LCTECH

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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/E40-G4

Test Date:	May. 2, 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/E40-G4
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	50W
Rated Light output	6400lm
Declared CCT	3000K
Power Supply	Integrated in lamp
LED Package, Array or Module	Not provided
Receipt Samples	1 unit
Sample Code of lab.	180423101002
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	120.06 V~60Hz
Input Current(A)	0.400	0.402
Total Power(W)	47.65	47.82
Power Factor	0.992	0.992
I-THD	11.71%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-[4]	6460.29
Luminaire Efficacy(Lm/W)	-	135.10
Correlated Color Temperature (CCT)(K)	4105	-
Color Rendering Index (CRI)	82.7	-
R9	6	-
Chromaticity Coordinate (x,y)	x = 0.3770 y = 0.3784	-
Chromaticity Coordinate (u,v)	u = 0.2222 v = 0.3345	-
Chromaticity Coordinate (u',v')	u' = 0.2222 v' = 0.5018	-
Duv	0.0018	-
Zone Lumens between 0-60 °	-	78.91%

3.3 Color Rendering Details

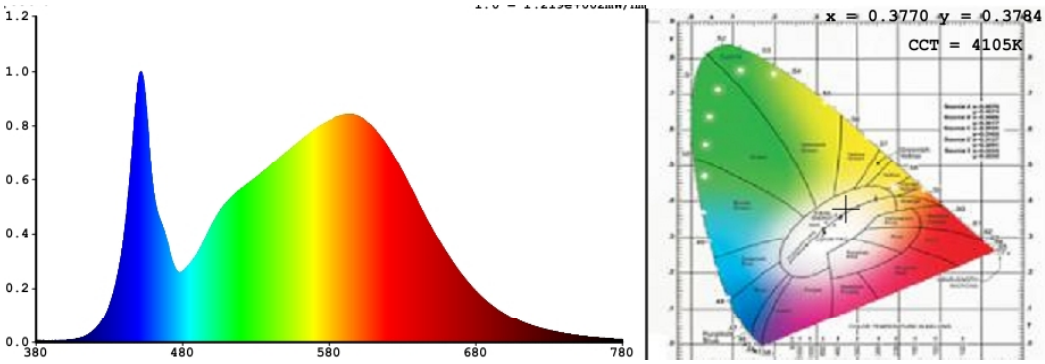
R1	R2	R3	R4	R5	R6	R7	R8
81	89	95	81	81	85	86	64
R9	R10	R11	R12	R13	R14	R15	-
6	74	80	61	83	97	74	-

Note:

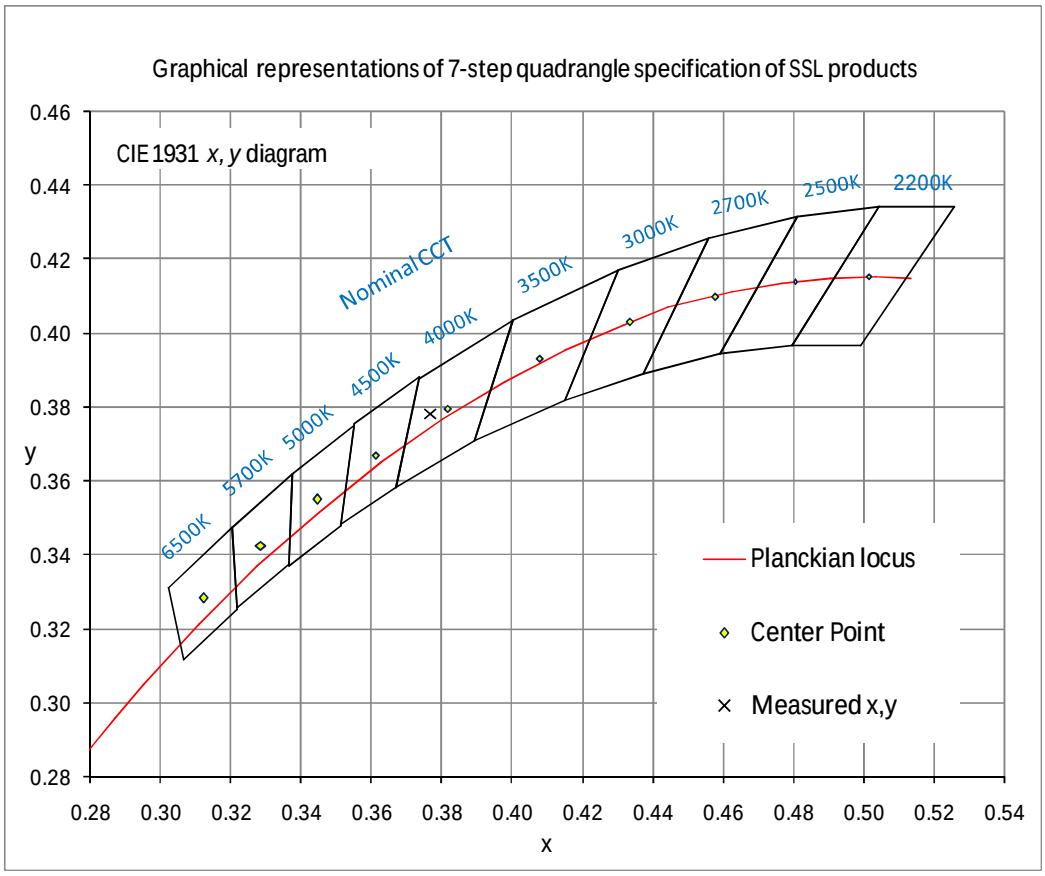
4, Self-absorption is 1.

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)	1.40	Luminous Height	0.00 m
Test Distance	29.79 m		

4.4 Zonal Lumen Summary

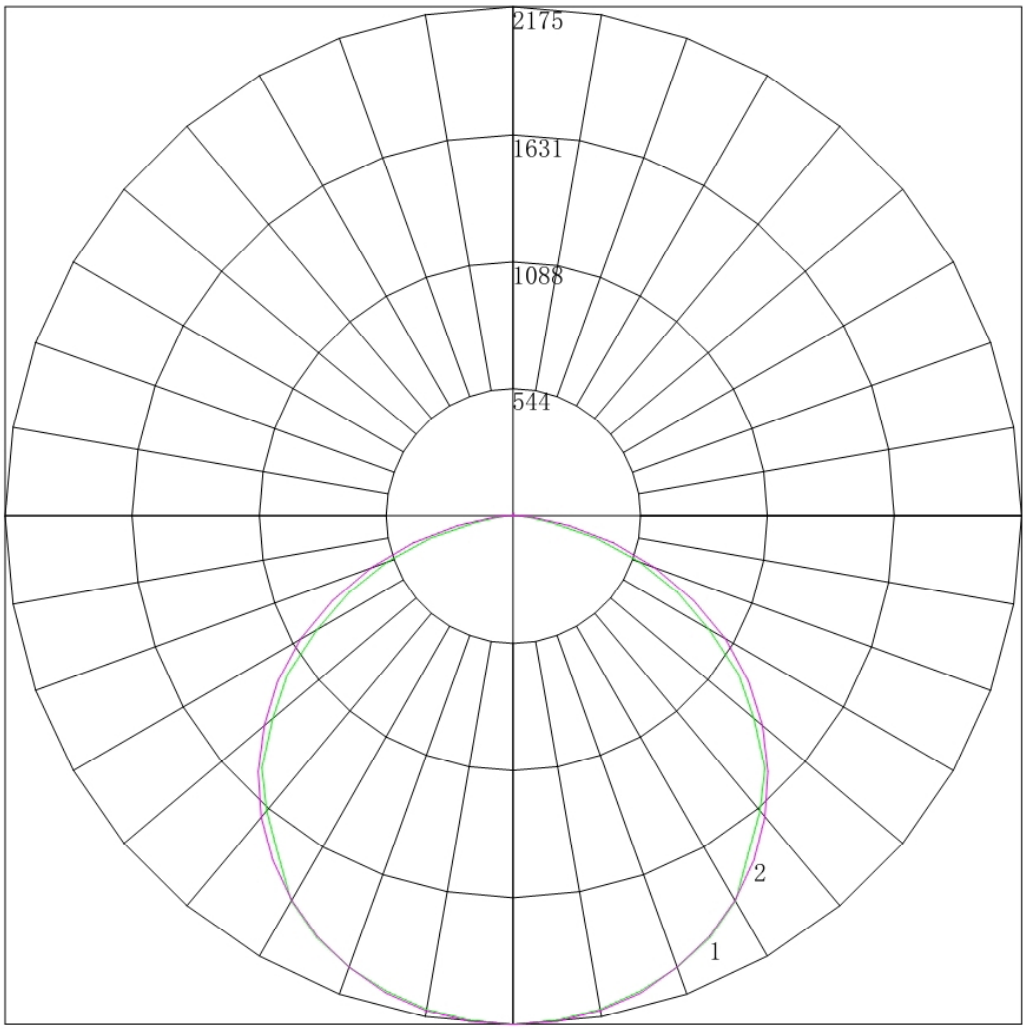
Zone	Lumens	%Lamp	%Fixt
0-20	802.49	12.40	12.40
0-30	1720.16	26.60	26.60
0-40	2841.64	44.00	44.00
0-60	5097.64	78.90	78.90
0-80	6335.95	98.10	98.10
0-90	6437.62	99.60	99.60
10-90	6231.27	96.50	96.50
20-40	2039.15	31.60	31.60
20-50	3219.98	49.80	49.80
40-70	3063.1	47.40	47.40
60-80	1238.31	19.20	19.20
70-80	431.21	6.70	6.70
80-90	101.67	1.60	1.60
90-110	9.87	0.20	0.20
90-120	11.83	0.20	0.20
90-130	13.84	0.20	0.20
90-150	17.61	0.30	0.30
90-180	22.68	0.40	0.40
110-180	12.81	0.20	0.20
0-180	6460.29	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	206.35
10-20	596.14
20-30	917.67
30-40	1121.48
40-50	1180.83
50-60	1075.17
60-70	807.10
70-80	431.21
80-90	101.67
90-100	7.30
100-110	2.57
110-120	1.96
120-130	2.00
130-140	1.81
140-150	1.96
150-160	2.28
160-170	1.99
170-180	0.79

4.5 Polar Curves

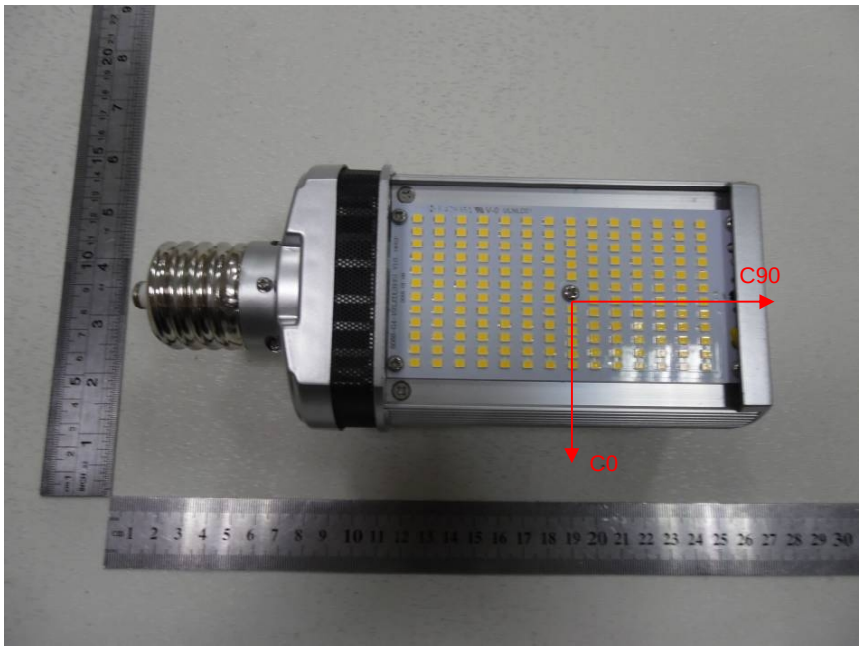


Maximum Candela = 2175.094 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	2175.094	2175.094	2175.094	2175.094	2175.094	2175.094	2175.094
5	2165.787	2172.646	2168.873	2169.991	2167.342	2167.788	2169.797
10	2141.413	2151.059	2147.770	2148.697	2146.064	2146.531	2148.138
15	2103.743	2114.324	2110.229	2110.979	2111.269	2108.448	2110.574
20	2054.551	2065.122	2060.028	2060.177	2057.633	2052.876	2053.572
25	1990.291	1997.441	1992.277	1990.955	1988.261	1985.572	1985.080
30	1901.213	1914.182	1910.088	1907.980	1903.380	1899.443	1896.266
35	1757.182	1773.704	1788.354	1807.256	1802.757	1796.487	1794.201
40	1643.729	1653.038	1645.518	1688.564	1685.295	1679.145	1676.669
45	1521.857	1527.248	1519.125	1517.070	1553.419	1543.865	1542.779
50	1344.144	1358.055	1378.518	1367.091	1401.836	1398.847	1391.223
55	1179.284	1185.508	1185.256	1210.460	1211.671	1232.123	1229.519
60	967.447	986.704	1009.553	1009.456	1031.698	1052.123	1048.359
65	775.996	791.236	790.976	819.768	838.000	855.297	852.180
70	570.807	573.055	585.508	602.563	630.984	648.724	644.073
75	365.618	374.473	389.366	404.010	424.219	445.476	444.810
80	164.860	183.224	200.341	218.742	232.039	238.453	242.464
85	62.044	61.886	72.181	75.650	78.670	81.035	79.462
90	21.272	21.816	19.321	12.866	9.084	6.641	7.501
95	1.330	5.342	8.883	6.877	4.210	2.435	1.326
100	1.330	2.672	4.220	3.993	3.324	2.213	1.769
105	1.773	1.781	2.666	2.884	2.660	2.214	1.769
110	1.773	1.781	2.221	2.219	2.216	2.214	1.769
115	1.773	1.781	1.777	2.219	2.216	1.771	1.769
120	1.773	1.781	1.777	2.219	2.216	2.214	1.769
125	2.216	2.226	2.221	2.219	2.216	2.214	2.210
130	2.659	2.672	2.443	2.440	2.437	2.435	2.651
135	2.216	2.226	2.221	2.219	2.216	2.214	2.208
140	2.659	2.672	2.443	2.219	2.437	2.214	2.208
145	3.102	3.117	3.110	3.106	3.103	3.100	3.092
150	3.989	4.007	3.998	3.993	3.989	3.985	3.976
155	4.875	4.898	4.887	4.659	4.876	4.871	4.859
160	6.204	6.234	6.219	6.212	6.206	6.199	6.184
165	7.091	7.124	7.108	7.099	7.092	7.085	7.068
170	7.977	8.015	7.996	7.987	7.979	7.971	7.951
175	8.420	8.460	8.441	8.431	8.422	8.413	8.394
180	8.869	8.869	8.869	8.869	8.869	8.869	8.869

Appendix A Product Photo



Picture 1

Picture 2

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