LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP17020276
Version: 1.0
Date of Issue: Jun. 6, 2018
Total pages: 11

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

Light Efficient Design, LLC

188 S. Northwest Highway，Cary, IL 60013, USA

For products:

LED Lamps

Models No.:

LED-8088M/E50-G4

Test Date:	May. 2, 2018 to May. 5, 2018
Test Item:	Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd** 2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China Tel:+86-760-22833366 Fax:+86-760-22833399 E-mail:Service@lccert.com http://www.lccert.com
Template No.:	LC-RT-PL-001 Rev.1.1
Test Note:	

Complied by:	**Reviewed by:**
Fish Tan	**Richard Li**
Project Engineer	**Technical Manager**
Jun. 6, 2018	**Jun. 6, 2018**

Table of Contents

1. General

1.1 Product Information

Brand Name	-
Product Type	LED Lamp
Model Number	LED-8088M/E50-G4
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	50W
Rated Light output	7200lm
Declared CCT	5000K
Power Supply	Integrated in lamp
LED Package, Array or Module	Not provided
Receipt Samples	1 unit
Sample Code of lab.	180423101003
Date of Receipt Samples	Apr. 23, 2018
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2015	Specifications for the Chromaticity of Solid State Lighting Products
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2018-01-10	2019-01-09
AC Power supply	LC-I-987	APW-110N	2018-01-10	2019-01-09
Power analyzer	LC-I-928	WT210	2018-01-05	2019-01-05
Power analyzer	LC-I-954	WT210	2018-01-10	2019-01-09
Multimeter	LC-I-972	Fluke 17B	2017-08-08	2018-08-07
Photometric colorimetric electric system[1] (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp[2]	LC-PL-I-011	D204C	2017-09-07	2018-09-06
Luminous Flux Standard Lamp[3]	LC-PL-I-003	24V100W	2017-09-22	2018-09-21
Goniophotometer(with mirror)	LC-I-902	GMS2000	2018-05-07	2019-05-06
Wireless temperature transmitter	LC-I-978	DWRF-B	2018-02-11	2019-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2018-02-11	2019-02-10

Note:

1, Bandwidth of spectroradiometer is 1 nm.

2, halogen lamp, 100W, omni-directional type, and its traceability to NIM.

3, halogen lamp, 100W, omni-directional type, and its traceability to NIM.

2. Test conducted and method

The lamp was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25 °C ± 1°C; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within±0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent(95 % confidence interval, k=2).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	120.00 V~60Hz	120.01 V~60Hz
Input Current(A)	0.413	0.415
Total Power(W)	49.07	49.23
Power Factor	0.990	0.989
I-THD	13.16%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-[4]	7249.69
Luminaire Efficacy(Lm/W)	-	147.26
Correlated Color Temperature (CCT)(K)	5159	-
Color Rendering Index (CRI)	83.8	-
R9	12	-
Chromaticity Coordinate (x,y)	x = 0.3408 y = 0.3490	-
Chromaticity Coordinate (u,v)	u = 0.2095 v = 0.3219	-
Chromaticity Coordinate (u',v')	u' = 0.2095 v' = 0.4828	-
Duv	0.0004	-
Zone Lumens between 0-60 °	-	78.44%

3.3 Color Rendering Details

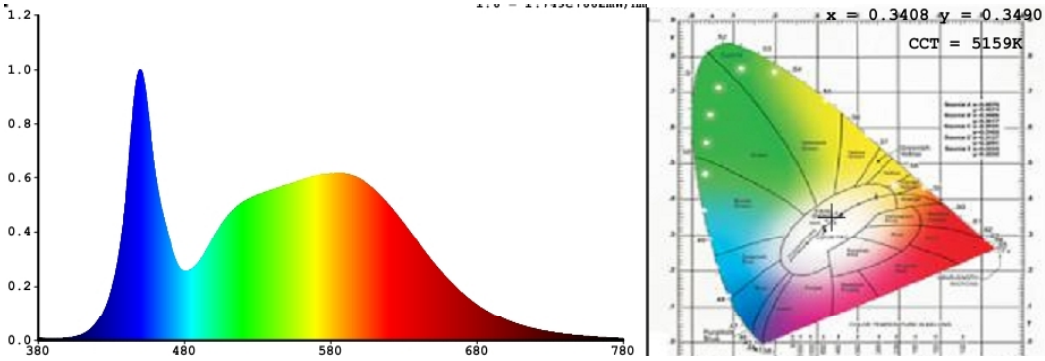
R1	R2	R3	R4	R5	R6	R7	R8
83	88	92	84	84	84	87	69
R9	R10	R11	R12	R13	R14	R15	-
12	72	84	65	84	96	78	-

Note:

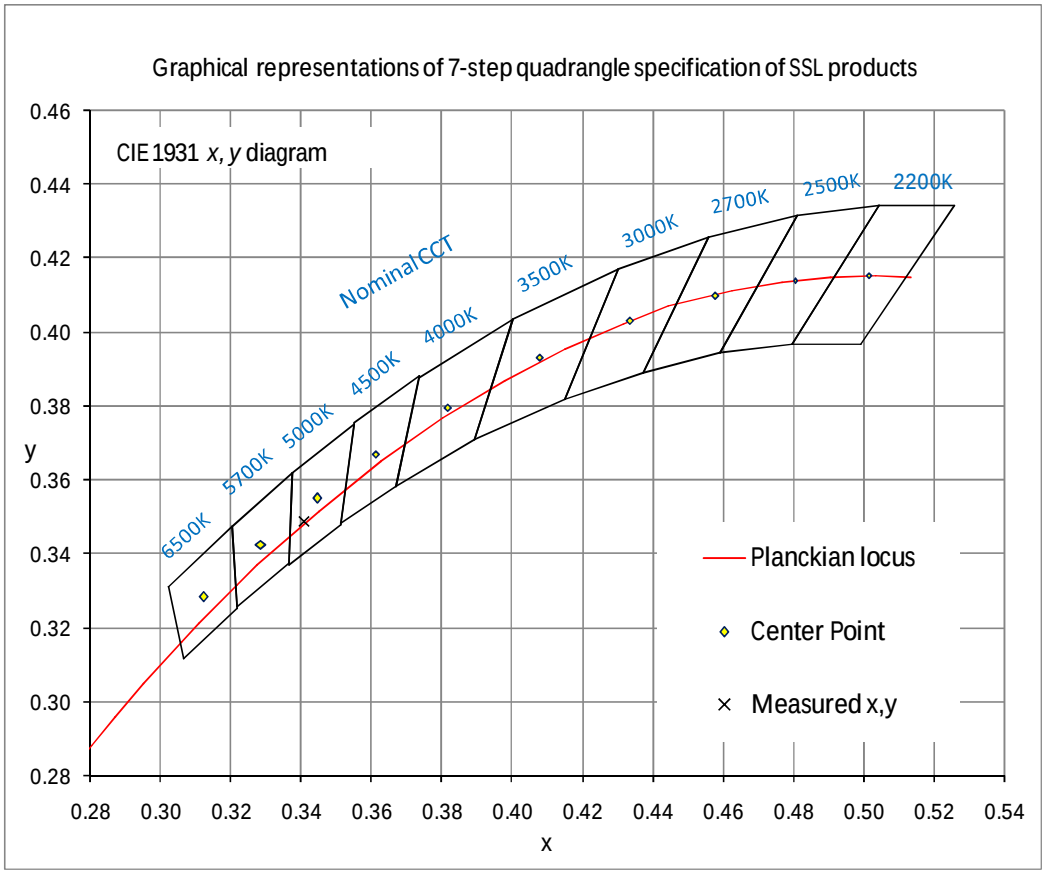
4, Self-absorption is 1.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Rectangular
Spacing Criteria (0-180)	1.30	Luminous Length	0.11 m
Spacing Criteria (90-270)	1.32	Luminous Width	0.07 m
Spacing Criteria (Diagonal)	1.42	Luminous Height	0.00 m
Test Distance	29.79 m		

4.4 Zonal Lumen Summary

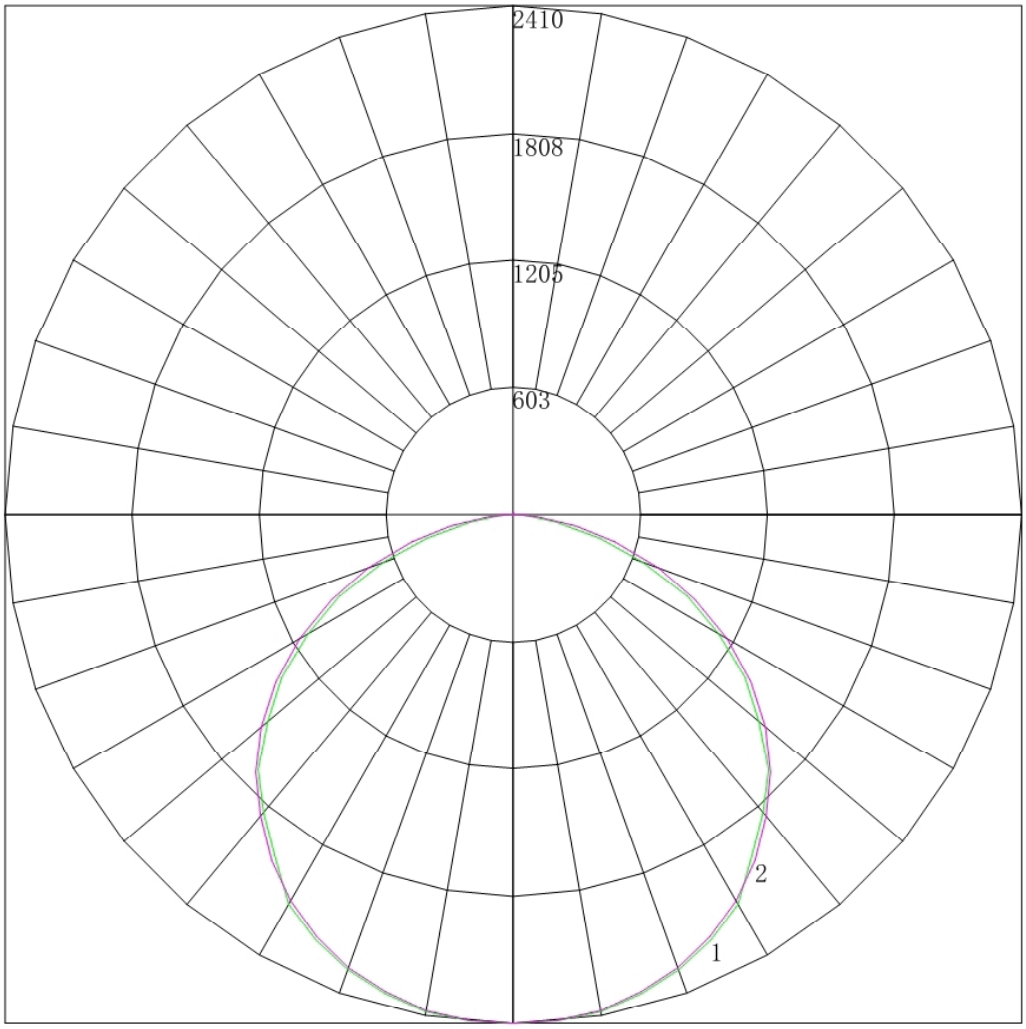
Zone	Lumens	%Lamp	%Fixt
0-20	890.47	12.30	12.30
0-30	1911.00	26.40	26.40
0-40	3161.64	43.60	43.60
0-60	5686.34	78.40	78.40
0-80	7095.35	97.90	97.90
0-90	7224.06	99.60	99.60
10-90	6995.35	96.50	96.50
20-40	2271.17	31.30	31.30
20-50	3589.21	49.50	49.50
40-70	3438.92	47.40	47.40
60-80	1409.02	19.40	19.40
70-80	494.80	6.80	6.80
80-90	128.71	1.80	1.80
90-110	13.25	0.20	0.20
90-120	15.37	0.20	0.20
90-130	17.37	0.20	0.20
90-150	20.97	0.30	0.30
90-180	25.64	0.40	0.40
110-180	12.39	0.20	0.20
0-180	7249.7	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	228.71
10-20	661.75
20-30	1020.53
30-40	1250.64
40-50	1318.03
50-60	1206.66
60-70	914.22
70-80	494.80
80-90	128.71
90-100	10.54
100-110	2.71
110-120	2.13
120-130	2.00
130-140	1.75
140-150	1.85
150-160	2.07
160-170	1.86
170-180	0.74

4.5 Polar Curves

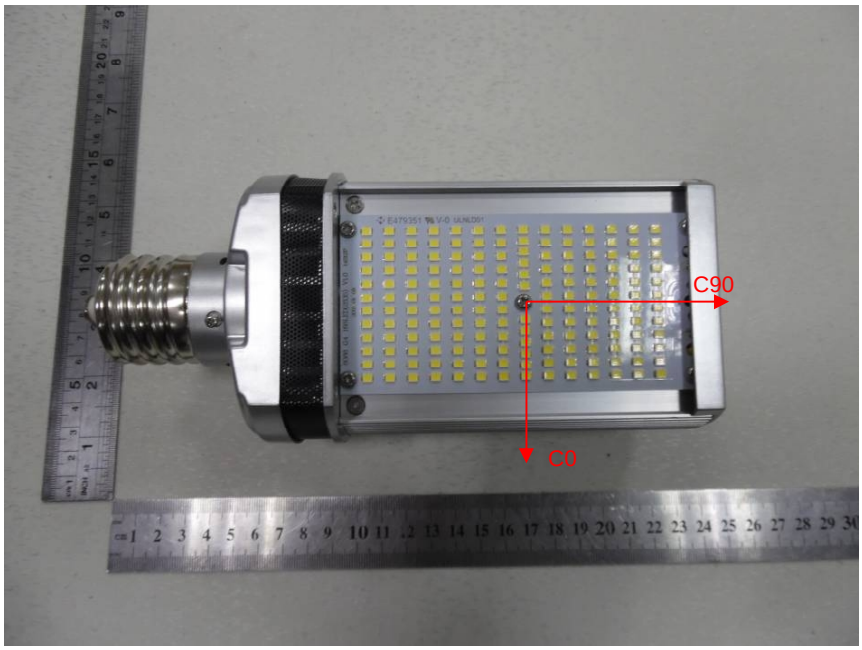


Maximum Candela = 2410.367 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	2410.367	2410.367	2410.367	2410.367	2410.367	2410.367	2410.367
5	2406.804	2401.489	2405.248	2401.948	2403.518	2401.094	2405.942
10	2391.216	2379.511	2384.572	2378.416	2380.458	2377.871	2385.144
15	2349.351	2340.878	2346.774	2343.571	2342.344	2338.293	2338.704
20	2293.679	2288.031	2291.185	2285.887	2284.932	2281.470	2283.423
25	2222.419	2216.983	2217.361	2214.660	2211.356	2206.964	2205.140
30	2131.563	2126.397	2126.195	2122.790	2119.389	2109.018	2113.595
35	1973.010	1976.104	2010.141	2012.937	2008.135	2003.335	2000.382
40	1844.074	1838.137	1836.606	1877.238	1875.030	1875.037	1865.588
45	1712.465	1699.581	1695.614	1698.603	1724.532	1724.496	1725.978
50	1519.128	1525.101	1542.392	1527.207	1555.701	1556.971	1562.407
55	1339.820	1326.920	1333.693	1348.601	1361.435	1380.109	1376.236
60	1123.012	1127.290	1135.672	1143.288	1153.902	1178.745	1171.183
65	911.281	908.750	913.705	917.736	932.939	952.755	949.064
70	649.134	664.178	681.551	693.642	709.198	722.970	731.415
75	423.061	427.811	440.442	471.676	485.913	493.179	497.676
80	207.411	219.211	242.845	257.372	274.107	287.742	300.414
85	72.952	75.232	85.736	97.670	109.080	114.766	113.554
90	22.180	22.747	23.420	23.433	26.423	29.316	26.774
95	1.292	5.704	9.507	7.491	4.760	2.674	1.593
100	1.514	2.619	4.243	4.278	3.299	2.320	1.770
105	1.737	2.131	2.756	2.971	2.702	2.276	1.947
110	1.871	2.042	2.356	2.528	2.481	2.188	2.079
115	1.915	1.976	2.179	2.218	2.215	2.034	2.124
120	2.004	2.043	2.045	2.174	2.127	2.056	2.123
125	2.182	2.198	2.290	2.308	2.260	2.233	2.300
130	2.316	2.265	2.357	2.330	2.371	2.344	2.344
135	2.093	2.176	2.113	2.153	2.194	2.145	2.122
140	2.450	2.420	2.402	2.375	2.416	2.410	2.388
145	3.029	2.931	2.935	2.929	2.948	2.919	2.918
150	3.608	3.575	3.536	3.551	3.546	3.538	3.581
155	4.543	4.441	4.470	4.438	4.455	4.466	4.421
160	5.612	5.595	5.603	5.614	5.585	5.572	5.615
165	6.814	6.772	6.760	6.724	6.693	6.677	6.721
170	7.438	7.460	7.449	7.434	7.425	7.384	7.340
175	7.928	7.860	7.894	7.922	7.846	7.893	7.871
180	8.246	8.246	8.246	8.246	8.246	8.246	8.246

Appendix A Product Photo



Picture 1

Picture 2

****End of test report****