



LM-79-08 Test Report

for

DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO., LTD

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

LED HIGH BAY

Model: TLHBH50P3YYZZ

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

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Report No.: HZ17060045a

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

Review by:

Engineer: April Zou
Jul. 10, 2017

Approved by

Manager: Jim Zhang
Jul. 10, 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: **TLHBH50P3YYZZ**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
136.5	6652.9	48.72	0.9904
CCT (K)	CRI	Stabilization Time (Light & Power)	
3007	73.3	60	
IES Classification		B-U-G	
Type VS		B3-U0-G0	

Table 1: Executive Data Summary

Note: The above results are recorded/ derived from measurements made using an Integrating Sphere.

Test specifications:

Date of Receipt	: Jun. 22, 2017
Date of Test	: Jun. 22, 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
Sample Photos.....	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 Photos



Overview of the sample

Equipment Under Test (EUT)

Name	: LED HIGH BAY
Model	: TLHBH50P3YYZZ
Electrical Ratings	: 100-277V, 50/60Hz
Product Description	: 3000K
Manufacturer	: DONGGUAN THAILIGHT SEMICONDUCTOR LIGHTING CO., LTD
Address	: Sanhui Ind. Area, Cunwei, Hengli, Dongguan, China.

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 95 minutes.

The photometric distance of Goniophotometer is 30 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)	0.410	0.189
Power Factor	0.9904	0.9227
Test Power (W)	48.72	48.40
THD A%	13.20	12.53
Luminous Efficacy (lm/W)	136.5	134.8
Total Luminous Flux (lm)	6652.9	6526.8
Color Rendering Index (CRI)	73.3	
R9	-25	
Correlated Color Temperature (CCT) (K)	3007	
Chromaticity (Chroma x, Chroma y)	(0.4358, 0.4026)	
Chromaticity (Chroma u, Chroma v)	(0.2505, 0.3473)	
Chromaticity (Chroma u', Chroma v')	(0.2505, 0.5209)	
Duv	-0.0003	
Average Beam Angle (°)	95.8	
Center Beam Candle Power (cd)	3078	
Spacing Criteria	1.40 (0°-180°)/ 1.39 (90°-270°)	
Zonal Lumens in the 0°-60°Zone	98.23%	
Zonal Lumens in the 60°-90°Zone	1.77%	
Zonal Lumens in the 90°-120°Zone	0.00%	
Zonal Lumens in the 120°-180°Zone	0.00%	

Special Color Rendering Indices	
R1	70
R2	85
R3	95
R4	67
R5	69
R6	78
R7	78
R8	46
R9	-25
R10	64
R11	61
R12	52
R13	73
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

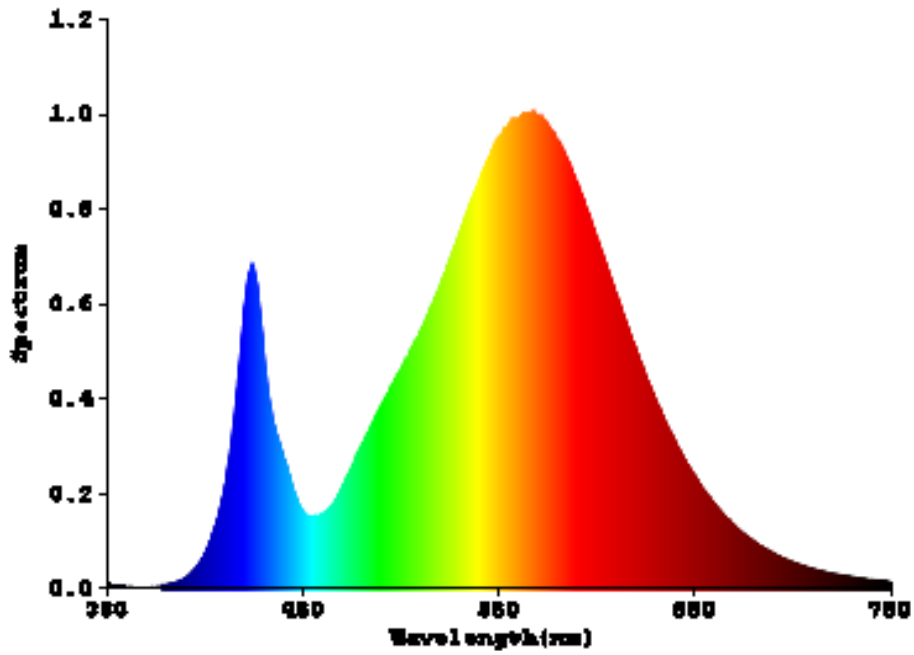


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	295.205	4.44%
10- 20	891.869	13.41%
20- 30	1480.268	22.25%
30- 40	1892.083	28.44%
40- 50	1539.827	23.15%
50- 60	435.706	6.55%
60- 70	68.453	1.03%
70- 80	38.237	0.57%
80- 90	11.244	0.17%
90-100	0	0.00%
100-110	0	0.00%
110-120	0	0.00%
120-130	0	0.00%
130-140	0	0.00%
140-150	0	0.00%
150-160	0	0.00%
160-170	0	0.00%
170-180	0	0.00%
Total	6652.9	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	6534.958	98.23%
60- 90	117.934	1.77%
0-90	6652.892	100.00%
90- 180	0	0.00%
0- 180	6652.9	100%

Table 3: Zonal Lumen Data

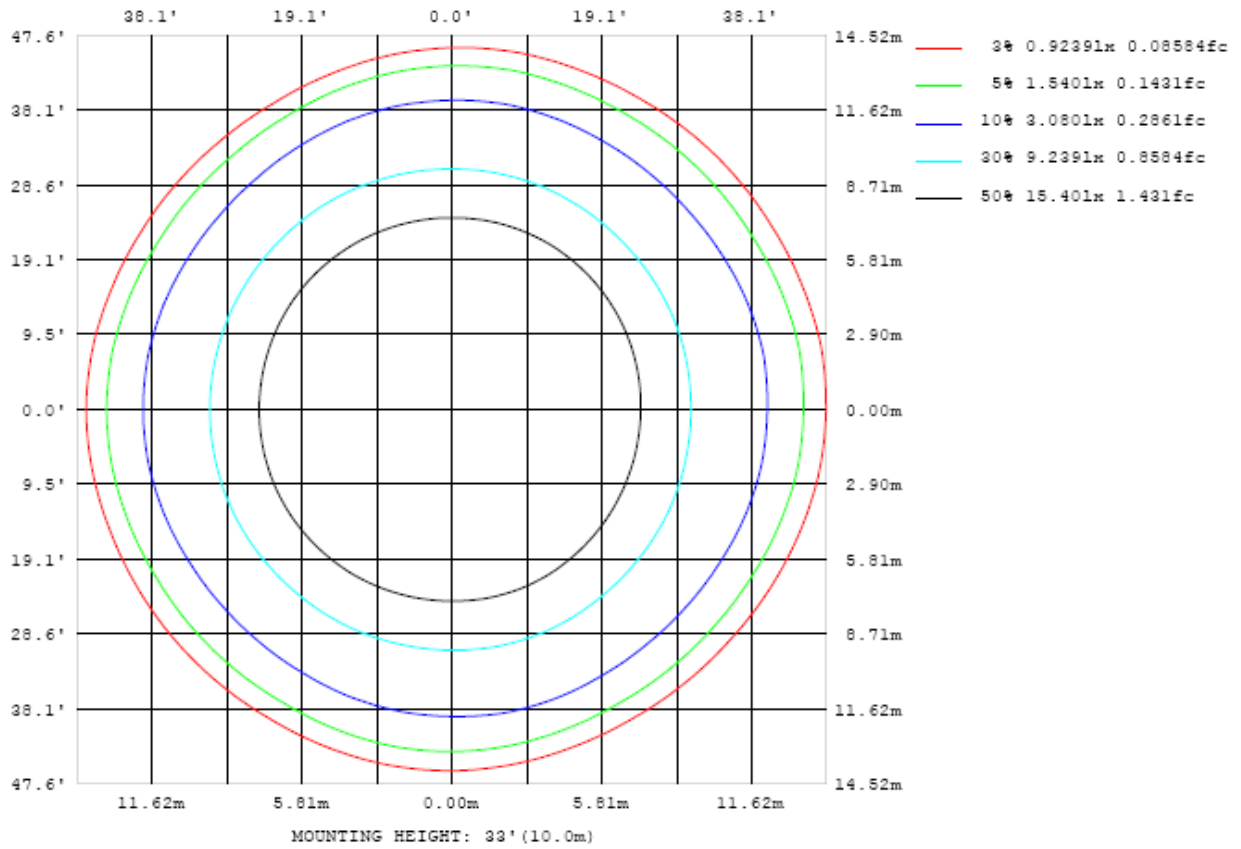


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

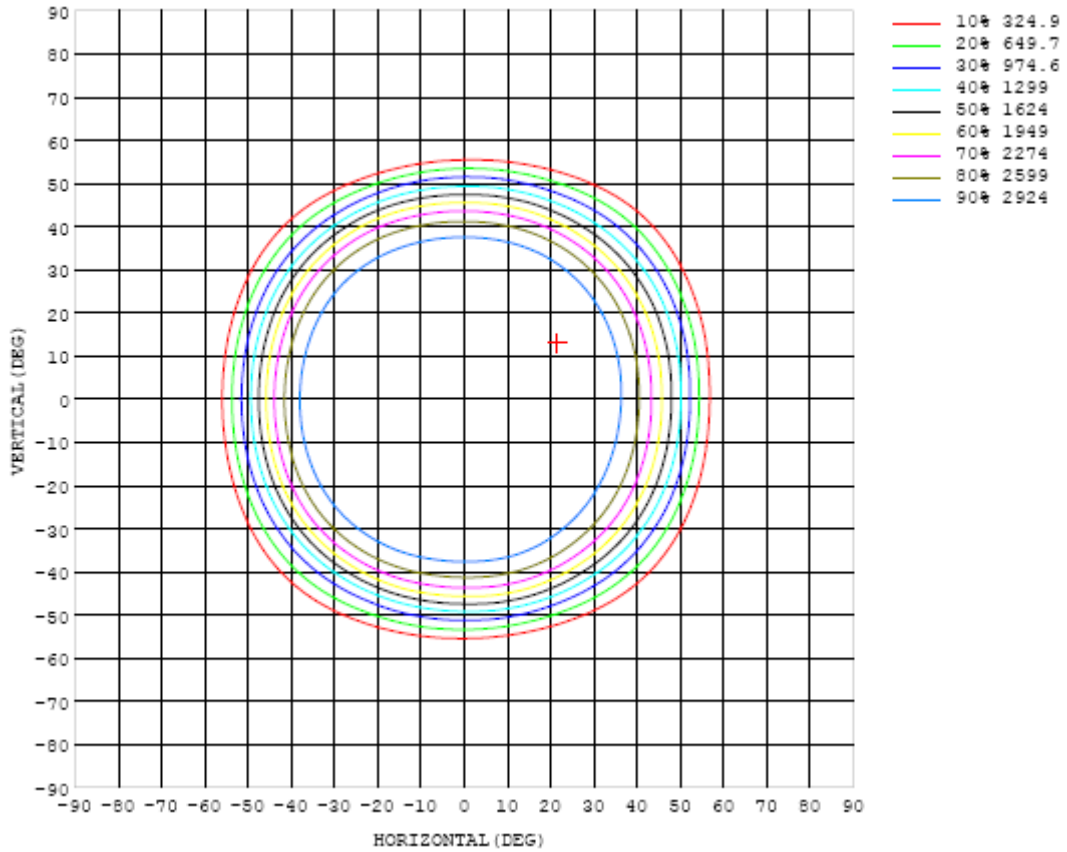


Chart 3: Isocandela Plot

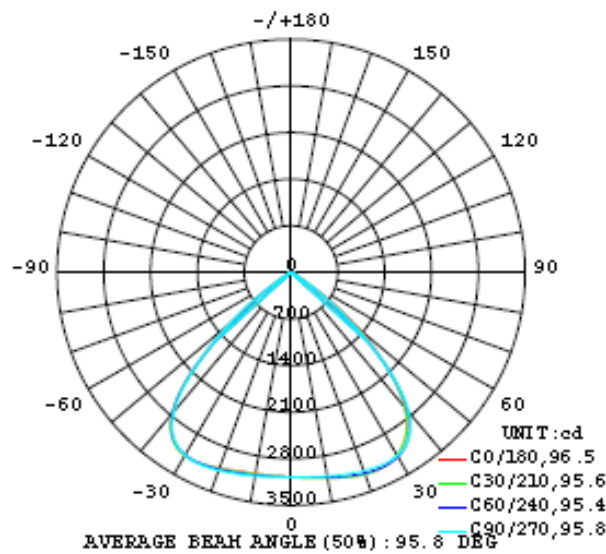


Chart 4: Polar Candela Distribution

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	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078
5	3097	3097	3098	3096	3096	3096	3093	3092	3090	3088	3086	3083	3080	3077	3075	3071	3071	3070	3071
10	3134	3136	3136	3135	3134	3131	3127	3121	3115	3111	3105	3099	3093	3087	3081	3076	3072	3071	3072
15	3185	3187	3187	3186	3185	3177	3170	3160	3151	3142	3136	3127	3119	3111	3104	3097	3092	3090	3091
20	3230	3232	3231	3229	3228	3220	3210	3199	3186	3174	3167	3160	3154	3147	3142	3136	3133	3132	3133
25	3238	3238	3235	3236	3238	3235	3232	3222	3210	3198	3189	3184	3181	3179	3177	3177	3177	3178	3179
30	3172	3166	3166	3173	3181	3191	3200	3198	3192	3182	3176	3172	3172	3173	3177	3180	3183	3185	3186
35	2997	2989	2991	3002	3019	3036	3059	3070	3068	3062	3062	3067	3070	3072	3078	3082	3083	3082	3080
40	2648	2647	2652	2665	2674	2692	2721	2742	2742	2735	2734	2743	2751	2756	2765	2773	2774	2768	2766
45	2053	2057	2057	2037	2019	2016	2047	2083	2083	2061	2053	2056	2037	2022	2028	2058	2085	2089	2095
50	1322	1306	1254	1185	1138	1114	1121	1158	1181	1162	1143	1110	1064	1052	1058	1085	1136	1177	1192
55	563	542	493	444	400	373	355	359	378	393	394	382	371	380	391	403	414	442	457
60	127	124	119	117	113	105	97.8	91.8	86.4	87.0	88.9	94.5	100	102	103	101	98.4	98.7	99.4
65	74.8	75.1	73.7	74.9	75.8	72.2	64.8	58.8	58.3	59.0	59.4	60.0	63.0	67.2	68.3	66.5	64.3	64.6	63.9
70	55.7	55.6	55.2	56.9	58.3	54.4	47.8	43.5	42.5	42.9	43.1	43.7	45.9	49.6	52.2	49.7	47.4	47.4	47.9
75	42.1	41.2	40.9	42.5	43.6	39.5	34.3	30.5	29.6	30.2	29.7	30.4	32.6	35.6	37.8	37.0	35.5	35.5	36.5
80	24.3	27.1	28.2	28.5	28.4	26.1	22.3	18.9	16.4	14.1	15.2	18.3	20.3	22.6	24.2	23.4	22.9	21.2	20.0
85	13.5	12.8	14.4	14.5	12.3	10.9	9.37	6.99	4.78	4.27	4.30	5.80	7.49	8.28	9.05	10.9	10.7	9.80	10.0
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078	3078		
5	3070	3072	3075	3075	3078	3081	3082	3085	3087	3089	3091	3091	3093	3094	3094	3096	3096		
10	3074	3077	3082	3087	3090	3096	3099	3104	3108	3113	3116	3120	3124	3126	3129	3131	3133		
15	3095	3098	3104	3110	3114	3121	3125	3132	3140	3146	3155	3162	3170	3175	3180	3182	3183		
20	3136	3139	3142	3146	3147	3152	3155	3163	3171	3181	3194	3206	3217	3223	3229	3230	3230		
25	3181	3179	3178	3176	3174	3178	3181	3188	3194	3204	3218	3231	3241	3246	3249	3246	3242		
30	3187	3184	3180	3174	3166	3167	3168	3170	3173	3182	3194	3202	3207	3207	3203	3193	3183		
35	3079	3079	3079	3076	3067	3061	3057	3055	3054	3061	3067	3067	3061	3051	3042	3027	3013		
40	2761	2762	2764	2761	2759	2753	2740	2733	2726	2729	2727	2719	2704	2692	2686	2675	2664		
45	2092	2085	2059	2042	2042	2059	2058	2052	2050	2057	2049	2019	2000	2004	2030	2057	2064		
50	1182	1143	1091	1060	1056	1090	1145	1180	1199	1213	1191	1168	1171	1185	1237	1302	1341		
55	437	393	361	338	315	307	327	364	396	414	414	422	446	472	490	526	566		
60	96.9	95.0	96.7	96.7	93.2	89.5	85.6	84.4	85.4	90.3	98.7	108	116	123	126	128	137		
65	63.7	62.9	64.6	66.2	64.8	59.9	58.3	59.6	59.7	61.2	61.8	68.7	75.5	77.6	75.6	74.1	76.0		
70	47.6	47.5	49.6	51.2	48.2	44.8	43.5	44.3	44.5	45.4	46.5	50.8	57.0	59.7	57.3	55.1	56.1		
75	35.5	35.5	37.2	37.9	35.1	32.1	30.5	31.0	31.5	31.8	33.2	37.1	41.8	45.1	43.3	41.4	42.1		
80	21.9	23.3	23.1	24.2	22.8	20.2	18.3	16.1	14.7	17.5	20.8	23.8	28.2	30.3	29.7	28.6	27.7		
85	10.1	10.9	11.0	9.34	8.42	7.48	5.85	4.41	4.21	5.07	7.89	10.5	12.0	13.4	15.4	15.0	13.1		
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
105	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
130	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
135	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Table 5: Luminous Intensity Data

EQUIPMENT LIST

Test Equipment	Model	Equipment No.	Calibration Date	Calibration Due date
Goniophotometer system	GO-R5000	HZTE011-01	Jul. 26, 2016	Jul. 25, 2017
Digital Power Meter	PF2010A	HZTE028-01	Jul. 26, 2016	Jul. 25, 2017
AC Power Supply	DPS1060	HZTE001-06	Dec. 25, 2016	Dec. 24, 2017
DC Power Supply	WY12010	HZTE004-03	Dec. 25, 2016	Dec. 24, 2017
Temperature Meter	TES1310	HZTE017-01	Aug. 08, 2016	Aug. 07, 2017
Standard Source	D908	HZTE012-01	Jul. 28, 2016	Jul. 27, 2017
Standard source	SCL-1400	HZTE012-02	Jul. 28, 2016	Jul. 27, 2017

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 2.3% with a coverage factor $k=2$.

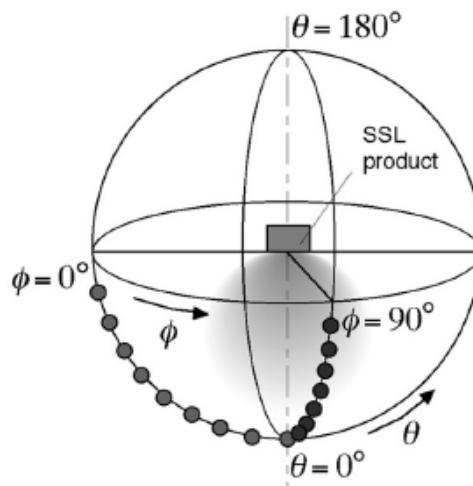
Color Characteristics Measurements

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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