



LM-79-08 Test Report

for

DONGGUAN THAILIGHT SEMICONDUCTOR

LIGHTING CO., LTD

Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

LED FLOOD LIGHT

Model: TLFLG15XYZZ-60

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ16060030c

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

Reviewed by:

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Jun. 27, 2016

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Manager: Jim Zhang
Jun. 27, 2016

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: **TLFLG15XYYZZ-60**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
107.0	1539.2	14.39	0.9709
CCT (K)	CRI	Stabilization Time (Light & Power)	BUG (Back, Up, Glare) Rating
3067	83.4	60	B1-U1-G0

Table 1: Executive Data Summary

Test specifications:

Date of Receipt : Jun. 20, 2016

Date of Test : Jun. 25, 2016

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 Photos



Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: LED FLOOD LIGHT
Model	: TLFLG15XYZZ-60
Electrical Ratings	: 120~277VAC, 50/60Hz
Product Description	: 3000K, Plastic Light Cover Manufacturer of light source: Philips Lumileds Model of light source: LUXEON 3030 2D
Manufacturer	: DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO., LTD
Address	: Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

TEST RESULTS

Test ambient temperature was 24.4°C.

Base orientation was Light down. 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 is 2.47m.

Luminous data was taken at 0.5°vertical intervals and 10°horizontal intervals.

Parameter	Result	
Test Voltage (V)	120.0	277.0
Voltage frequency (Hz)	60	60
Test Current (A)	0.124	0.059
Power Factor	0.971	0.900
Test Power (W)	14.39	14.74
THD A%	17.40	15.30
Luminous Efficacy (lm/W)	107.0	104.9
Total Luminous Flux (lm)	1539.2	1546.6
Color Rendering Index (CRI)	83.4	
R9	12	
Correlated Color Temperature (CCT) (K)	3067	
Chromaticity (Chroma x, Chroma y)	(0.4342, 0.4066)	
Chromaticity (Chroma u, Chroma v)	(0.2477, 0.3480)	
Chromaticity (Chroma u', Chroma v')	(0.2477, 0.5220)	
Duv	0.0014	
Average Beam Angle (°)	60.6	
Center Beam Candle Power (cd)	1261	
Spacing Criteria	0.95 (0°-180°)/ 0.86 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	94.51%	
Zonal Lumens in the 60°-90°Zone	5.42%	
Zonal Lumens in the 90°-120°Zone	0.01%	
Zonal Lumens in the 120°-180°Zone	0.06%	

Special Color Rendering Indices	
R1	82
R2	92
R3	96
R4	81
R5	82
R6	90
R7	84
R8	61
R9	12
R10	82
R11	80
R12	70
R13	84
R14	99

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

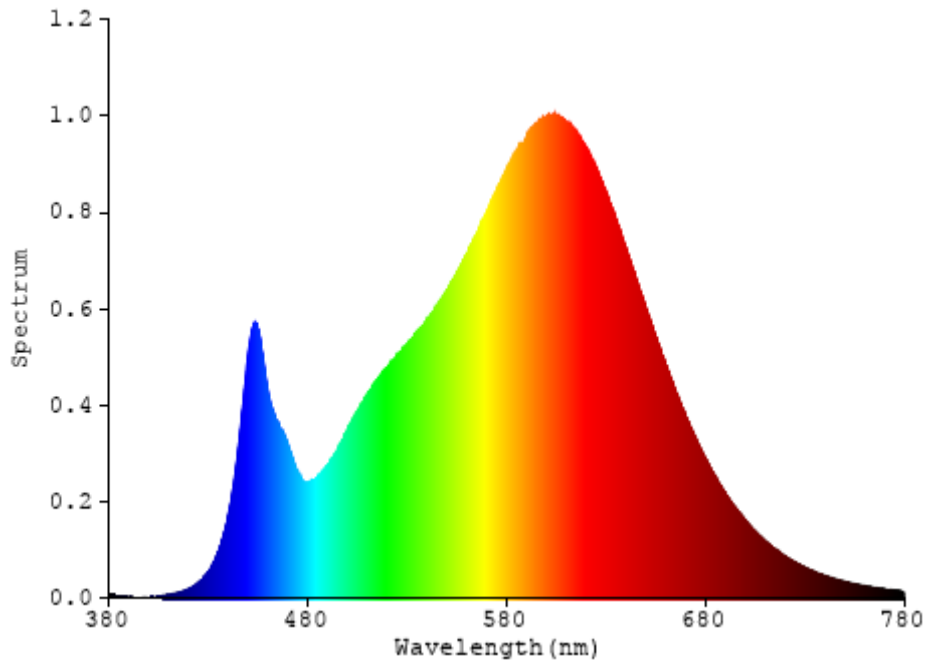


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	115.379	7.50%
10- 20	292.552	19.01%
20- 30	358.109	23.27%
30- 40	320.987	20.85%
40- 50	232.478	15.10%
50- 60	135.164	8.78%
60- 70	59.96	3.90%
70- 80	20.234	1.31%
80- 90	3.221	0.21%
90-100	0.049	0.00%
100-110	0.054	0.00%
110-120	0.083	0.01%
120-130	0.127	0.01%
130-140	0.197	0.01%
140-150	0.237	0.02%
150-160	0.207	0.01%
160-170	0.139	0.01%
170-180	0.049	0.00%
Total	1539.2	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	1454.669	94.51%
60- 90	83.415	5.42%
0-90	1538.084	99.93%
90- 180	1.142	0.07%
0- 180	1539.2	100%

Table 3: Zonal Lumen Data

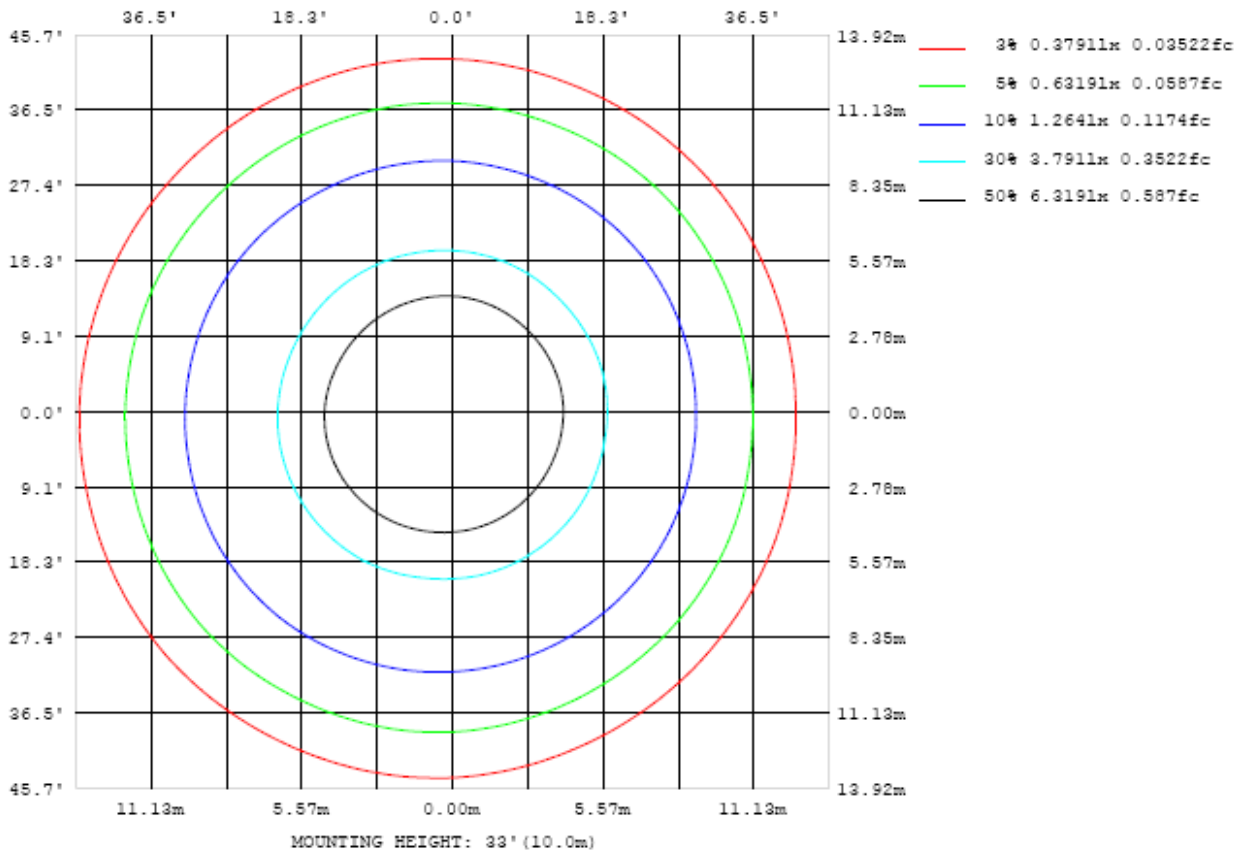


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

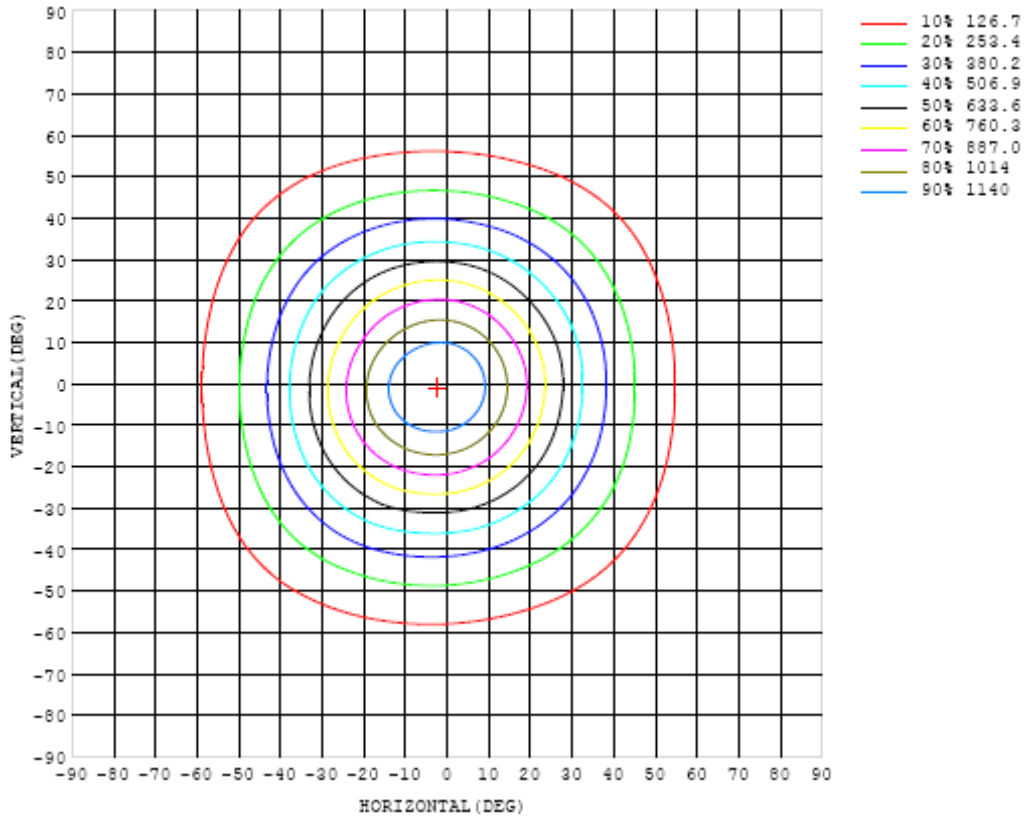


Chart 3: Isocandela Plot

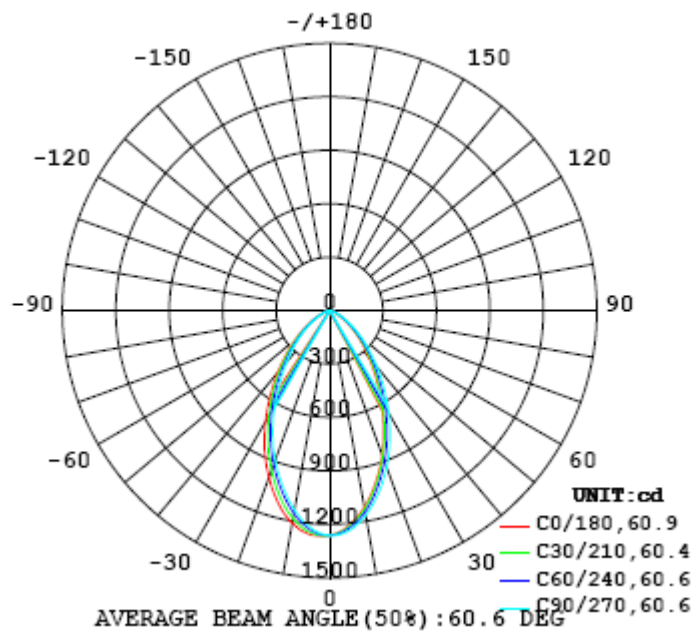


Chart 4: Polar Candela Distribution

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	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261
5	1213	1215	1218	1220	1223	1225	1228	1231	1235	1240	1243	1248	1253	1256	1259	1261	1262	1263	1261
10	1120	1124	1127	1131	1135	1140	1146	1153	1159	1166	1174	1182	1192	1199	1207	1213	1215	1215	1212
15	998	1002	1006	1011	1017	1023	1032	1041	1051	1060	1071	1081	1093	1103	1112	1121	1124	1124	1118
20	863	863	866	872	880	889	900	911	924	936	950	962	974	984	995	1003	1006	1004	997
25	716	717	720	729	738	750	763	776	789	802	814	828	843	854	864	871	873	871	865
30	573	573	579	590	603	614	626	639	652	662	674	691	706	715	724	729	730	728	721
35	449	450	457	466	477	486	497	511	523	532	542	559	575	582	587	590	590	587	581
40	344	348	354	360	368	376	385	397	406	416	426	439	452	460	463	464	463	460	454
45	255	259	265	271	276	282	289	298	306	316	326	333	343	350	353	354	352	348	344
50	182	185	190	194	198	202	208	215	224	232	238	243	249	255	259	259	257	254	251
55	123	126	128	131	134	139	143	148	155	161	166	170	173	177	180	180	178	176	174
60	79.8	81.2	83.1	85.3	87.9	90.2	93.6	97.4	102	106	109	111	112	113	115	115	115	114	114
65	50.3	51.0	52.2	53.4	54.9	56.5	58.5	61.0	63.6	65.0	64.2	63.8	63.5	64.6	66.6	67.1	65.5	64.4	64.4
70	31.5	31.9	32.5	33.1	33.7	34.5	35.3	35.9	35.3	34.5	33.7	33.5	33.0	32.0	31.9	31.7	31.5	32.3	32.8
75	19.4	19.7	19.9	20.1	20.3	20.2	19.9	18.9	18.4	18.3	17.2	16.0	15.5	15.5	15.7	15.6	15.2	14.8	15.1
80	11.0	11.0	10.7	10.5	10.6	10.3	9.69	9.25	8.48	7.37	6.95	6.26	4.98	3.82	3.26	3.19	3.52	4.45	5.14
85	4.42	4.20	3.78	3.61	3.52	3.60	3.09	2.58	1.85	1.16	0.65	0.21	0.12	0.09	0.09	0.09	0.09	0.12	0.15
90	0.21	0.18	0.17	0.13	0.09	0.04	0.03	0.03	0.02	0.03	0.03	0.05	0.02	0.06	0.06	0.06	0.06	0.06	0.05
95	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
100	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
105	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06
110	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07
115	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.09
120	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.11
125	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.10	0.10	0.10	0.09	0.15
130	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.21
135	0.20	0.20	0.20	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.30
140	0.25	0.25	0.25	0.25	0.24	0.24	0.23	0.23	0.23	0.22	0.22	0.22	0.22	0.21	0.21	0.21	0.22	0.22	0.38
145	0.29	0.29	0.29	0.29	0.28	0.28	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.25	0.25	0.25	0.26	0.25	0.46
150	0.32	0.32	0.31	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.28	0.28	0.51
155	0.34	0.34	0.34	0.33	0.33	0.33	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.55
160	0.36	0.36	0.36	0.36	0.36	0.35	0.35	0.35	0.35	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.57
165	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.38	0.59
170	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.41	0.41	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.60
175	0.49	0.49	0.49	0.49	0.49	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.58
180	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.54

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	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261	1261		
5	1258	1253	1249	1245	1240	1236	1230	1227	1224	1221	1218	1216	1215	1213	1214	1213	1213		
10	1204	1195	1184	1175	1164	1155	1148	1142	1137	1132	1127	1125	1121	1119	1119	1118	1119		
15	1107	1096	1081	1068	1056	1044	1036	1028	1021	1015	1008	1003	998	995	993	995	996		
20	986	970	956	943	930	919	910	902	894	885	877	869	862	858	858	858	861		
25	851	835	821	809	798	788	778	768	759	749	738	728	718	713	712	714	716		
30	709	696	684	673	662	651	640	628	617	608	598	588	578	573	573	574	575		
35	572	561	553	542	531	520	509	497	486	478	470	463	456	453	451	451	450		
40	447	440	432	423	411	402	393	383	374	365	360	355	352	350	347	345	345		
45	339	334	328	320	311	301	293	287	280	274	269	266	263	261	258	255	254		
50	247	243	237	230	224	218	212	207	201	195	191	189	187	186	184	182	181		
55	171	167	163	159	155	151	146	142	138	134	131	129	128	127	126	124	124		
60	112	110	107	104	101	97.7	94.5	91.9	89.1	86.1	84.1	83.5	83.3	83.2	81.7	80.3	79.9		
65	65.5	66.8	65.6	63.4	61.7	59.6	58.1	56.4	54.6	53.0	52.2	51.7	52.0	52.1	51.6	50.6	50.2		
70	33.1	33.8	35.3	36.6	36.3	35.7	34.9	34.2	33.4	32.5	32.0	32.0	32.1	32.4	32.2	31.8	31.5		
75	16.1	17.0	17.6	18.2	19.7	20.3	20.7	20.5	20.2	19.8	19.5	19.4	19.5	19.6	19.5	19.4	19.3		
80	6.00	6.38	7.23	8.41	9.02	9.75	10.5	10.5	10.8	11.0	11.0	10.9	10.6	10.2	10.3	10.7	10.9		
85	0.39	0.74	1.22	1.97	2.44	3.03	3.12	3.22	3.42	3.91	4.12	4.30	4.27	3.92	3.95	4.39	4.41		
90	0.04	0.03	0.03	0.03	0.03	0.03	0.05	0.09	0.13	0.16	0.20	0.23	0.21	0.26	0.27	0.23	0.25		
95	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
100	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
105	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07		
110	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		
115	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.11		
120	0.11	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15		
125	0.15	0.16	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.20	0.20	0.19		
130	0.21	0.22	0.22	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.26	0.26	0.26	0.27	0.27	0.27	0.27		
135	0.30	0.30	0.31	0.31	0.31	0.32	0.33	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.36	0.36	0.36		
140	0.38	0.39	0.39	0.39	0.40	0.40	0.41	0.42	0.42	0.43	0.44	0.44	0.45	0.45	0.45	0.45	0.45		
145	0.46	0.46	0.46	0.47	0.47	0.48	0.48	0.49	0.50	0.50	0.51	0.52	0.52	0.52	0.53	0.53	0.53		
150	0.52	0.52	0.52	0.53	0.53	0.53	0.54	0.55	0.55	0.56	0.56	0.57	0.57	0.57	0.58	0.58	0.58		
155	0.55	0.56	0.56	0.56	0.56	0.57	0.57	0.58	0.58	0.59	0.59	0.60	0.60	0.60	0.60	0.60	0.61		
160	0.58	0.58	0.58	0.58	0.58	0.59	0.59	0.59	0.60	0.60	0.60	0.61	0.61	0.61	0.61	0.61	0.61		
165	0.59	0.59	0.59	0.59	0.59	0.59	0.60	0.60	0.60	0.60	0.61	0.61	0.61	0.61	0.61	0.61	0.61		
170	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
175	0.58	0.58	0.58	0.58	0.58	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57		
180	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 17, 2015	Jul. 16, 2016
Digital Power Meter	PF2010A	HZTE028-01	Jul. 17, 2015	Jul. 16, 2016
AC Power Supply	PCR 500L	HZTE001-08	Jul. 17, 2015	Jul. 16, 2016
DC Power Supply	WY12010	HZTE004-03	Jul. 17, 2015	Jul. 16, 2016
Temperature Meter	TES1310	HZTE017-01	Jul. 17, 2015	Jul. 16, 2016
Standard Source	D908	HZTE012-01	Jul. 23, 2015	Jul. 22, 2016
Standard source	SCL-1400	HZTE012-02	Oct. 21, 2015	Oct. 20, 2016

Table 6: 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 $k=2$.

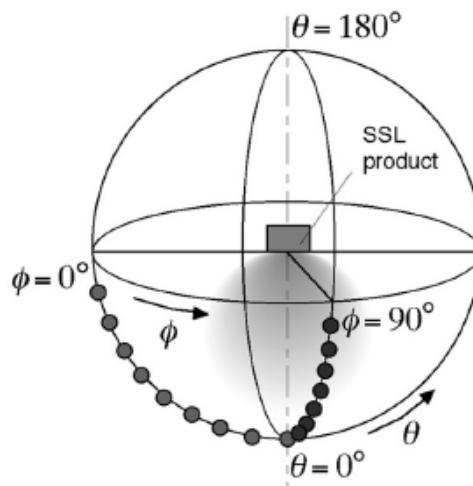
Color Characteristics Measurements

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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