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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-8035E57-A

Test Date: Mar. 1, 2018 to Mar. 2, 2018

Test Item: Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.

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Table of Contents

1. General	3
1.1 Product Information	3
1.2 Standards or methods	4
1.3 Equipment list	4
2. Test conducted and method	5
2.1 Ambient Condition	5
2.2 Power Supply Characteristics	5
2.3 Seasoning and Stabilization	5
2.4 Electrical Instrumentation	5
2.5 Color Measurement Method	5
2.6 Total Luminous Flux Measurement Method	5
2.7 Luminous Intensity Distribution Measurement Method	5
2.8 Spatial Non-uniformity of Chromaticity	5
3. Test Result Summary	6
3.1 Electrical data	6
3.2 Photometric data	6
3.3 Color Rendering Details	6
4. Test Data	7
4.1 Spectral Distribution	7
4.2 ANSI Chromaticity Quadrangles Diagram	7
4.3 Goniometry Test Data	8
4.4 Zonal Lumen Summary	8
4.5 Polar Curves	9
4.6 Candela Tabulation	10
Appendix A Product Photo	11





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1. General

1.1 Product Information



Brand Name	-
Product Type	LED Lamp
Model Number	LED-8035E57-A
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	60W
Rated Light output	7200lm
Declared CCT	5700K
Power Supply	Integrated in lamp
LED Package, Array or Module	Not provided
Receipt Samples	1 unit
Sample Code of lab.	180127105009
Date of Receipt Samples	Jan. 27, 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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$; 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	120.08 V~60Hz
Input Current(A)	0.491	0.488
Total Power(W)	58.14	58.02
Power Factor	0.986	0.990
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	- ⁴	7238.79
Luminaire Efficacy(Lm/W)	-	124.76
Correlated Color Temperature (CCT)(K)	5829	-
Color Rendering Index (CRI)	84.3	-
R9	13	-
Chromaticity Coordinate (x,y)	x = 0.3253 y = 0.3384	-
Chromaticity Coordinate (u,v)	u = 0.2030 v = 0.3167	-
Chromaticity Coordinate (u',v')	u' = 0.2030 v' = 0.4751	-
Duv	0.0019	-
Zone Lumens between 0-60 °	-	55.00%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
83	88	91	85	84	83	88	71
R9	R10	R11	R12	R13	R14	R15	-
13	71	86	65	84	95	78	-

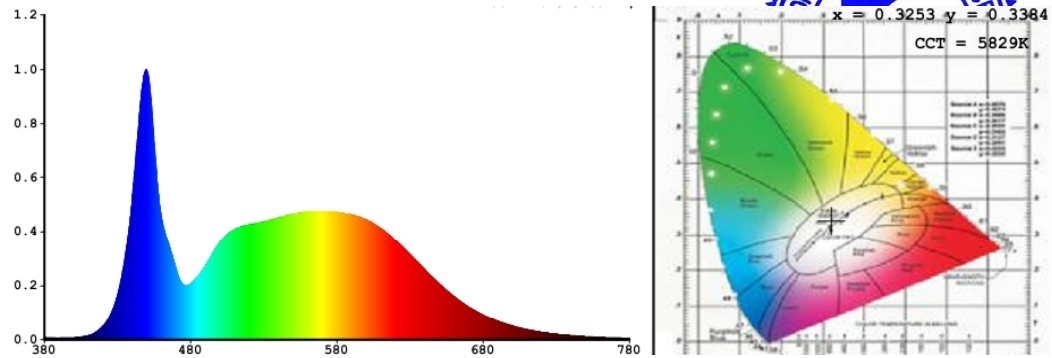
Note:

4, Self-absorption is 1.

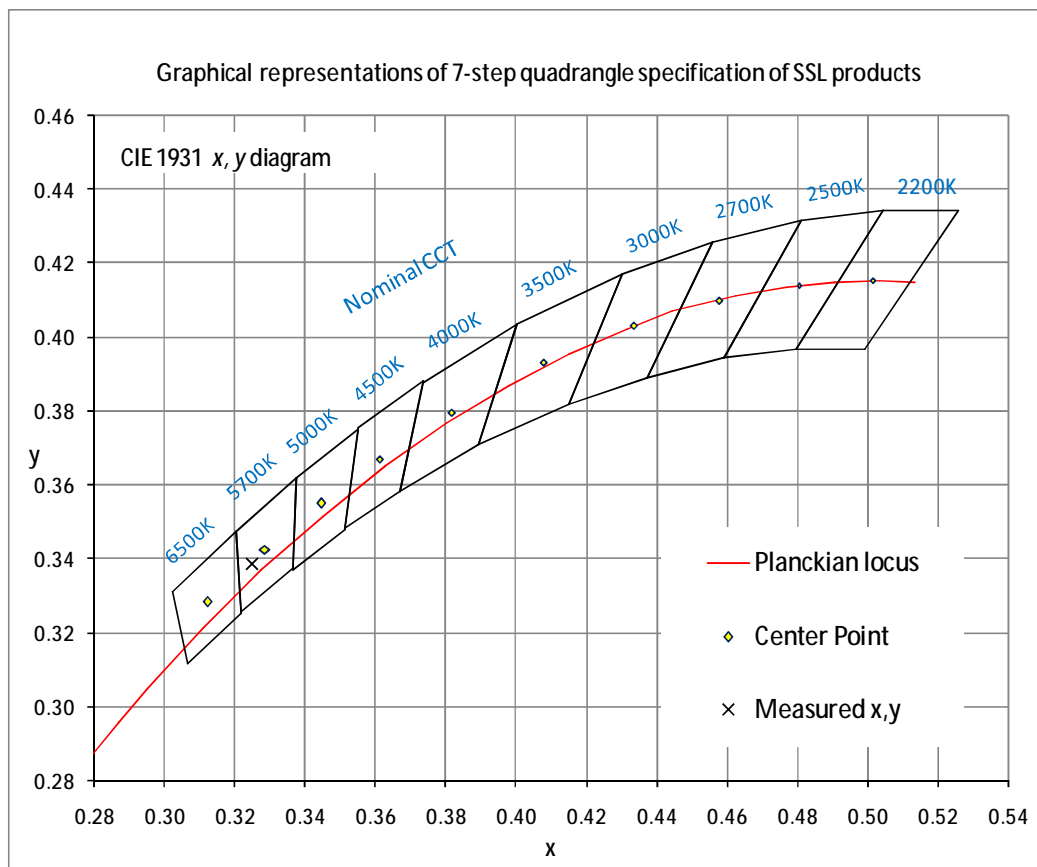


4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram

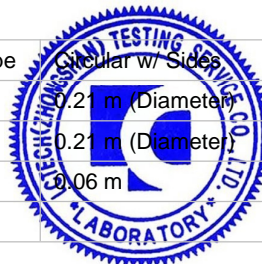




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4.3 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Circular w/ Sides
Spacing Criteria (0-180)	1.10	Luminous Length	0.21 m (Diameter)
Spacing Criteria (90-270)	1.14	Luminous Width	0.21 m (Diameter)
Spacing Criteria (Diagonal)	1.28	Luminous Height	0.06 m
Test Distance	29.79 m		



4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	698.70	9.70	9.70
0-30	1457.56	20.10	20.10
0-40	2362.24	32.60	32.60
0-60	3980.75	55.00	55.00
0-80	5124.34	70.80	70.80
0-90	5487.92	75.80	75.80
10-90	5303.82	73.30	73.30
20-40	1663.54	23.00	23.00
20-50	2547.04	35.20	35.20
40-70	2265.93	31.30	31.30
60-80	1143.59	15.80	15.80
70-80	496.17	6.90	6.90
80-90	363.58	5.00	5.00
90-110	632.32	8.70	8.70
90-120	904.86	12.50	12.50
90-130	1136.67	15.70	15.70
90-150	1536.86	21.20	21.20
90-180	1750.88	24.20	24.20
110-180	1118.56	15.50	15.50
0-180	7238.8	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	184.10
10-20	514.60
20-30	758.86
30-40	904.68
40-50	883.51
50-60	735.00
60-70	647.42
70-80	496.17
80-90	363.58
90-100	327.69
100-110	304.64
110-120	272.53
120-130	231.81
130-140	214.09
140-150	186.09
150-160	126.72
160-170	67.45
170-180	19.85

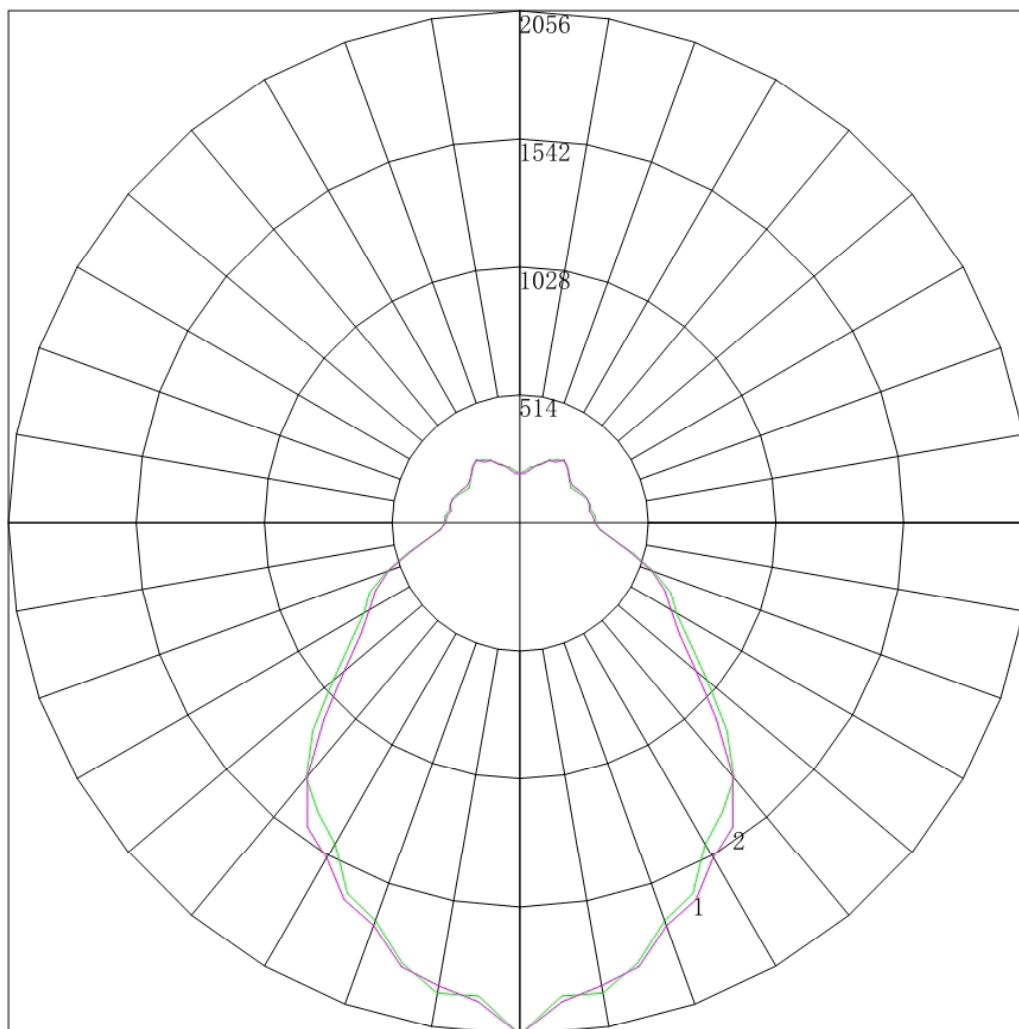


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4.5 Polar Curves

Page 9 of 11

Ref. No.: LCZP17020268 , V1.0



Maximum Candela = 2055.831 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



	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	2055.831	2055.831	2055.831	2055.831	2055.831	2055.831	2055.831
5	1907.394	1910.247	1906.121	1907.525	1923.515	1924.622	1930.955
10	1918.028	1910.282	1904.679	1906.775	1903.903	1895.788	1888.290
15	1829.620	1835.290	1835.492	1832.929	1848.676	1835.386	1845.916
20	1700.403	1717.257	1702.833	1704.841	1724.126	1720.977	1719.376
25	1642.753	1678.525	1654.394	1656.805	1670.610	1671.606	1670.714
30	1486.808	1558.599	1542.113	1512.898	1522.110	1535.683	1554.777
35	1416.785	1446.108	1506.883	1436.161	1425.900	1467.593	1489.734
40	1338.662	1342.794	1290.042	1330.138	1351.388	1326.515	1328.777
45	1176.148	1145.212	1110.035	1149.523	1187.283	1149.635	1115.008
50	980.221	950.147	917.138	961.530	985.505	962.936	922.830
55	828.855	810.160	775.941	803.291	832.617	802.611	780.696
60	725.885	723.121	701.064	718.960	738.310	723.718	699.195
65	668.640	668.555	644.185	666.859	674.960	670.152	641.439
70	567.739	570.903	564.611	568.547	557.616	568.368	562.557
75	469.375	470.146	464.108	465.355	467.194	466.388	455.354
80	382.053	384.858	377.006	378.456	381.588	381.101	377.753
85	320.431	324.836	319.872	324.734	319.922	329.284	323.480
90	304.887	307.995	301.787	308.622	303.992	310.548	299.865
95	304.037	308.416	298.711	306.337	302.744	302.444	294.976
100	290.043	293.676	285.893	292.615	290.466	287.626	281.491
105	292.026	292.077	286.643	287.967	285.677	288.568	288.761
110	285.401	285.043	286.052	284.732	282.810	286.204	289.170
115	272.633	273.886	276.233	275.319	273.075	275.000	278.146
120	258.323	260.683	263.764	263.143	260.296	264.948	269.603
125	249.447	250.498	254.020	256.119	253.887	257.233	258.997
130	260.405	259.946	260.121	262.554	262.337	264.994	264.443
135	275.425	273.951	275.718	275.276	278.395	277.859	277.307
140	294.021	291.362	290.662	291.025	293.414	294.248	294.924
145	304.887	299.257	297.184	300.079	303.006	303.491	308.163
150	292.469	288.999	288.998	287.416	291.797	287.816	285.227
155	276.749	279.464	276.888	273.197	269.489	273.087	279.653
160	251.705	258.241	254.812	250.543	249.031	250.723	252.722
165	235.976	234.540	237.691	234.400	232.467	235.385	240.431
170	227.764	229.581	227.893	224.573	220.604	216.742	217.255
175	210.573	201.277	198.427	190.031	194.929	200.443	200.016
180	199.213	199.213	199.213	199.213	199.213	199.213	199.213

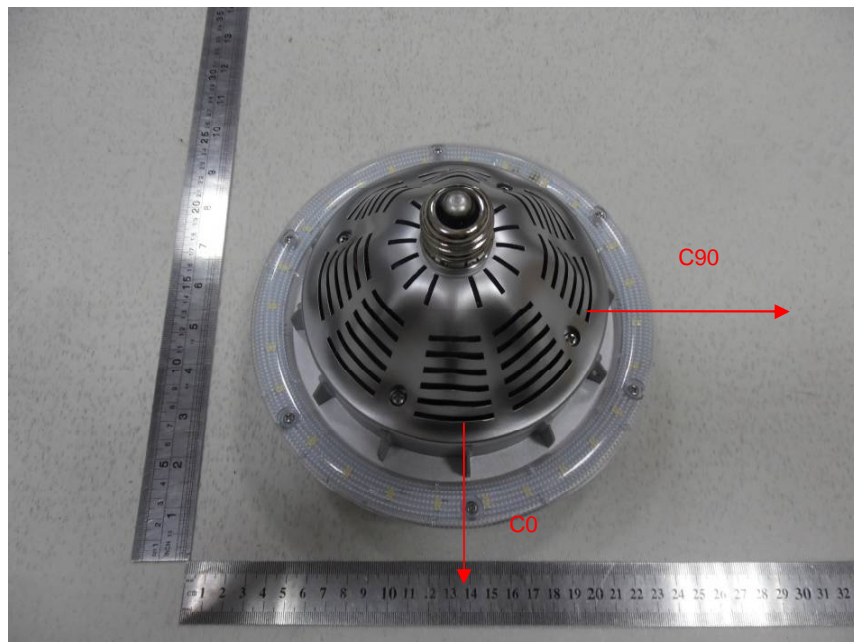


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Appendix A Product Photo



Picture 1



Picture 2

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