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IESNA SUSTAINING MEMBER

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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/E40C-G4

Test Date:	May. 4, 2018 to May. 7, 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**

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1. General

1.1 Product Information

Brand Name	-
Product Type	LED Lamp
Model Number	LED-8088M/E40C-G4
Rated Inputs	220-347VAC, 50/60Hz
Rated Power	50W
Rated Light output	7900lm
Declared CCT	4000K
Power Supply	Integrated in lamp
LED Package, Array or Module	Not provided
Receipt Samples	1 unit
Sample Code of lab.	180423101005
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	347.00 V~60Hz	347.00 V~60Hz
Input Current(A)	0.172	0.173
Total Power(W)	55.94	56.08
Power Factor	0.935	0.934
I-THD	18.45%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-[4]	7989.92
Luminaire Efficacy(Lm/W)	-	142.47
Correlated Color Temperature (CCT)(K)	3954	-
Color Rendering Index (CRI)	81.7	-
R9	3	-
Chromaticity Coordinate (x,y)	x=0.3811 y=0.3731	-
Chromaticity Coordinate (u,v)	u=0.227 v=0.3334	-
Chromaticity Coordinate (u',v')	u'=0.227 v'=0.5001	-
Duv	-0.0019	-
Zone Lumens between 0-60 °	-	78.90%

3.3 Color Rendering Details

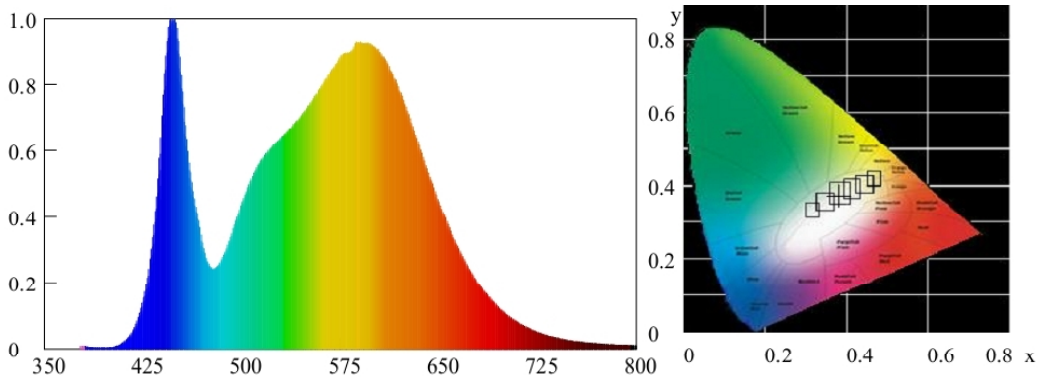
R1	R2	R3	R4	R5	R6	R7	R8
80	88	94	81	80	83	85	62
R9	R10	R11	R12	R13	R14	R15	-
3	72	80	63	83	97	74	-

Note:

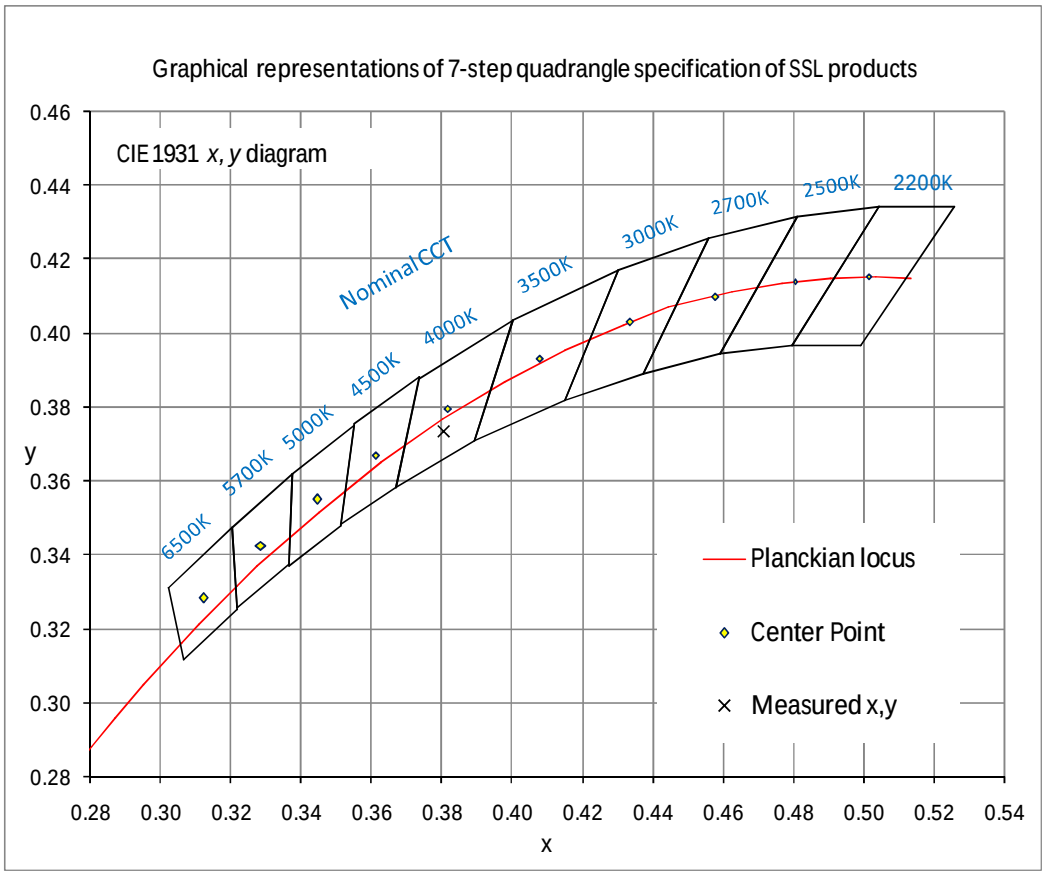
4, Self-absorption is 1.

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)	1.30	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

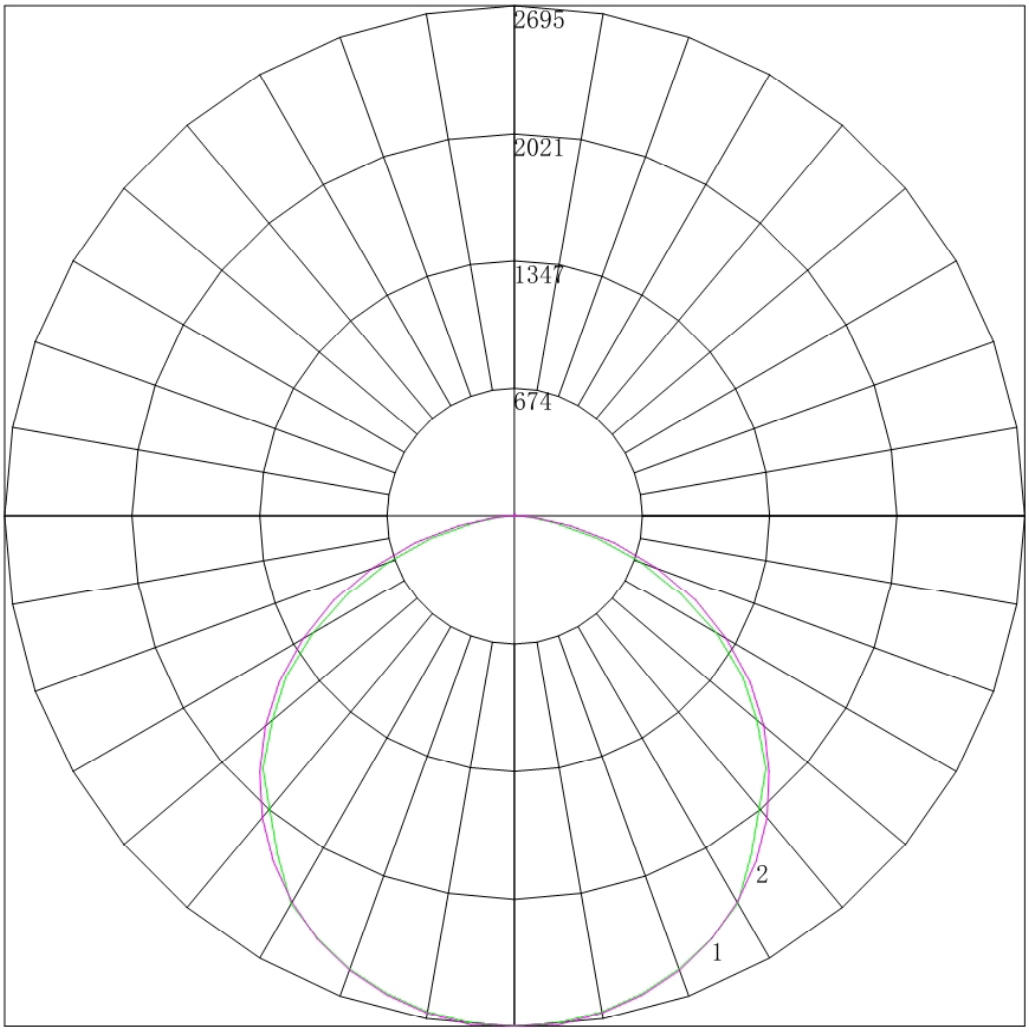
Zone	Lumens	%Lamp	%Fixt
0-20	993.57	12.40	12.40
0-30	2128.75	26.60	26.60
0-40	3516.24	44.00	44.00
0-60	6304.33	78.90	78.90
0-80	7836.65	98.10	98.10
0-90	7963.53	99.70	99.70
10-90	7707.99	96.50	96.50
20-40	2522.68	31.60	31.60
20-50	3980.57	49.80	49.80
40-70	3789.99	47.40	47.40
60-80	1532.32	19.20	19.20
70-80	530.41	6.60	6.60
80-90	126.88	1.60	1.60
90-110	11.89	0.10	0.10
90-120	14.28	0.20	0.20
90-130	16.61	0.20	0.20
90-150	20.78	0.30	0.30
90-180	26.39	0.30	0.30
110-180	14.50	0.20	0.20
0-180	7989.92	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	255.54
10-20	738.03
20-30	1135.18
30-40	1387.49
40-50	1457.9
50-60	1330.19
60-70	1001.9
70-80	530.41
80-90	126.88
90-100	8.93
100-110	2.96
110-120	2.39
120-130	2.34
130-140	2.02
140-150	2.14
150-160	2.46
160-170	2.25
170-180	0.89

4.5 Polar Curves

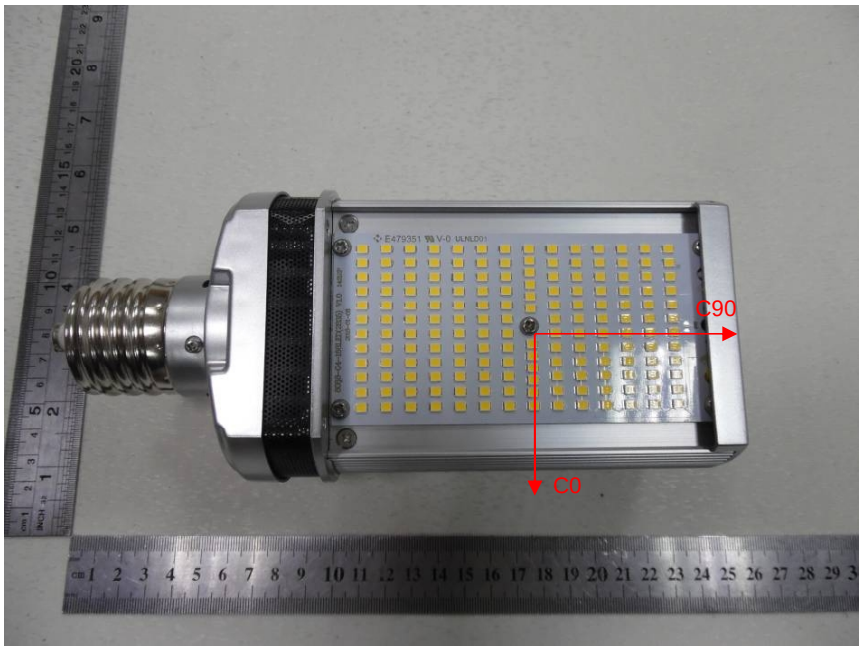


Maximum Candela = 2694.571 Located At Horizontal Angle = 90, Vertical Angle = 5
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	2692.702	2692.702	2692.702	2692.702	2692.702	2692.702	2692.702
5	2684.715	2687.142	2685.807	2684.937	2683.835	2686.076	2694.571
10	2656.315	2661.999	2659.801	2658.953	2657.908	2658.426	2664.188
15	2607.502	2616.824	2613.781	2614.083	2610.034	2610.875	2616.622
20	2544.045	2551.616	2549.531	2547.895	2543.339	2544.071	2549.232
25	2460.175	2467.499	2466.162	2462.816	2457.793	2455.600	2462.441
30	2359.443	2364.464	2362.347	2358.849	2351.860	2348.326	2352.280
35	2181.941	2196.234	2232.513	2233.343	2227.740	2223.136	2223.628
40	2012.870	2031.102	2027.085	2086.995	2081.702	2076.940	2073.798
45	1880.188	1885.347	1872.370	1877.954	1915.484	1908.395	1902.404
50	1668.073	1685.728	1702.738	1688.248	1732.874	1720.165	1720.441
55	1472.378	1469.633	1468.204	1494.086	1495.746	1518.666	1518.588
60	1229.200	1235.524	1255.450	1245.307	1267.259	1294.588	1290.329
65	970.491	982.950	995.800	1022.105	1037.203	1055.505	1053.238
70	706.457	709.465	726.141	755.800	778.835	794.525	799.418
75	455.292	461.354	476.257	492.737	516.689	536.846	545.085
80	216.996	229.019	248.379	272.211	279.059	294.408	300.033
85	82.538	82.359	88.968	94.450	96.879	101.326	98.956
90	28.400	26.710	23.348	16.228	11.534	9.959	7.084
95	2.219	7.127	10.232	8.002	5.099	3.097	1.324
100	1.775	2.894	4.672	4.445	3.546	2.654	1.767
105	2.219	2.449	3.336	3.113	2.882	2.434	1.767
110	2.219	2.225	2.668	2.889	2.439	2.434	1.767
115	2.219	2.225	2.446	2.666	2.439	2.434	1.767
120	2.219	2.225	2.668	2.666	2.439	2.434	2.206
125	2.663	2.670	2.446	2.889	2.660	2.654	2.644
130	2.663	2.670	2.668	2.666	2.660	2.654	2.644
135	2.663	2.670	2.668	2.445	2.439	2.212	2.201
140	2.663	2.670	2.668	2.887	2.880	3.097	3.083
145	3.550	3.561	3.336	3.554	3.326	3.539	3.083
150	3.994	4.006	4.002	3.999	3.989	3.981	3.964
155	5.325	5.341	5.336	5.331	5.319	5.309	5.284
160	7.100	6.899	7.114	6.888	6.872	6.858	6.604
165	7.988	8.233	8.004	8.218	8.199	8.183	8.367
170	8.875	8.902	8.893	8.886	8.865	8.848	8.810
175	9.763	9.792	9.782	9.330	9.531	9.510	9.691
180	9.756	9.756	9.756	9.756	9.756	9.756	9.756

Appendix A Product Photo



Picture 1

Picture 2

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