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Test report of

IES LM-79-08

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

Rendered to:

Foshan Ledkey Lighting Co, LTD.

Building 1, No.5 Nanda Road, Danzao, Nanhai, Foshan, Guangdong, China

For products:

Ceiling Fixture

Models No.:

WR02-4805-40-940

Test Date: Jan. 4, 2018 to Jan. 5, 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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1. General

1.1 Product Information

Brand Name	LedKey
Product Type	Ceiling Fixture
Model Number	WR02-4805-40-940
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	40W
Rated Light output	3400lm
Declared CCT	4000K
Power Supply	LED Driver
LED Package, Array or Module	BXEN-27E-11M-3A
Dimming Information	Non-dimmable
Receipt Samples	1 unit
Sample Code of lab.	180102101002
Date of Receipt Samples	Jan. 2, 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	2017-02-04	2018-02-03
AC Power supply	LC-I-987	APW-110N	2017-02-04	2018-02-03
Power analyzer	LC-I-928	WT210	2017-01-19	2018-01-19
Power analyzer	LC-I-954	WT210	2017-02-04	2018-02-03
Multimeter	LC-I-972	Fluke 17B	2017-08-08	2018-08-07
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-011	D204C	2019-09-07	2018-09-06
Luminous Flux Standard Lamp	LC-PL-I-003	24V100W	2017-10-08	2018-10-07
Goniophotometer(with mirror)	LC-I-902	GMS2000	2017-05-06	2018-05-05
Wireless temperature transmitter	LC-I-978	DWRF-B	2017-02-10	2018-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2017-02-10	2018-02-10

2. Test conducted and method

The luminaire 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 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)	0.335	0.336
Total Power(W)	39.90	39.92
Power Factor	0.991	0.991
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	3477.29
Luminaire Efficacy(Lm/W)	-	87.11
Correlated Color Temperature (CCT)(K)	4044	-
Color Rendering Index (CRI)	97.2	-
R9	90	-
Chromaticity Coordinate (x,y)	x = 0.3792 y = 0.3782	-
Chromaticity Coordinate (u,v)	u = 0.2237 v = 0.3347	-
Chromaticity Coordinate (u',v')	u' = 0.2237 v' = 0.5021	-
Duv	0.0011	-
Zone Lumens between 0-60 °	-	68.81%

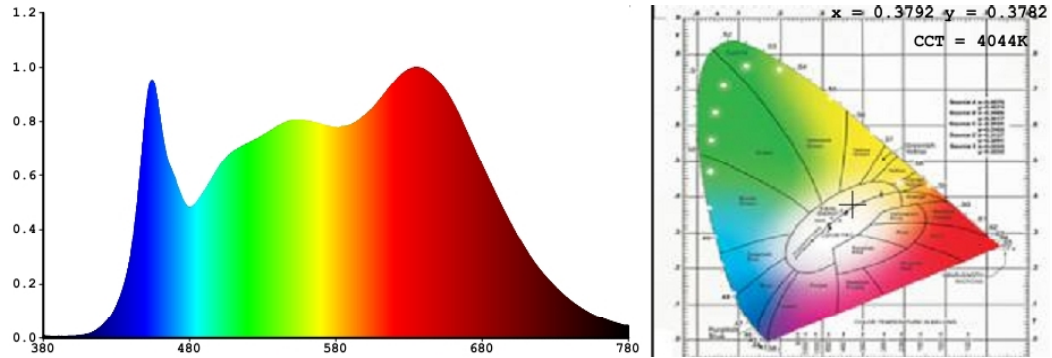
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
97	99	98	97	97	98	97	95
R9	R10	R11	R12	R13	R14	R15	-
90	99	98	78	97	98	95	-

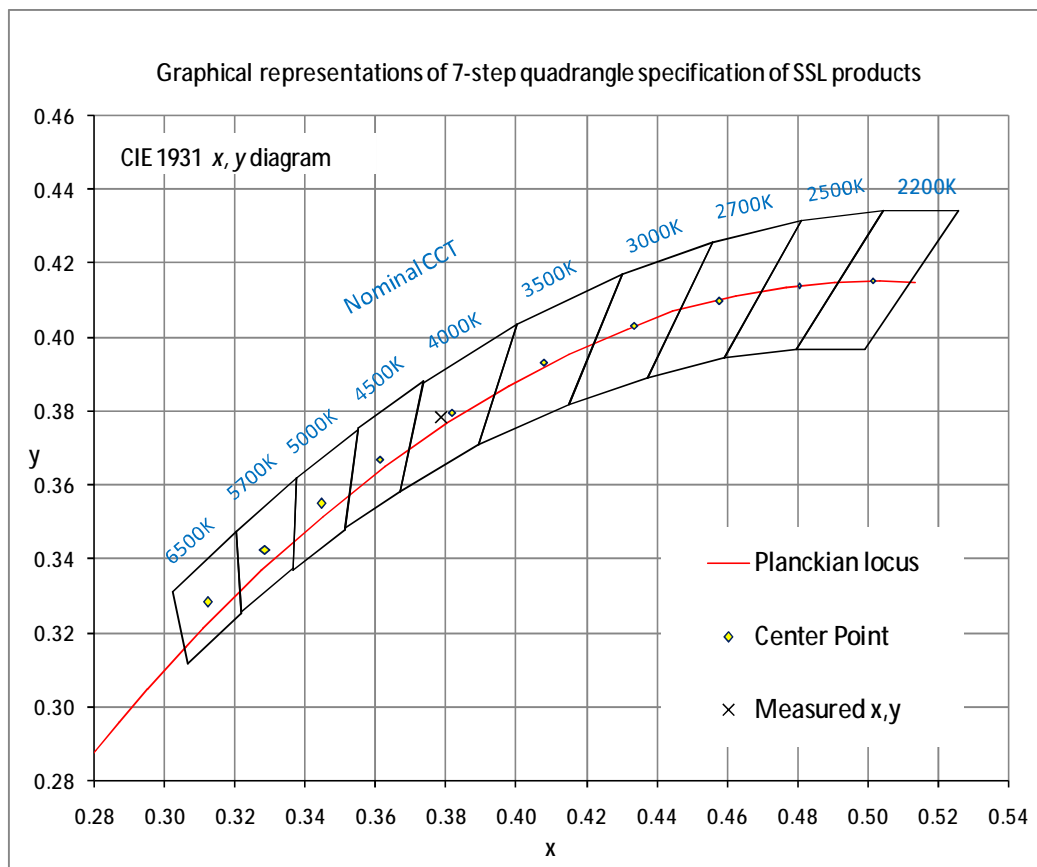
Note: N.A.

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 w/Sides
Spacing Criteria (0-180)	1.06	Luminous Length	1.20 m
Spacing Criteria (90-270)	1.06	Luminous Width	0.13 m
Spacing Criteria (Diagonal)	1.18	Luminous Height	0.04 m
Test Distance	29.79 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	463.91	13.30	13.30
0-30	938.91	27.00	27.00
0-40	1460.41	42.00	42.00
0-60	2392.64	68.80	68.80
0-80	3006.1	86.40	86.40
0-90	3160.83	90.90	90.90
10-90	3035.76	87.30	87.30
20-40	996.50	28.70	28.70
20-50	1497.18	43.10	43.10
40-70	1281.67	36.90	36.90
60-80	613.46	17.60	17.60
70-80	264.02	7.60	7.60
80-90	154.72	4.40	4.40
90-110	156.45	4.50	4.50
90-120	212.05	6.10	6.10
90-130	254.01	7.30	7.30
90-150	301.19	8.70	8.70
90-180	316.47	9.10	9.10
110-180	160.02	4.60	4.60
0-180	3477.29	100.00	100.00

Total Luminaire Efficiency = 100.00%

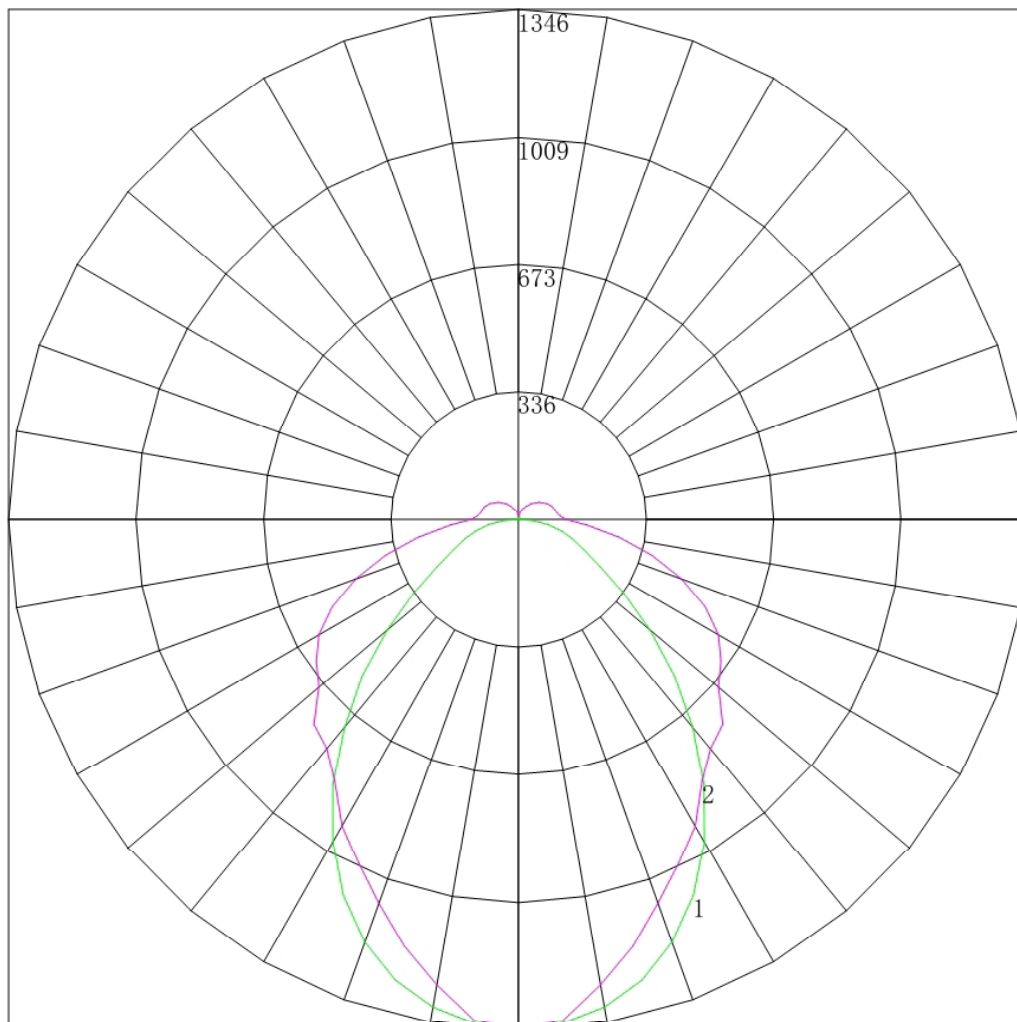
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	125.07
10-20	338.84
20-30	475.00
30-40	521.50
40-50	500.69
50-60	431.55
60-70	349.44
70-80	264.02
80-90	154.72
90-100	87.08
100-110	69.36
110-120	55.61
120-130	41.96
130-140	29.00
140-150	18.18
150-160	10.04
160-170	4.35
170-180	0.89



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4.5 Polar Curves



Maximum Candela = 1345.76 Located At Horizontal Angle = 0, Vertical Angle = 0

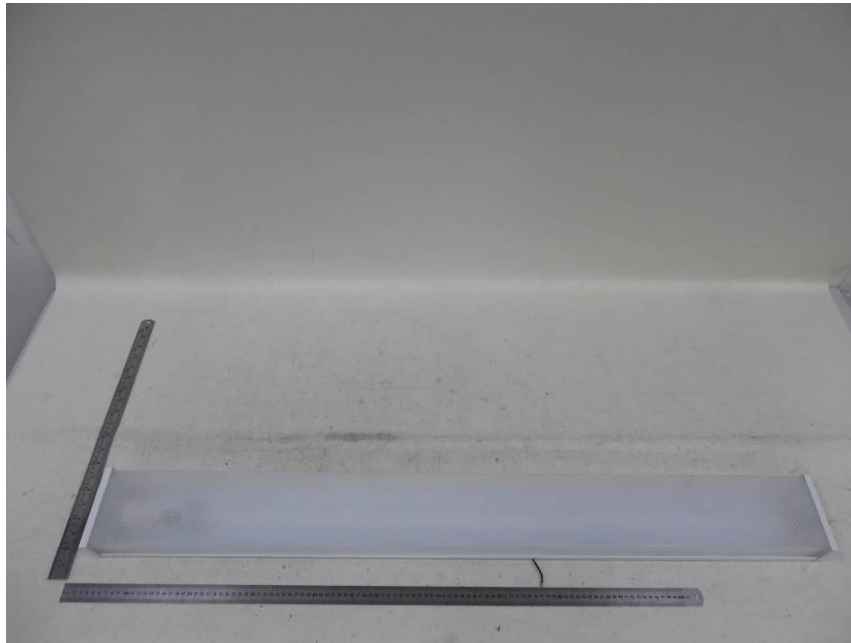
1 - Vertical Plane Through Horizontal Angles (0 - 180)

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

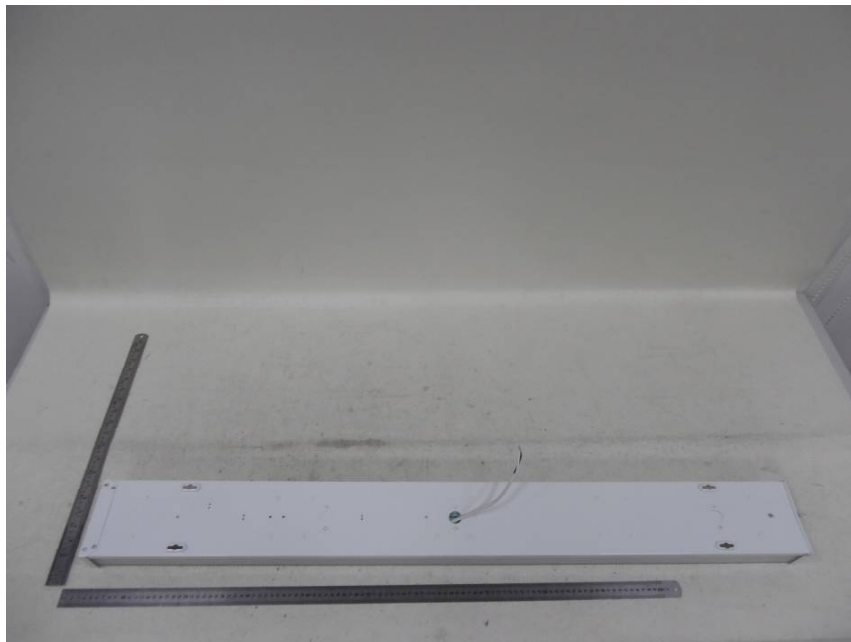
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	1345.760	1345.760	1345.760	1345.760	1345.760	1345.760	1345.760
5	1333.760	1331.064	1325.190	1327.155	1327.566	1322.690	1327.202
10	1304.871	1306.354	1293.272	1273.289	1255.692	1249.800	1244.603
15	1256.427	1251.566	1225.724	1199.895	1175.650	1162.865	1163.721
20	1185.317	1176.538	1139.330	1109.413	1094.194	1082.830	1077.140
25	1092.874	1075.673	1043.656	1020.986	1003.703	1001.225	999.441
30	980.876	968.347	936.453	918.521	915.170	922.083	932.329
35	852.877	846.554	822.598	810.559	826.414	837.605	844.923
40	714.657	714.962	705.202	719.908	741.652	764.216	788.058
45	582.659	591.383	593.151	632.104	674.891	741.400	762.893
50	451.994	474.267	481.547	538.768	619.894	668.685	687.909
55	338.218	364.717	382.749	458.296	561.344	617.931	651.742
60	246.663	272.092	302.575	394.011	494.563	567.826	608.441
65	190.220	209.081	243.214	342.809	428.218	511.295	542.627
70	150.220	172.566	208.661	298.471	379.654	439.010	456.077
75	117.776	137.387	179.869	263.213	325.734	357.857	364.183
80	78.666	105.545	149.301	211.991	264.917	279.149	270.125
85	39.111	70.364	110.763	159.435	195.022	189.783	180.944
90	2.667	36.742	73.548	111.760	135.557	128.135	125.356
95	1.778	32.512	63.359	95.129	113.150	110.632	109.492
100	1.778	29.173	55.603	84.040	99.842	103.540	102.875
105	1.778	26.278	49.401	74.731	92.302	98.885	99.786
110	1.778	23.382	44.526	66.966	85.426	94.228	96.253
115	1.778	20.487	39.431	60.761	78.550	89.573	91.838
120	2.222	18.261	35.444	55.883	72.114	82.924	85.660
125	2.667	16.256	31.679	50.782	65.901	75.386	78.596
130	2.667	14.698	27.913	44.574	59.245	67.625	71.088
135	2.667	13.140	24.589	39.253	53.257	60.750	62.701
140	3.111	12.025	22.374	34.152	46.157	53.878	55.640
145	4.000	10.912	20.380	29.494	39.277	46.340	48.572
150	4.000	10.022	18.388	25.723	33.508	38.358	40.181
155	4.889	8.908	16.173	22.842	29.071	32.817	33.999
160	5.778	8.239	13.735	19.071	24.410	27.716	28.701
165	6.667	7.348	12.183	15.300	19.085	22.174	22.963
170	7.555	7.571	8.860	11.749	13.536	15.520	16.338
175	7.555	7.571	7.531	7.762	8.211	8.869	9.274
180	7.984	7.984	7.984	7.984	7.984	7.984	7.984

Appendix 1 Product Photo



Picture 1



Picture 2

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