



LM-79-08 Test Report

for

ABOVE ALL LIGHTING INC

1501 Industrial Way N. Toms River, NJ 08755.

V-Line Flood Light

Model: FL70401

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17030090g

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

Reviewed by:

April Zou

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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: **FL70401**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
115.4	9121.9	79.05	0.9916
CCT (K)	CRI	BUG	Stabilization Time (Light & Power)
3827	65.9	B3-U1-G1	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 Flood Light
Model	: FL70401
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°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)	0.664	0.294
Power Factor	0.9916	0.9569
Test Power (W)	79.05	77.92
THD A%	8.99	13.24
Luminous Efficacy (lm/W)	115.4	116.1
Total Luminous Flux (lm)	9121.9	9048.0
Color Rendering Index (CRI)	65.9	
R9	-50	
Correlated Color Temperature (CCT) (K)	3827	
Chromaticity (Chroma x, Chroma y)	(0.3945, 0.4015)	
Chromaticity (Chroma u, Chroma v)	(0.2245, 0.3427)	
Chromaticity (Chroma u', Chroma v')	(0.2245, 0.5141)	
Duv	0.0073	
Average Beam Angle (°)	85.0	
Center Beam Candle Power (cd)	5067	
Spacing Criteria	0.57 (0°-180°)/ 1.45 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	94.05%	
Zonal Lumens in the 60°-90°Zone	5.88%	
Zonal Lumens in the 90°-120°Zone	0.01%	
Zonal Lumens in the 120°-180°Zone	0.06%	

Special Color Rendering Indices	
R1	61
R2	73
R3	83
R4	64
R5	60
R6	61
R7	79
R8	46
R9	-50
R10	36
R11	56
R12	29
R13	63
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

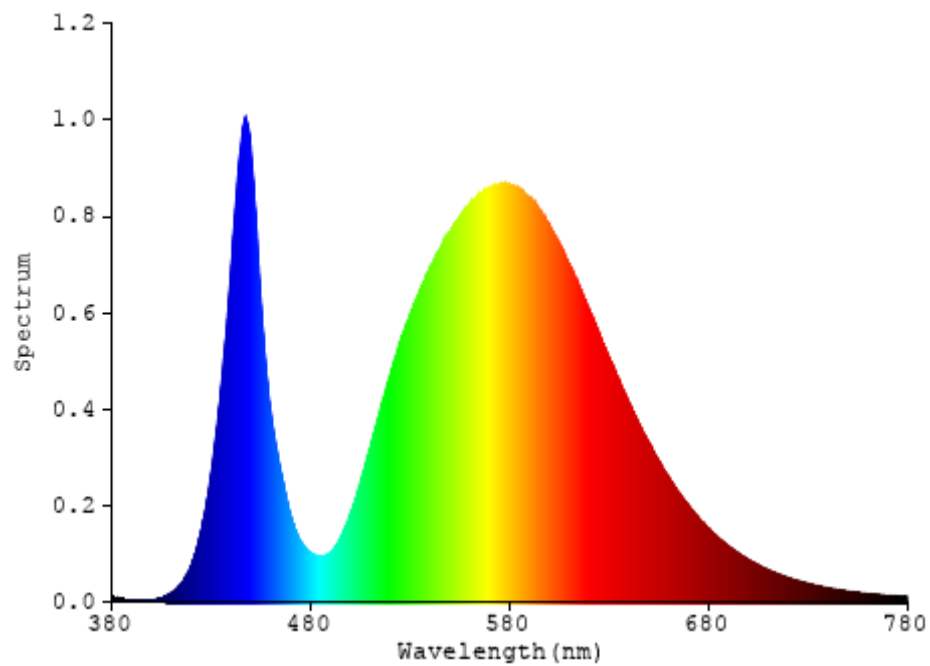


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	471.959	5.17%
10- 20	1307.128	14.33%
20- 30	1832.165	20.09%
30- 40	1984.915	21.76%
40- 50	1830.155	20.06%
50- 60	1152.737	12.64%
60- 70	462.969	5.08%
70- 80	70.629	0.77%
80- 90	2.344	0.03%
90-100	0.158	0.00%
100-110	0.358	0.00%
110-120	0.566	0.01%
120-130	0.827	0.01%
130-140	1.2	0.01%
140-150	1.398	0.02%
150-160	1.221	0.01%
160-170	0.83	0.01%
170-180	0.298	0.00%
Total	9121.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	8579.059	94.05%
60- 90	535.942	5.88%
0-90	9115.001	99.92%
90- 180	6.856	0.08%
0- 180	9121.9	100%

Table 3: Zonal Lumen Data

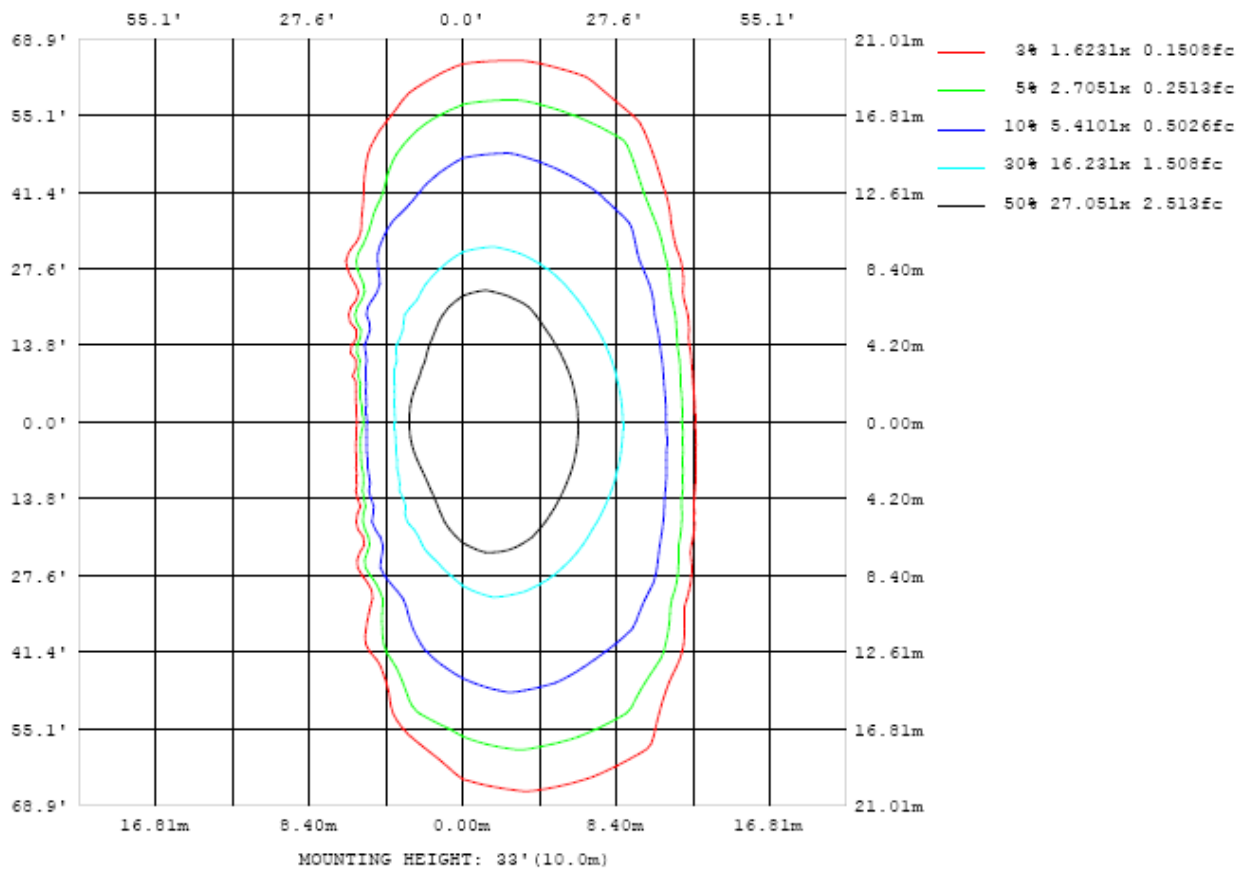


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

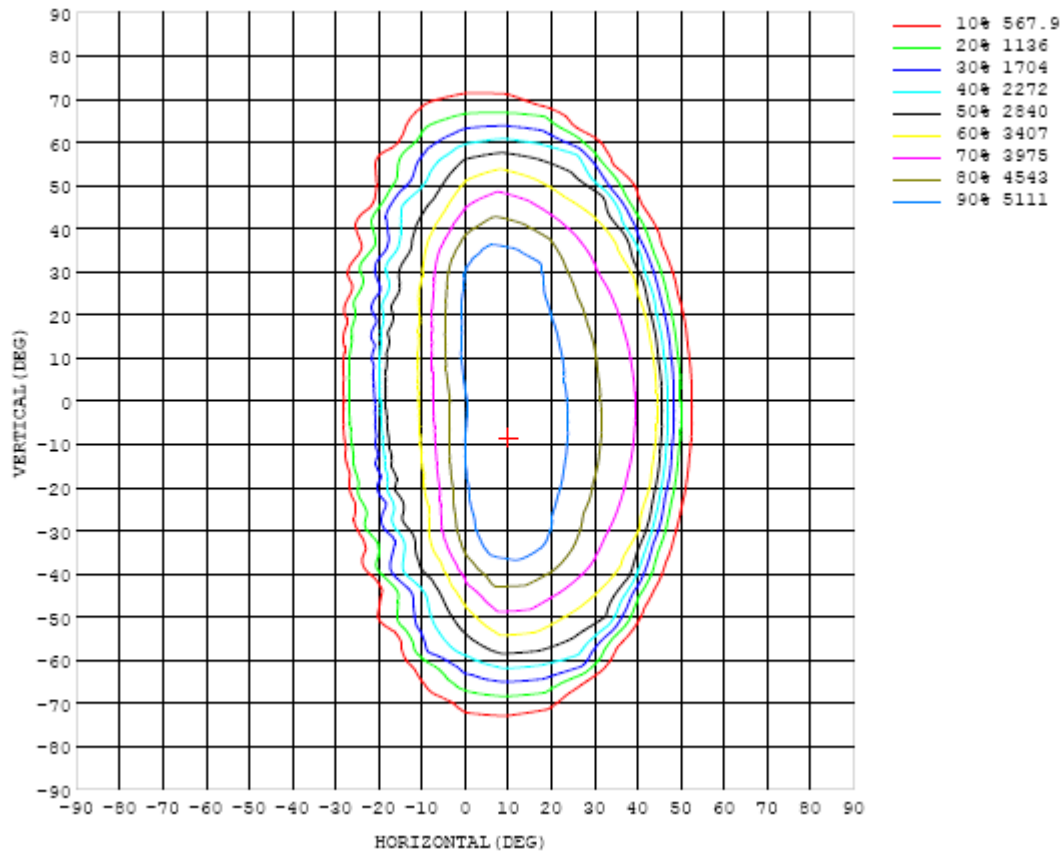


Chart 3: Isocandela Plot

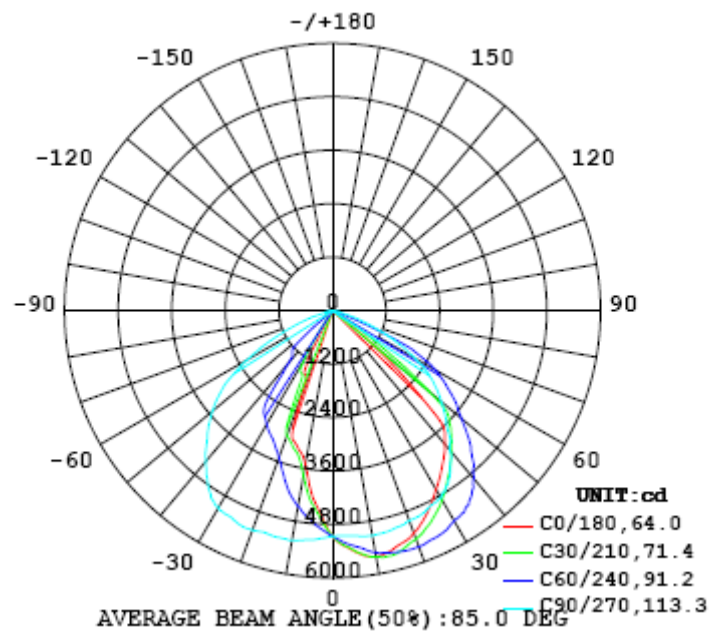


Chart 4: Polar Candela Distribution

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	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067
5	5415	5417	5407	5391	5361	5331	5297	5249	5181	5080	4965	4835	4715	4604	4510	4445	4394	4364	4352
10	5613	5621	5618	5607	5596	5572	5513	5435	5336	5126	4869	4585	4345	4096	3874	3698	3584	3525	3511
15	5490	5518	5562	5632	5660	5675	5611	5509	5403	5099	4698	4283	3816	3470	3297	3222	3168	3138	3124
20	5316	5357	5418	5456	5496	5572	5642	5587	5402	5017	4456	3860	3349	3157	3061	2955	2827	2176	2084
25	5015	5057	5127	5229	5343	5421	5587	5600	5404	4952	4282	3448	3101	2957	1952	1596	1569	1538	1457
30	4634	4679	4787	4903	5069	5237	5448	5559	5366	4848	4044	3153	2870	1579	1535	1086	498	319	227
35	4274	4319	4404	4524	4721	4999	5316	5376	5177	4570	3633	2892	1759	1453	418	226	206	191	194
40	3921	3960	4030	4140	4300	4651	4920	4981	4800	4090	3120	2644	1379	331	200	197	184	177	177
45	3088	3395	3622	3745	3896	4141	4382	4487	4347	3621	2663	1568	621	190	187	184	177	169	169
50	1102	1294	1797	2839	3442	3646	3772	3970	3899	3178	2327	1199	192	181	182	189	185	177	177
55	163	234	464	886	2151	3096	3237	3432	3373	2733	2002	589	173	175	183	185	161	153	153
60	98.5	100	101	120	536	1825	2652	2721	2639	2129	1321	159	163	177	163	158	148	143	143
65	27.7	37.4	59.4	84.6	84.8	324	1614	1812	1792	1426	636	128	153	152	150	123	98.1	70.1	66.8
70	9.48	10.5	11.8	12.9	38.4	64.2	208	921	921	755	117	108	117	125	72.4	33.7	11.1	9.27	8.37
75	5.73	6.38	6.94	7.20	8.48	12.4	32.7	181	339	280	41.5	68.0	76.3	25.8	7.74	7.08	6.69	6.19	5.73
80	0.81	0.84	0.90	0.99	2.80	4.70	7.18	12.2	51.0	38.0	10.9	18.9	5.61	4.95	4.91	5.06	5.29	5.13	4.66
85	0.49	0.55	0.57	0.54	0.52	0.51	0.52	1.48	2.65	2.71	1.86	1.72	2.40	3.46	4.06	4.25	4.31	4.32	3.94
90	0.07	0.07	0.08	0.09	0.10	0.11	0.11	0.12	0.13	0.14	0.24	0.29	0.34	0.42	0.42	0.36	0.25	0.16	0.11
95	0.05	0.05	0.06	0.06	0.07	0.09	0.11	0.13	0.16	0.18	0.20	0.19	0.17	0.14	0.08	0.05	0.04	0.04	0.05
100	0.06	0.06	0.06	0.07	0.09	0.12	0.16	0.19	0.22	0.25	0.27	0.29	0.28	0.22	0.17	0.10	0.07	0.06	0.07
105	0.06	0.06	0.06	0.07	0.11	0.17	0.23	0.30	0.45	0.50	0.42	0.43	0.40	0.34	0.27	0.20	0.13	0.10	0.16
110	0.07	0.07	0.07	0.10	0.15	0.22	0.31	0.40	0.60	0.66	0.55	0.56	0.50	0.43	0.37	0.31	0.23	0.19	0.33
115	0.08	0.08	0.08	0.13	0.18	0.29	0.37	0.52	0.66	0.72	0.67	0.67	0.63	0.56	0.48	0.41	0.34	0.32	0.59
120	0.09	0.09	0.11	0.16	0.23	0.38	0.51	0.61	0.77	0.85	0.85	0.85	0.80	0.73	0.65	0.60	0.54	0.53	0.91
125	0.12	0.14	0.18	0.25	0.33	0.50	0.67	0.75	0.92	1.04	1.07	1.07	1.02	0.93	0.87	0.84	0.80	0.78	1.30
130	0.20	0.24	0.31	0.41	0.43	0.63	0.86	1.00	1.08	1.25	1.33	1.35	1.32	1.19	1.11	1.14	1.10	1.10	1.78
135	0.37	0.42	0.50	0.60	0.65	0.82	1.04	1.27	1.32	1.58	1.68	1.70	1.64	1.58	1.55	1.50	1.50	1.54	2.35
140	0.53	0.59	0.70	0.81	0.89	1.09	1.27	1.44	1.58	1.76	1.91	2.00	2.02	2.03	1.92	1.85	1.89	1.93	2.93
145	0.73	0.84	0.95	0.97	1.09	1.22	1.46	1.61	1.86	2.01	2.19	2.32	2.32	2.28	2.24	2.18	2.23	2.22	3.45
150	1.01	1.13	1.23	1.28	1.35	1.49	1.69	1.82	2.01	2.19	2.31	2.34	2.42	2.48	2.47	2.54	2.52	3.85	
155	1.35	1.49	1.54	1.66	1.52	1.51	1.60	1.70	1.82	1.90	2.11	2.27	2.36	2.49	2.61	2.75	2.77	2.78	4.08
160	1.80	1.90	1.91	1.96	1.88	1.74	1.69	1.78	1.87	1.84	2.18	2.35	2.46	2.62	2.78	2.87	2.91	3.00	4.18
165	2.15	2.25	2.26	2.23	2.21	2.02	1.99	2.03	2.03	2.10	2.36	2.56	2.66	2.79	2.89	2.96	3.06	3.10	3.96
170	2.52	2.56	2.55	2.52	2.42	2.21	2.19	2.20	2.37	2.41	2.48	2.75	2.84	2.92	3.00	3.08	3.19	3.22	3.72
175	2.90	2.97	2.94	2.92	2.92	2.78	2.76	2.79	2.74	2.67	2.92	3.07	3.14	3.21	3.31	3.41	3.48	3.47	3.48
180	2.92	2.92	2.92	2.91	2.90	2.89	2.88	2.86	2.85	2.83	2.83	2.83	2.84	2.84	2.84	2.84	2.85	2.85	2.85

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	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067	5067		
5	4363	4400	4468	4561	4656	4785	4917	5039	5167	5250	5321	5354	5372	5395	5410	5417	5415		
10	3543	3628	3761	3966	4226	4455	4728	5012	5237	5429	5475	5548	5596	5616	5623	5615	5610		
15	3140	3183	3245	3333	3602	4027	4467	4887	5233	5441	5569	5620	5625	5622	5575	5532	5484		
20	2282	2736	2994	3070	3196	3515	4172	4754	5245	5473	5610	5571	5497	5432	5413	5355	5312		
25	1561	1576	1592	2507	2974	3177	3810	4582	5204	5509	5608	5496	5353	5238	5131	5064	5006		
30	248	551	1292	1530	2251	2949	3436	4388	5119	5493	5498	5361	5107	4929	4788	4689	4631		
35	205	218	243	875	1446	2668	3073	4049	4855	5259	5272	5182	4779	4538	4406	4319	4270		
40	182	190	198	205	943	1545	2751	3559	4422	4846	4847	4718	4370	4138	4023	3953	3912		
45	173	179	185	183	206	1277	2420	3060	3960	4360	4327	4133	3926	3756	3619	3508	3168		
50	182	189	183	179	179	287	1764	2585	3509	3876	3787	3537	3455	3281	2190	1577	1183		
55	157	167	189	178	172	173	1058	2156	2981	3322	3208	3067	2841	1534	660	398	269		
60	145	153	160	164	169	153	601	1579	2198	2504	2450	2454	1127	346	109	101	98.8		
65	74.3	107	137	150	146	135	114	1018	1399	1552	1559	904	153	83.6	77.0	47.4	31.8		
70	8.31	16.8	33.8	90.3	116	111	80.7	505	724	734	448	66.6	63.0	25.8	12.1	11.1	9.99		
75	5.24	5.04	4.99	5.33	24.3	68.0	41.8	74.1	191	194	29.4	29.2	9.82	7.67	7.65	7.09	5.98		
80	4.03	3.43	3.00	2.77	2.80	3.33	5.55	9.40	10.1	9.70	7.61	5.49	4.42	1.41	0.86	0.81	0.80		
85	3.40	2.90	2.44	1.98	1.54	1.22	1.08	1.85	2.08	1.43	0.48	0.45	0.49	0.53	0.55	0.51	0.49		
90	0.05	0.04	0.05	0.06	0.11	0.17	0.23	0.24	0.21	0.16	0.11	0.09	0.08	0.08	0.07	0.07	0.07		
95	0.05	0.05	0.07	0.15	0.26	0.36	0.43	0.43	0.36	0.25	0.15	0.10	0.09	0.08	0.07	0.06	0.06		
100	0.08	0.11	0.19	0.33	0.48	0.62	0.69	0.66	0.54	0.39	0.25	0.14	0.09	0.09	0.08	0.08	0.07		
105	0.18	0.26	0.41	0.60	0.77	0.92	0.99	0.98	0.93	0.83	0.39	0.21	0.12	0.10	0.10	0.09	0.09		
110	0.37	0.49	0.66	0.84	1.03	1.17	1.22	1.19	1.09	0.95	0.53	0.29	0.15	0.11	0.11	0.10	0.09		
115	0.64	0.74	0.91	1.10	1.26	1.35	1.37	1.30	1.17	1.01	0.65	0.39	0.22	0.13	0.11	0.11	0.11		
120	0.96	1.06	1.21	1.37	1.48	1.55	1.55	1.44	1.30	1.13	0.82	0.53	0.35	0.21	0.15	0.13	0.13		
125	1.36	1.44	1.54	1.65	1.77	1.84	1.82	1.70	1.52	1.33	1.04	0.73	0.53	0.35	0.25	0.21	0.19		
130	1.83	1.88	1.99	2.07	2.19	2.29	2.23	2.10	1.89	1.63	1.39	1.06	0.81	0.59	0.47	0.38	0.34		
135	2.38	2.43	2.53	2.67	2.76	2.78	2.71	2.56	2.32	2.06	1.78	1.49	1.22	1.01	0.80	0.67	0.62		
140	2.97	2.99	3.07	3.22	3.29	3.26	3.15	2.93	2.66	2.43	2.14	1.93	1.67	1.42	1.18	1.00	0.90		
145	3.47	3.53	3.54	3.61	3.67	3.63	3.47	3.20	2.98	2.70	2.54	2.36	2.15	1.83	1.60	1.42	1.28		
150	3.85	3.90	3.87	3.88	3.83	3.74	3.58	3.34	3.03	2.87	2.81	2.61	2.49	2.24	2.11	1.95	1.79		
155	4.09	4.11	4.11	3.99	3.84	3.69	3.49	3.30	3.12	3.00	2.87	2.80	2.67	2.62	2.62	2.39	2.23		
160	4.22	4.16	4.12	4.04	3.87	3.69	3.50	3.33	3.06	2.99	2.91	2.94	2.91	2.94	3.00	2.94	2.82		
165	4.02	4.05	4.00	3.94	3.87	3.71	3.54	3.33	3.19	3.00	2.93	2.98	3.00	3.06	3.16	3.28	3.24		
170	3.76	3.85	3.85	3.80	3.74	3.63	3.52	3.33	3.21	3.13	3.08	3.06	3.00	3.19	3.38	3.51	3.49		
175	3.50	3.59	3.60	3.59	3.49	3.45	3.36	3.25	3.14	3.02	3.20	3.22	3.18	3.31	3.50	3.57	3.62		
180	2.85	2.85	2.84	2.84	2.84	2.84	2.83	2.83	2.83	2.85	2.86	2.88	2.89	2.90	2.91	2.92	2.92		

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.

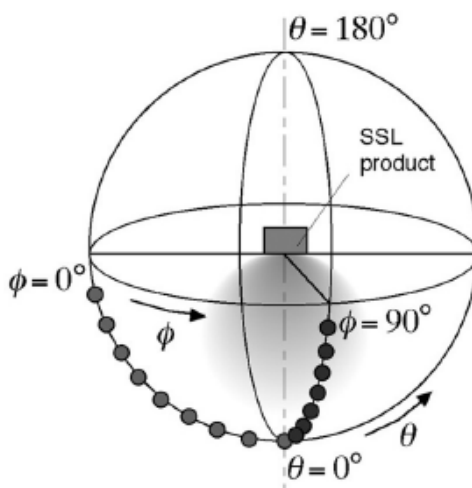
Color Characteristics Measurements

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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