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Test report of

IES LM-79-08

Approved Method: Electrical and Photometric

Measurements of Solid-State Lighting Products

Rendered to:

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NO.1 JINFENG ROAD ,TANGJIAWAN TOWN,XIANGZHOU

DISTRICT,ZHUHAI CITY,GUANGDONG PROVINCE, P.R.China

For products:

Inseparable SSL luminaires

Models:

546141XX ("XX" can be 41~50 which identifies 4000K)

Test date: Mar 13,2014

Test laboratory: LCTECH (Zhongshan) Testing Service Co.,Ltd
2/F.,Technology and Enterprise Development Center, Guangyuan Road,
Xiaolan, Zhongshan, Guangdong, China

Laboratory note: N/A

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Mar 21, 2014

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Mar 21, 2014

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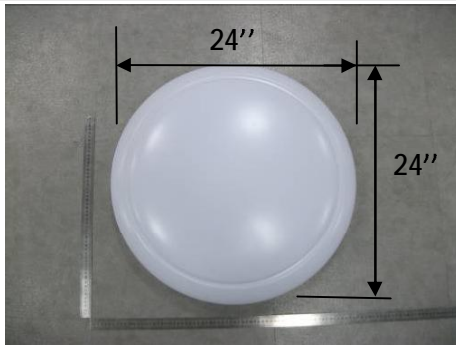
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1 General

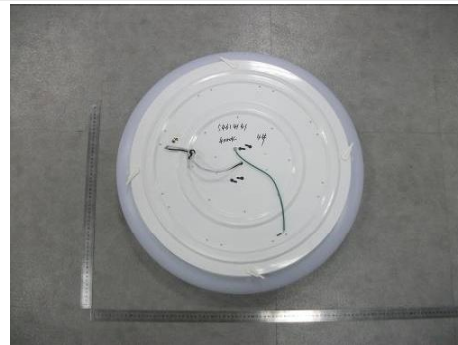
1.1 Product Information

Brand Name	ETI,Whirlpool
Trade Mark	-
Luminaire Type	Inseparable SSL luminaires
Model Number	546141XX ("XX" can be 41~50 which identifies 4000K)
Rated Inputs	120VAC,60Hz
Rated Power	40 W
Rated Initial Lamp Lumens	2900 lm
Declared CCT	4000 K
Driver Model	Integral LED Driver
Suitable Dimmer	SCR Dimmer
LED Package, Array or Module	Everlight electronics co.,ltd;Model:62-217D(3000K)
Date of Receipt Samples	Mar 10,2014
Quantity of Receipt Samples	1 unit

Photo



Picture 1



Picture 2

1.2 Reference standards or methods

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

No.	Name
ANSI/NEMA/ ANSLG C78.377-2011 [#]	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

[#]For reference only.

1.3 Equipment list

ID	Instrument	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2014-03-04	2015-03-03
AC Power supply	LC-I-953	APW-110N	2014-03-04	2015-03-03
Power analyzer	LC-I-928	WT210	2013-03-21	2014-03-20
Power analyzer	LC-I-954	WT210	2014-03-04	2015-03-03
Multimeter	LC-I-972	Fluke 17B	2013-08-14	2014-08-13
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-I-971	STD-ESN	2013-04-22	2014-04-21
Goniophotometer(with mirror)	LC-I-902	GMS2000	2013-05-13	2014-05-12
Wireless temperature transmitter	LC-I-958	DWRP-B(0)	2013-08-22	2014-08-21
Wireless temperature transmitter	LC-I-959	DWRP-B(0)	2013-08-22	2014-08-21



2 Test conducted and method

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

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 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	120.04 V~60Hz	120.09 V~60Hz
Input Current	0.334 A	0.331 A
Total Power	39.9 W	39.62 W
Power Factor	0.997	0.995
I-THD	5.18 %	-
Off-state Power	0.0 W	-

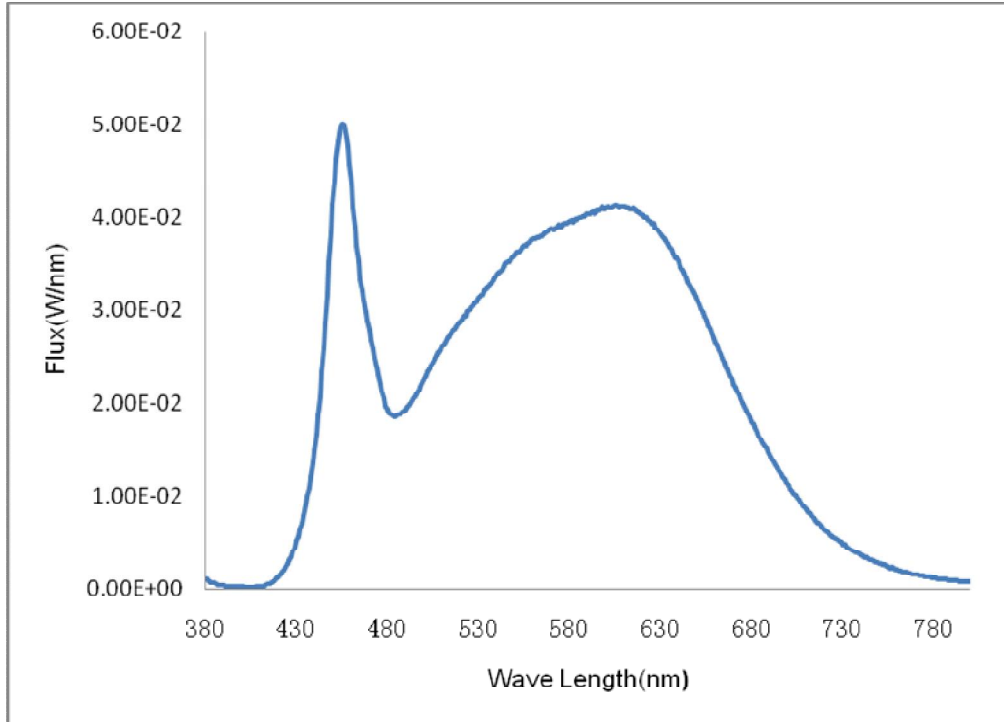
3.2 Photometric data

Criteria Item	Result (Sphere)	Result (Goniophotometer)
Total Lumens	-	3098.47 lm
Luminaire Efficacy	-	78.20 lm/W
Correlated Color Temperature (CCT)	4068 k	-
Color Rendering Index (CRI)	90.9	-
R9	57	-
Chromaticity Coordinate (x,y)	x= 0.3762 y= 0.3697	-
Chromaticity Coordinate (u,v)	u= 0.2251,v= 0.3319	-
Chromaticity Coordinate (u',v')	u'= 0.2251 v'= 0.4978	-
Duv	-0.00206	-
Beam Angle(50% I _{max})	-	116.0°

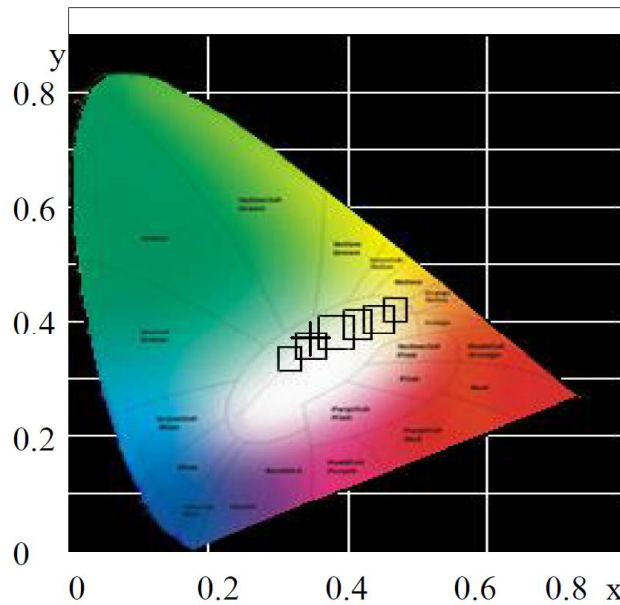
Note: N.A.

4 Test Data

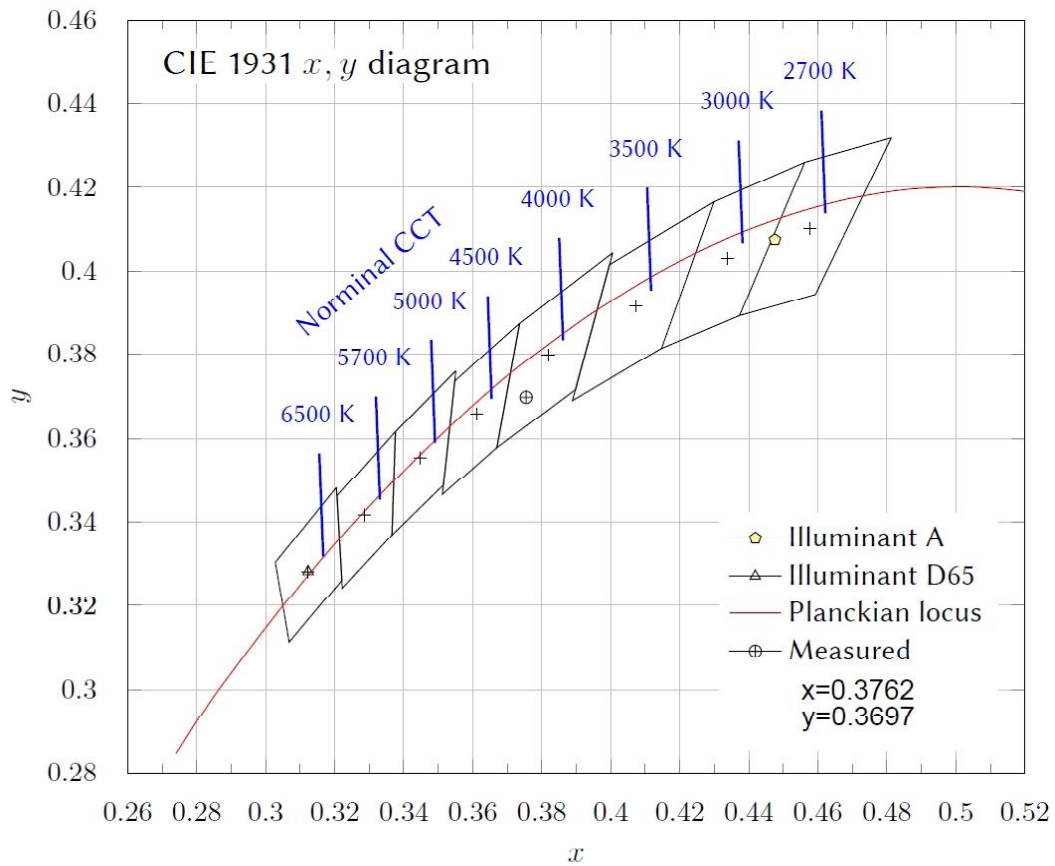
4.1 Spectral Distribution



4.2 Chromaticity Diagram (CIE 1931)



4.3 ANSI Chromaticity Quadrangles Diagram



4.4 Color Rendering Details

R1	R2	R3	R4	R5
91	96	97	88	90
R6	R7	R8	R9	R10
92	91	82	57	89
R11	R12	R13	R14	R15
87	68	93	98	89



4.5 Goniometry Test Data

CIE Type	Semi-Direct	Basic Luminous Shape	Sphere
Spacing Criteria (0-180)	1.28	Luminous Diameter	0.61 m
Spacing Criteria (90-270)	1.28	Luminous Height	0.09 m
Spacing Criteria (Diagonal)	1.40		
Test Distance	18.54 m		

4.6 Zonal Lumen Summary

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	690.86	22.3	22.3
0-40	1135.83	36.7	36.7
0-60	2034.37	65.7	65.7
0-90	2729.03	88.1	88.1
90-120	170	5.5	5.5
90-130	218.69	7.1	7.1
90-150	307.28	9.9	9.9
90-180	369.44	11.9	11.9
0-180	3098.48	100	100

Total Luminaire Efficiency = 100%

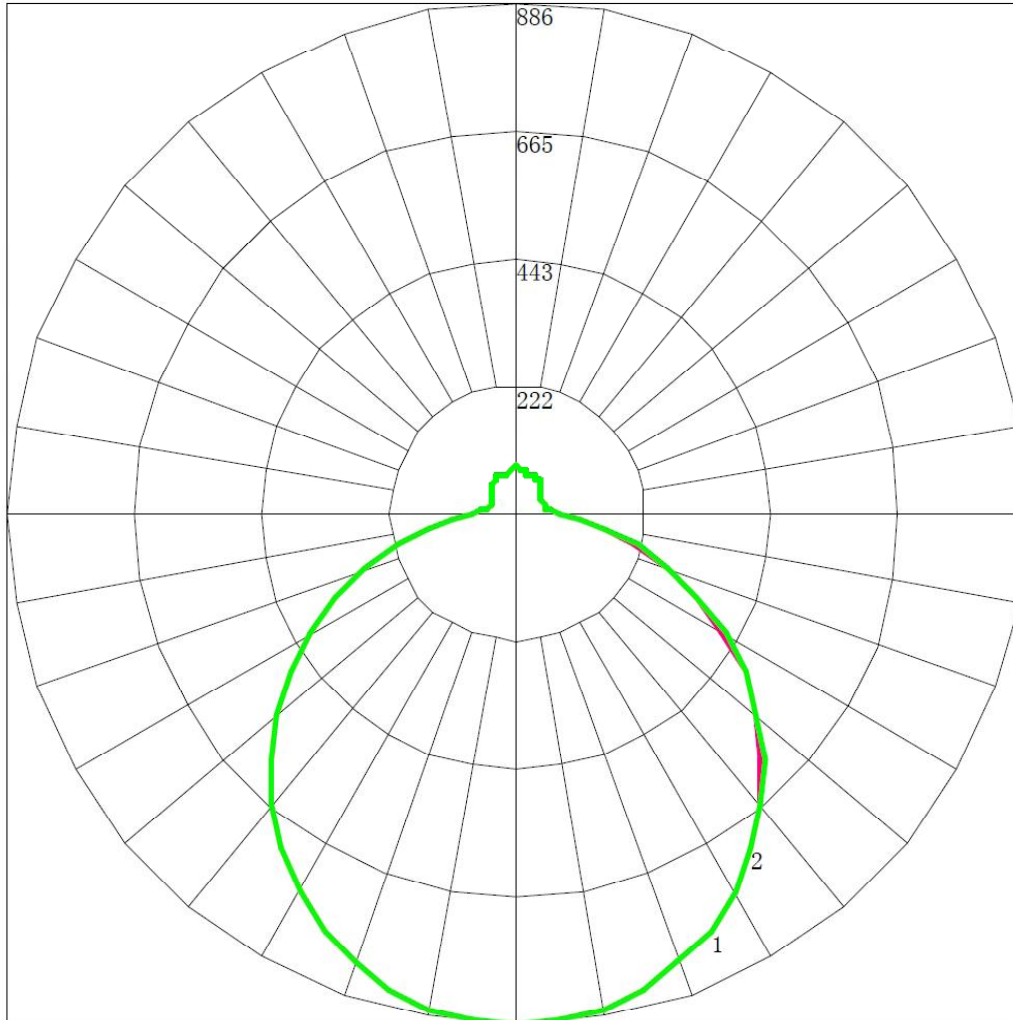
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	83.86
10-20	240.65
20-30	366.35
30-40	444.97
40-50	467.3
50-60	431.24
60-70	343.87
70-80	227.75
80-90	123.04
90-100	68.11
100-110	52.27
110-120	49.61
120-130	48.69
130-140	46.35
140-150	42.25
150-160	34.03
160-170	20.72
170-180	7.4



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4.7 Polar Curves



Maximum Candela = 886 Located At Horizontal Angle = 0, Vertical Angle = 0

1 - Vertical Plane Through Horizontal Angles (90 - 270)

2 - Vertical Plane Through Horizontal Angles (0 - 180)



4.8 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	886.00	886.00	886.00	886.00	886.00	886.00	886.00
5	882.22	882.56	882.56	882.04	881.87	882.22	882.39
10	871.04	871.38	871.21	870.87	870.70	870.96	871.08
15	852.65	852.72	852.72	852.23	852.22	852.24	852.73
20	827.21	827.27	827.36	826.96	826.70	826.81	827.00
25	794.72	794.94	795.11	794.48	794.73	794.42	794.59
30	756.55	756.33	756.16	755.72	756.32	755.77	755.82
35	711.17	711.70	711.62	710.69	710.86	710.67	711.06
40	661.32	661.49	660.97	660.67	660.93	660.68	660.81
45	605.79	606.03	606.03	606.62	605.67	605.35	605.41
50	545.80	546.27	546.61	545.09	545.78	545.91	545.56
55	482.19	482.55	483.07	482.79	482.62	481.91	482.96
60	415.84	415.40	415.83	415.59	415.41	415.77	415.39
65	347.42	347.47	347.12	346.49	347.10	347.05	346.95
70	278.83	278.94	278.51	278.86	278.86	278.67	278.70
75	214.71	213.59	213.68	214.07	213.72	213.72	213.87
80	155.75	156.06	156.06	156.23	155.89	156.26	156.41
85	108.64	108.86	108.69	109.22	109.40	109.27	109.08
90	76.50	76.70	77.04	77.26	77.43	77.48	78.03
95	59.82	60.02	60.19	60.16	60.24	60.30	60.54
100	51.91	52.11	51.85	52.08	52.16	52.14	52.14
105	48.65	48.41	48.58	48.55	48.55	48.53	48.37
110	48.48	48.50	48.58	48.47	48.38	48.62	48.37
115	49.68	49.96	49.79	49.76	49.76	49.74	49.91
120	51.91	51.94	51.76	51.65	51.91	52.14	51.97
125	54.32	54.34	54.34	54.23	54.23	54.38	54.37
130	56.56	56.75	56.58	56.72	56.80	56.87	56.60
135	59.65	59.76	59.76	59.90	59.81	59.79	59.51
140	63.26	63.29	63.37	63.59	63.68	63.31	63.46
145	67.39	67.41	67.33	67.63	67.63	67.43	67.06
150	71.00	70.94	71.11	71.41	71.33	71.21	71.17
155	74.26	74.38	74.64	74.51	74.42	74.65	74.43
160	73.92	74.12	74.29	74.42	74.33	74.13	73.92
165	72.54	72.23	72.06	72.10	71.67	71.99	72.03
170	74.44	74.29	74.21	73.91	74.08	74.05	73.75
175	79.42	79.54	79.45	79.41	79.49	79.46	79.06
180	80.40	80.40	80.40	80.40	80.40	80.40	80.40



LCTECH



Attachment 1

U.S. Department of Energy

Lighting Facts^{CM} Uniform LM-79 Reporting Template

Laboratory Information

Name of test lab	LCTECH (Zhongshan) Testing Service Co.,Ltd
Date of test report	Mar 21,2014
Test report number	LCZP14030102
Laboratory contact name	Richard Li

Product Information

Manufacturer	Elec-Tech International Co., Ltd	
Brand name	ETI,Whirlpool	
Model number	546141XX ("XX" can be 41~50 which identifies 4000K)	
SKU (if available)	N/A	
Type of luminaire (for integral lamps, list base type and lamp type)	Inseparable SSL luminaires	
Luminaire aperture	24.0	in.
Luminaire height	3.5	in.
Luminaire length	N/A	in.
Luminaire width	N/A	in.
Number of units (modular products)	N/A	

Electrical Measurements	Integrating sphere output	Goniophotometer Output	
Input wattage	39.90	39.62	W
Input current	0.334	0.331	A
Input voltage (AC)	120.04	120.09	V
Power factor	0.997	0.995	
Off-state power	0.0	0.0	W

Photometric Characteristics

Total initial lumen output	-	3098.47	lm
Initial luminaire efficacy	-	78.20	lm/W
Correlated color temperature / CCT	4068	K	
Color rendering index / CRI	90.9		
R _g value	57		
Duv	-0.00206		

Luminous Intensity Distribution		Goniophotometer Output	
Center beam candlepower (if applicable)		885.997	cd
Beam angle (if applicable)		116.0	°
Zonal lumens in the 0°-60° zone	--	65.7	%
Zonal lumens in the 60°-90° zone		22.4	%
Zonal lumens in the 90°-120° zone		5.5	%
Zonal lumens in the 120°-180° zone		6.4	%



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