



LM-79-08 Test Report

for

IGT Lighting, Inc.

3755 Lincoln St. Suite B, Riverside, CA 92503

150W LED LINEAR HIGH BAY WITH PIR SENSOR

Model: IGTLHB-1615050-PIR

Laboratory: Leading Testing Laboratories

NVLAP CODE: 200960-0

No.1805, DongLiu road, BinJiang District, Hangzhou, China

Tel: +86-571-56680806

www.ledtestlab.com

Report No.: HZ16060019b

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

Reviewed by:

Engineer: April Zou
Jul. 01, 2016

Approved by:

Manager: Jim Zhang
Jul. 01, 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: **IGTLHB-1615050-PIR**

Luminous Efficacy (Lumens /Watt)	Total Luminous Flux (Lumens)	Power (Watts)	Power Factor
139.7	20661.0	147.90	0.9760
CCT (K)	CRI	Stabilization Time (Light & Power)	
4969	77.4	60	

Table 1: Executive Data Summary

Test specifications:

Date of Receipt	: Jun. 20, 2016
Date of Test	: Jun. 30, 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

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

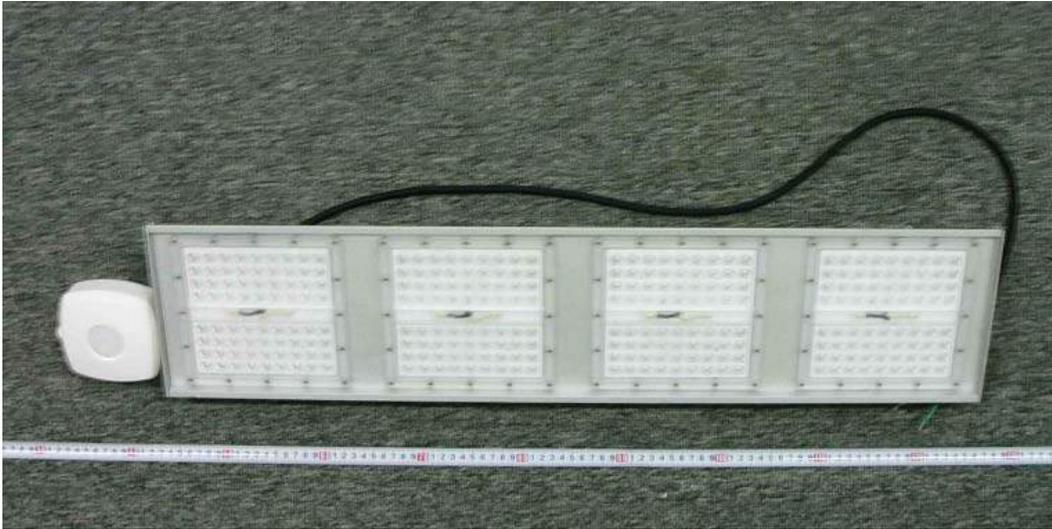


Figure 1- Overview of the sample

Equipment Under Test (EUT)

Name	: 150W LED LINEAR HIGH BAY WITH PIR SENSOR
Model	: IGTLHB-1615050-PIR
Electrical Ratings	: 100~277Vac, 50/60Hz, 150W
Product Description	: 5000K, Plastic Lens, Aluminum Enclosure
Manufacturer	: IGT Lighting, Inc.
Address	: 1900 Compton Ave., Building 101, Corona, CA 92881, USA

TEST RESULTS

Test ambient temperature was 24.6°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 of Goniophotometer is 30 m.

Luminous data was taken at 0.5° vertical intervals and 10.0° horizontal intervals.

Parameter	Result			Special Color Rendering Indices	
Test Voltage (V)	120.0	100.0	277.0	R1	75
Voltage frequency (Hz)	60	60	60	R2	85
Test Current (A)	1.264	1.600	0.576	R3	89
Power Factor	0.9760	0.9412	0.9126	R4	74
Test Power (W)	147.90	150.26	145.60	R5	74
THD A%	5.87	9.90	11.79	R6	77
Luminous Efficacy (lm/W)	139.7			R7	85
Total Luminous Flux (lm)	20661.0			R8	61
Color Rendering Index (CRI)	77.4			R9	-10
R9	-10			R10	61
Correlated Color Temperature (CCT) (K)	4969			R11	69
Chromaticity (Chroma x, Chroma y)	(0.3461, 0.3544)			R12	45
Chromaticity (Chroma u, Chroma v)	(0.2110, 0.3241)			R13	78
Chromaticity (Chroma u', Chroma v')	(0.2110, 0.4862)			R14	94
Duv	0.0010				
Average Beam Angle (°)	44.6				
Center Beam Candle Power (cd)	22050				
Spacing Criteria	0.98 (0°-180°)/ 0.43 (90°-270°)				
Zonal Lumens in the 0°-60°Zone	93.24%				
Zonal Lumens in the 60°-90°Zone	6.63%				
Zonal Lumens in the 90°-120°Zone	0.07%				
Zonal Lumens in the 120°-180°Zone	0.06%				

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

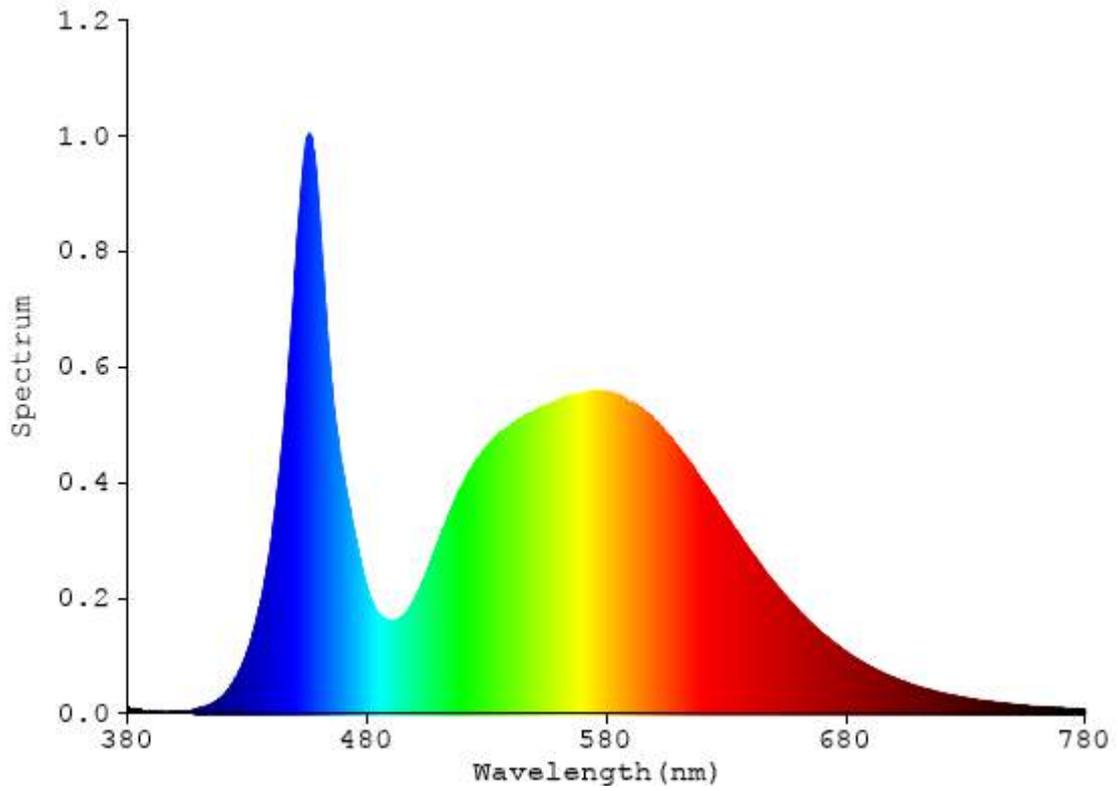


Chart 1: Spectral Power Distribution

Zonal Lumen Tabulation

$\gamma(^{\circ})$	Lumens	% Total
0- 10	1853.963	8.97%
10- 20	3927.571	19.01%
20- 30	4265.419	20.64%
30- 40	4043.129	19.57%
40- 50	3291.233	15.93%
50- 60	1884.033	9.12%
60- 70	817.044	3.95%
70- 80	452.682	2.19%
80- 90	99.779	0.48%
90-100	7.55	0.04%
100-110	3.548	0.02%
110-120	2.623	0.01%
120-130	2.574	0.01%
130-140	2.85	0.01%
140-150	2.979	0.01%
150-160	2.487	0.01%
160-170	1.504	0.01%
170-180	0.502	0.00%
Total	20661.5	100%

$\gamma(^{\circ})$	Lumens	% Total
0- 60	19265.348	93.24%
60- 90	1369.505	6.63%
0-90	20634.853	99.87%
90- 180	26.617	0.13%
0- 180	20661.5	100%

Table 3: Zonal Lumen Data

Note: The Flux in this table might be a little different from the total flux in Table 2 due to rounding.

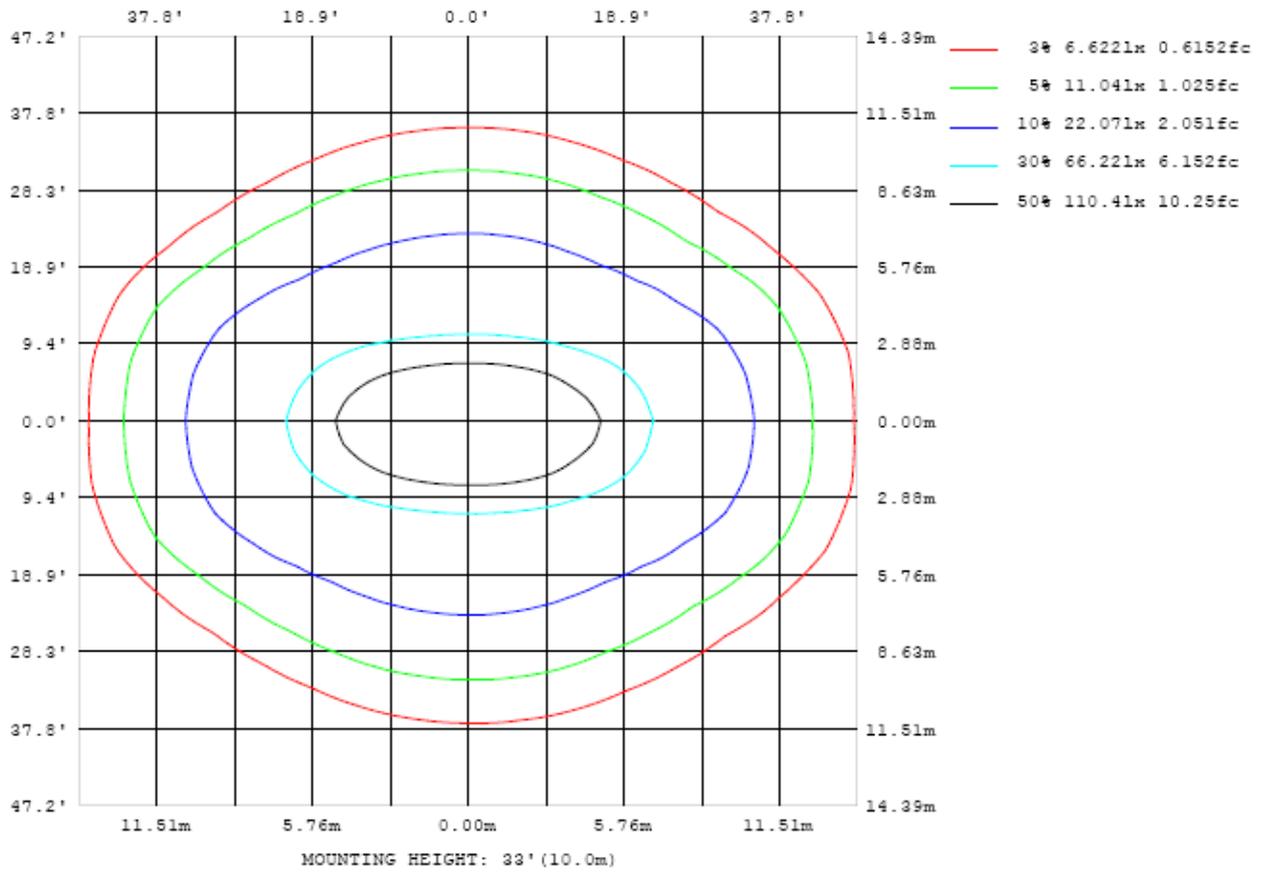


Chart 2: Illuminance Plot (Footcandles)

Luminous Intensity Distribution Plots

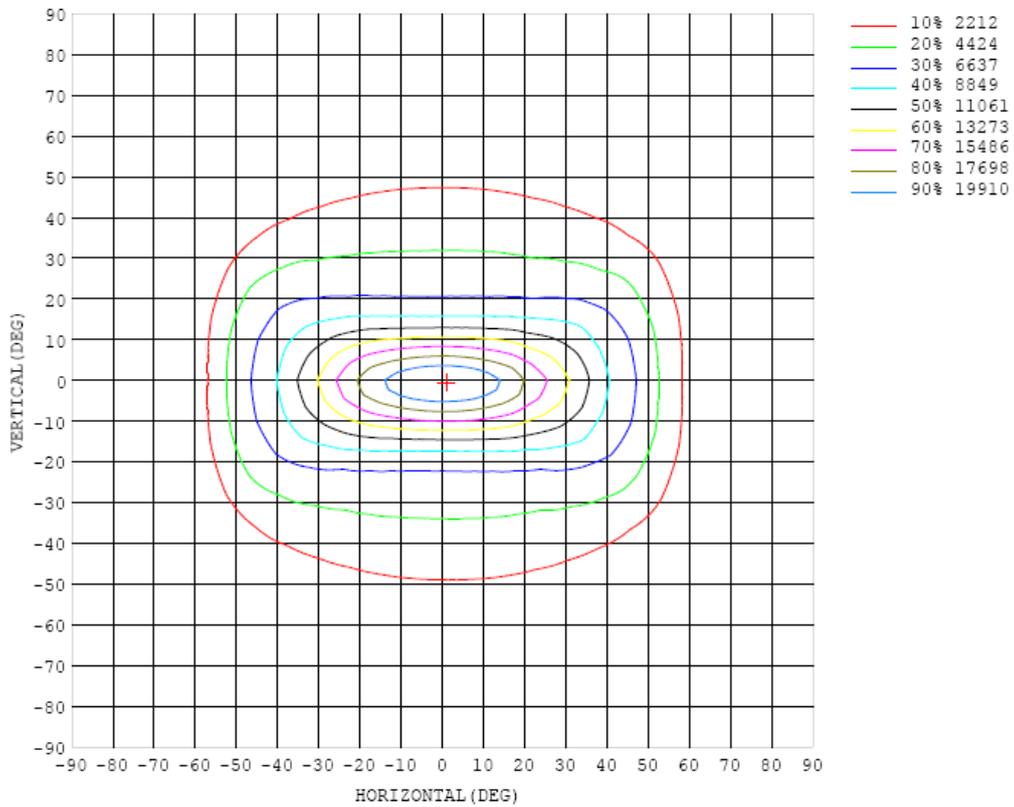


Chart 3: Isocandela Plot

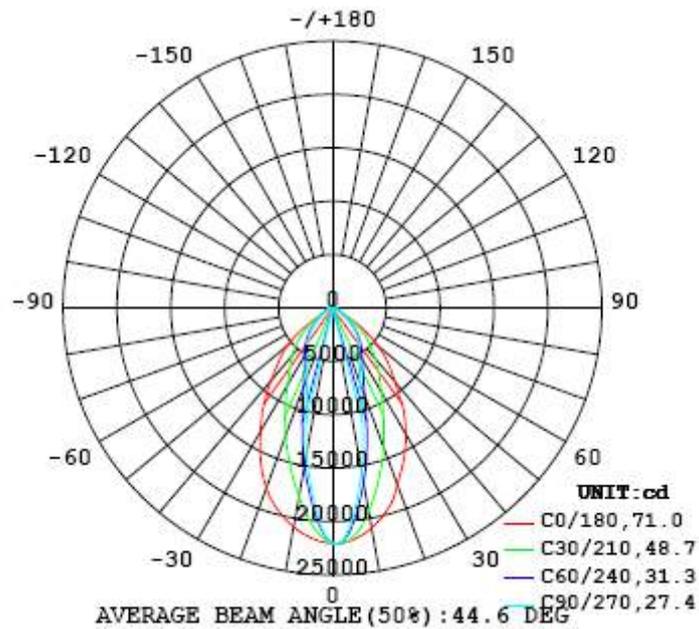


Chart 4: Polar Candela Distribution

Luminous Intensity Data

Table--1 UNIT: ×10cd

C (DEG) y (DEG)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
0	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205
5	2180	2187	2179	2156	2126	2091	2059	2033	2016	2009	2015	2031	2056	2087	2120	2149	2170	2175	2166
10	2093	2091	2032	1937	1834	1741	1663	1604	1565	1550	1561	1596	1653	1731	1827	1932	2027	2083	2081
15	1960	1937	1814	1659	1512	1371	1243	1144	1084	1064	1081	1136	1231	1357	1498	1652	1815	1939	1960
20	1762	1720	1565	1391	1195	1010	878	799	761	753	761	795	871	1000	1186	1386	1578	1749	1796
25	1568	1502	1323	1119	911	764	672	623	597	588	595	620	669	761	914	1128	1332	1514	1580
30	1362	1290	1127	912	718	609	554	520	502	496	500	517	551	611	722	908	1109	1268	1339
35	1145	1085	951	753	592	505	471	446	434	429	432	445	469	509	588	749	932	1057	1115
40	906	870	766	623	496	428	392	379	366	361	364	375	393	425	492	617	771	856	890
45	732	716	643	499	404	348	314	301	288	283	285	295	309	339	396	495	626	690	706
50	543	542	503	383	297	258	230	218	210	206	207	211	221	245	287	369	487	538	548
55	348	362	329	243	194	165	153	144	146	148	147	143	149	160	184	232	304	331	316
60	153	188	175	139	116	108	105	108	107	105	108	109	107	110	119	132	152	145	119
65	72.5	79.9	88.2	85.1	81.8	80.7	82.5	80.9	76.5	74.5	74.3	80.7	83.7	83.2	84.7	87.8	88.3	77.0	70.8
70	50.7	53.2	61.3	63.1	60.7	61.8	65.2	60.2	54.5	53.7	54.5	60.3	65.3	62.4	60.8	64.5	63.0	54.4	51.9
75	35.4	37.6	44.8	44.9	41.2	44.4	48.7	45.3	43.6	46.2	45.1	45.9	48.6	44.3	41.9	45.4	45.2	37.9	35.8
80	23.2	25.1	28.6	27.8	27.0	27.6	29.7	31.8	37.1	52.6	39.8	32.2	29.7	27.4	26.6	27.3	27.5	25.0	23.5
85	8.42	8.99	9.94	11.0	7.80	6.25	4.66	2.83	2.64	0.58	2.59	4.48	5.27	6.13	8.43	9.74	8.97	8.50	9.06
90	0.03	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03
95	0.11	0.26	0.62	1.02	1.19	1.19	1.04	0.80	0.50	0.47	0.78	1.21	1.52	1.67	1.54	1.11	0.62	0.17	0.12
100	0.14	0.18	0.31	0.47	0.60	0.64	0.62	0.53	0.40	0.38	0.46	0.63	0.69	0.67	0.53	0.38	0.32	0.19	0.16
105	0.16	0.19	0.23	0.31	0.38	0.42	0.41	0.37	0.30	0.28	0.27	0.34	0.36	0.35	0.32	0.32	0.28	0.20	0.21
110	0.18	0.19	0.21	0.25	0.30	0.32	0.33	0.30	0.26	0.24	0.23	0.26	0.29	0.32	0.32	0.30	0.25	0.20	0.24
115	0.19	0.18	0.21	0.23	0.26	0.28	0.28	0.25	0.24	0.24	0.24	0.25	0.29	0.32	0.32	0.29	0.25	0.18	0.26
120	0.14	0.20	0.22	0.22	0.25	0.25	0.25	0.23	0.24	0.25	0.26	0.26	0.29	0.31	0.31	0.29	0.25	0.16	0.23
125	0.24	0.19	0.23	0.24	0.23	0.24	0.24	0.22	0.24	0.25	0.26	0.27	0.29	0.30	0.31	0.29	0.28	0.18	0.34
130	0.22	0.21	0.27	0.26	0.26	0.24	0.22	0.24	0.24	0.26	0.27	0.27	0.28	0.32	0.32	0.31	0.31	0.24	0.41
135	0.32	0.28	0.31	0.30	0.28	0.28	0.26	0.26	0.25	0.26	0.28	0.31	0.32	0.35	0.35	0.37	0.35	0.26	0.42
140	0.36	0.33	0.32	0.35	0.33	0.31	0.30	0.30	0.30	0.31	0.33	0.35	0.36	0.38	0.41	0.40	0.38	0.32	0.50
145	0.38	0.36	0.33	0.37	0.37	0.36	0.35	0.34	0.35	0.35	0.36	0.37	0.40	0.42	0.43	0.42	0.35	0.38	0.52
150	0.34	0.35	0.33	0.37	0.39	0.39	0.38	0.39	0.39	0.38	0.40	0.43	0.43	0.44	0.44	0.41	0.34	0.38	0.58
155	0.36	0.36	0.36	0.37	0.40	0.41	0.41	0.42	0.43	0.42	0.45	0.47	0.46	0.46	0.44	0.38	0.36	0.38	0.58
160	0.38	0.40	0.40	0.38	0.38	0.39	0.41	0.44	0.45	0.43	0.48	0.49	0.47	0.46	0.42	0.38	0.37	0.39	0.56
165	0.37	0.40	0.41	0.41	0.41	0.39	0.39	0.42	0.44	0.44	0.48	0.50	0.46	0.44	0.42	0.41	0.38	0.37	0.53
170	0.41	0.42	0.44	0.44	0.44	0.42	0.42	0.42	0.44	0.45	0.45	0.47	0.46	0.45	0.43	0.41	0.41	0.40	0.54
175	0.49	0.49	0.49	0.49	0.49	0.46	0.48	0.50	0.50	0.47	0.51	0.53	0.50	0.49	0.49	0.48	0.48	0.49	0.56
180	0.52	0.52	0.52	0.52	0.52	0.53	0.53	0.52	0.54	0.56	0.53	0.52	0.54	0.54	0.54	0.53	0.53	0.52	0.52

Table 4: Luminous Intensity Data

Table--2 UNIT: ×10cd

C (DEG) y (DEG)	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350		
0	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205	2205		
5	2142	2104	2057	2006	1956	1915	1884	1864	1858	1865	1885	1916	1959	2010	2063	2113	2153		
10	2023	1917	1794	1679	1581	1500	1436	1397	1384	1399	1439	1503	1583	1679	1793	1918	2028		
15	1865	1696	1525	1361	1208	1084	997	950	935	952	1001	1086	1210	1359	1517	1685	1856		
20	1676	1480	1273	1061	893	785	723	691	681	692	725	785	891	1056	1258	1447	1637		
25	1453	1256	1034	831	696	619	577	555	549	556	578	619	692	812	1008	1230	1431		
30	1221	1049	839	669	573	517	486	471	466	472	487	516	560	653	829	1052	1236		
35	1026	884	692	555	482	443	418	405	401	405	417	437	471	546	689	894	1048		
40	839	740	581	464	403	371	348	334	330	334	346	359	395	457	572	730	845		
45	678	604	473	375	317	288	269	258	255	258	269	282	315	363	456	604	695		
50	534	467	347	267	224	202	191	182	181	183	191	203	227	265	345	464	523		
55	323	286	212	165	143	132	132	135	136	136	132	136	151	177	221	306	353		
60	140	140	117	105	98.5	98.3	97.9	93.8	92.2	96.5	101	100	103	114	134	170	186		
65	75.3	83.3	81.4	78.6	77.8	78.1	73.2	65.7	64.5	66.9	73.6	79.1	78.9	80.4	86.8	90.2	81.7		
70	54.1	61.3	61.6	55.6	58.4	61.5	56.1	51.1	50.9	50.5	54.8	60.9	58.3	56.0	61.7	62.2	54.0		
75	37.6	43.8	42.6	39.3	41.3	44.9	42.7	43.2	45.3	41.6	41.5	43.9	40.7	38.7	42.3	43.8	37.8		
80	24.8	25.7	25.0	24.1	24.5	27.3	29.0	30.0	36.3	32.5	28.6	26.5	24.4	24.9	25.5	26.5	25.2		
85	8.07	7.73	6.79	4.63	3.14	2.44	0.94	0.59	0.39	0.38	0.60	2.60	5.04	6.97	9.02	8.70	8.90		
90	0.03	0.43	0.51	0.60	0.57	0.40	0.06	0.04	0.04	0.05	0.05	0.05	0.07	0.08	0.51	0.03	0.03		
95	0.15	0.73	1.28	1.62	1.68	1.51	1.26	0.90	0.67	0.62	0.77	0.91	0.97	0.92	0.75	0.41	0.10		
100	0.13	0.23	0.48	0.72	0.86	0.89	0.80	0.66	0.53	0.47	0.46	0.49	0.49	0.44	0.34	0.22	0.12		
105	0.16	0.19	0.26	0.38	0.49	0.54	0.52	0.47	0.42	0.39	0.40	0.34	0.32	0.29	0.25	0.20	0.16		
110	0.21	0.20	0.22	0.28	0.34	0.38	0.37	0.37	0.36	0.35	0.33	0.30	0.27	0.25	0.23	0.21	0.20		
115	0.23	0.22	0.24	0.25	0.28	0.31	0.31	0.33	0.33	0.34	0.33	0.34	0.25	0.24	0.23	0.23	0.24		
120	0.25	0.25	0.25	0.27	0.27	0.28	0.29	0.32	0.33	0.33	0.35	0.35	0.33	0.24	0.26	0.26	0.24		
125	0.33	0.31	0.29	0.28	0.29	0.29	0.30	0.32	0.33	0.34	0.36	0.38	0.36	0.33	0.31	0.32	0.30		
130	0.36	0.40	0.36	0.36	0.34	0.32	0.33	0.35	0.36	0.35	0.38	0.40	0.41	0.41	0.38	0.37	0.34		
135	0.41	0.46	0.46	0.46	0.43	0.41	0.40	0.39	0.40	0.41	0.42	0.46	0.50	0.47	0.48	0.46	0.46		
140	0.51	0.53	0.57	0.56	0.54	0.51	0.49	0.48	0.48	0.48	0.50	0.52	0.53	0.55	0.55	0.50	0.52		
145	0.52	0.55	0.64	0.66	0.64	0.60	0.59	0.58	0.57	0.56	0.57	0.59	0.61	0.61	0.58	0.53	0.55		
150	0.57	0.57	0.66	0.71	0.72	0.69	0.69	0.66	0.63	0.66	0.67	0.68	0.70	0.68	0.61	0.57	0.56		
155	0.59	0.58	0.63	0.70	0.72	0.75	0.74	0.74	0.73	0.74	0.73	0.73	0.72	0.69	0.63	0.60	0.59		
160	0.55	0.56	0.59	0.64	0.69	0.73	0.76	0.77	0.76	0.75	0.75	0.72	0.70	0.66	0.64	0.62	0.59		
165	0.53	0.55	0.58	0.60	0.63	0.66	0.70	0.71	0.72	0.71	0.71	0.68	0.67	0.66	0.63	0.60	0.57		
170	0.54	0.54	0.55	0.57	0.59	0.62	0.65	0.65	0.65	0.68	0.68	0.67	0.66	0.65	0.63	0.60	0.57		
175	0.56	0.56	0.56	0.57	0.57	0.58	0.59	0.61	0.59	0.60	0.62	0.62	0.60	0.60	0.61	0.59	0.58		
180	0.52	0.52	0.52	0.52	0.52	0.53	0.53	0.53	0.54	0.55	0.53	0.52	0.53	0.54	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 $k=2$.

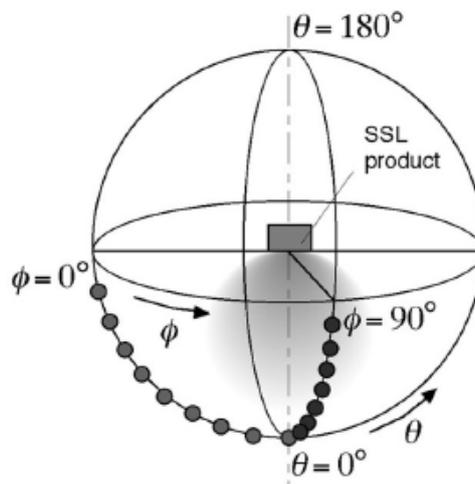
Color Characteristics Measurements

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 ***

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.