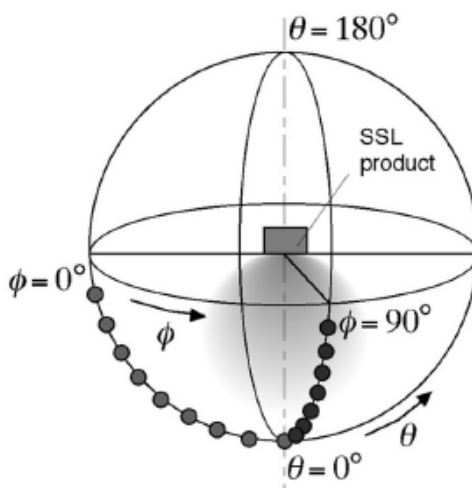
Color Characteristics Measurements

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 ***

This report is considered invalidated without the Special Seal for Inspection of the LTL. This report shall not be altered, increased or deleted. The results shown in this test report refer only to the sample(s) tested. Without written approval of LTL, this test report shall not be copied except in full and published as advertisement.

Prepared by: Leading Testing Laboratories
3rd Floor, Bld. 2, NO. 96 Longchuanwu Rd Qianjiang Economy Dev. Zone, Yuhang Dist,
Hangzhou, Zhejiang Province, China 311100
Tel: +86 571 86376106 www.ledtestlab.com

Page 13 of 13