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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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For products:

High Bay Luminaires for Commercial and Industrial Buildings

Models No.:

LT-GK-UFO-100W-30K

Test Date: Mar. 30, 2018 to Apr. 3, 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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Test Note:

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1. General

1.1 Product Information

Brand Name	LI-TIAN LIGHTING
Category	Indoor
General Application	High Bay
Product Type	High Bay Luminaires for Commercial and Industrial Buildings
Model Number	LT-GK-UFO-100W-30K
Rated Inputs	100-277V, 50/60Hz
Rated Power	100W
Rated Light output	12000lm
Declared CCT	3000K
Power Supply	N/A
LED Package, Array or Module	Model: JB3030 6-V, manufactured by Cree, Inc.
Receipt Samples	1 unit
Sample Code of lab.	180329101019+3000K PCB
Date of Receipt Samples	Mar. 29, 2018
Note	-



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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 (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-011	D204C	2017-09-07	2018-09-06
Luminous Flux Standard Lamp	LC-PL-I-003	24V100W	2017-09-22	2018-09-21
Goniophotometer(with mirror)	LC-I-902	GMS2000	2017-05-07	2018-05-06
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

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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$; 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	120.06V~60Hz	120.01V~60Hz
Input Current(A)	0.823	0.822
Total Power(W)	98.72	98.51
Power Factor	0.999	0.999
I-THD	3.95%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	11840.50
Luminaire Efficacy(Lm/W)	-	120.20
Correlated Color Temperature (CCT)(K)	3041	-
Color Rendering Index (CRI)	71.9	-
R9	-18	-
Chromaticity Coordinate (x,y)	x=0.4344 y=0.4038	-
Chromaticity Coordinate (u,v)	u=0.2491 v=0.3473	-
Chromaticity Coordinate (u',v')	u'=0.2491 v'=0.5209	-
Duv	0.00023	-
Zone Lumens between 20-50 °	-	53.10%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
70	80	87	70	67	70	80	51
R9	R10	R11	R12	R13	R14	R15	-
-18	51	64	42	71	92	64	-

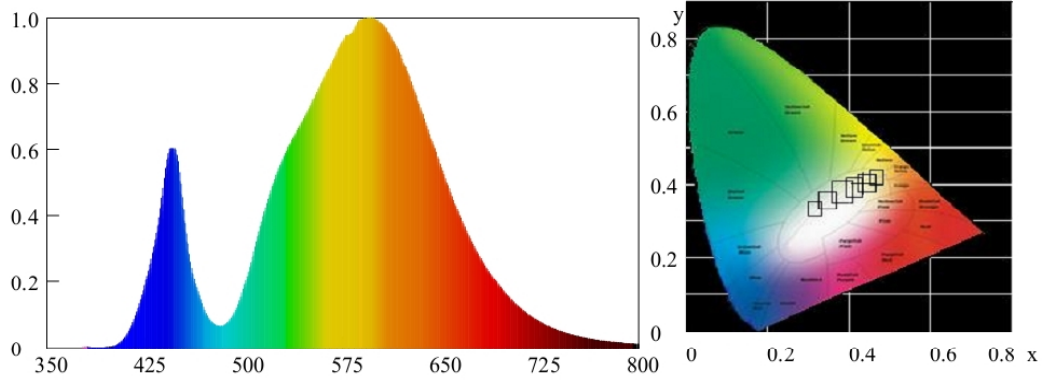
3.4 Additional test at 277V

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.07V~60Hz	-
Power Factor	0.942	-
I-THD	9.96%	-

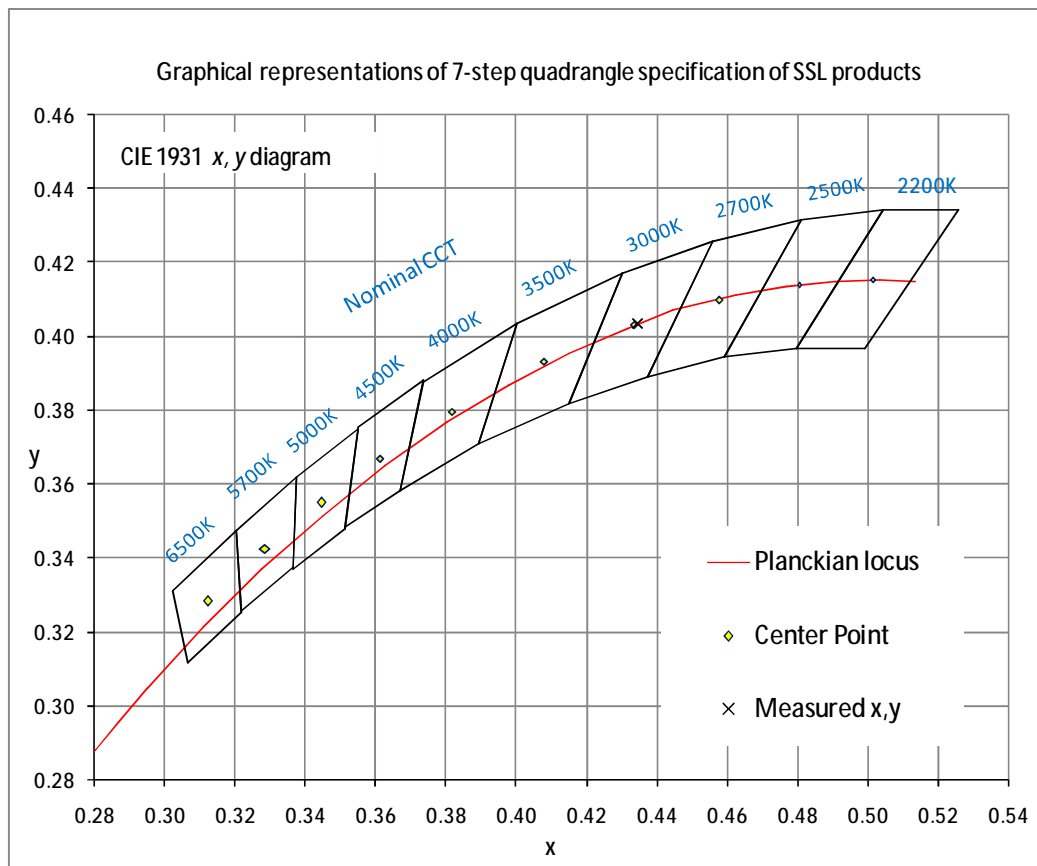
Note: N.A.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram





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4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Circular
Spacing Criteria (0-180)	1.28	Luminous Length	0.19 m (Diameter)
Spacing Criteria (90-270)	1.30	Luminous Width	0.19 m (Diameter)
Spacing Criteria (Diagonal)	1.36	Luminous Height	0.00 m
Test Distance	29.79 m	-	-

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	1632.36	13.80	13.80
0-30	3485.18	29.40	29.40
0-40	5707.56	48.20	48.20
0-60	9847.99	83.20	83.20
0-80	11734.15	99.10	99.10
0-90	11808.42	99.70	99.70
10-90	11387.81	96.20	96.20
20-40	4075.2	34.40	34.40
20-50	6290.9	53.10	53.10
40-70	5467.09	46.20	46.20
60-80	1886.16	15.90	15.90
70-80	559.51	4.70	4.70
80-90	74.27	0.60	0.60
90-110	5.83	0.00	0.00
90-120	9.29	0.10	0.10
90-130	13.17	0.10	0.10
90-150	21.16	0.20	0.20
90-180	32.07	0.30	0.30
110-180	26.24	0.20	0.20
0-180	11840.49	100.00	100.00

Total Luminaire Efficiency = 100.00%

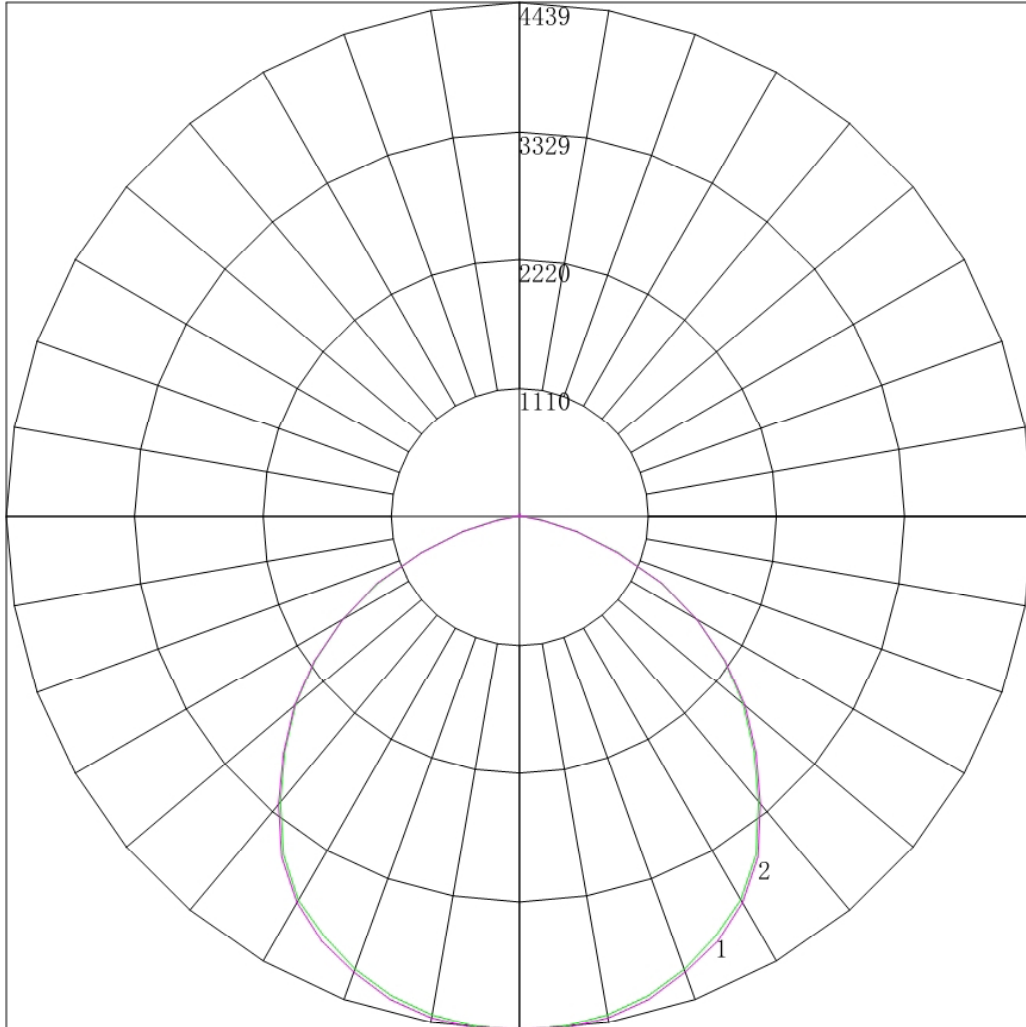
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	420.61
10-20	1211.75
20-30	1852.82
30-40	2222.38
40-50	2215.71
50-60	1924.72
60-70	1326.65
70-80	559.51
80-90	74.27
90-100	2.63
100-110	3.20
110-120	3.46
120-130	3.88
130-140	3.70
140-150	4.29
150-160	4.87
160-170	4.30
170-180	1.74



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4.5 Polar Curves



Maximum Candela = 4439.286 Located At Horizontal Angle = 90, Vertical Angle = 5

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

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



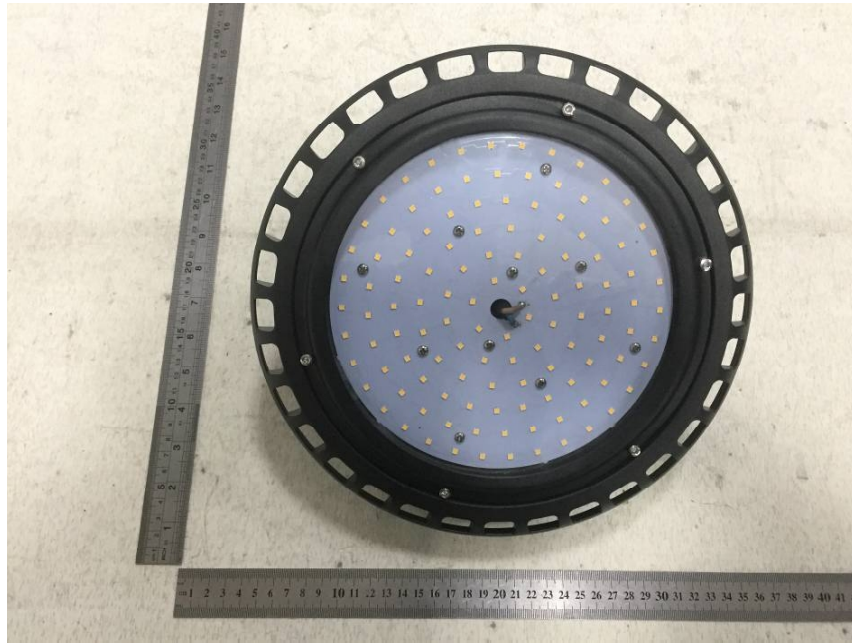
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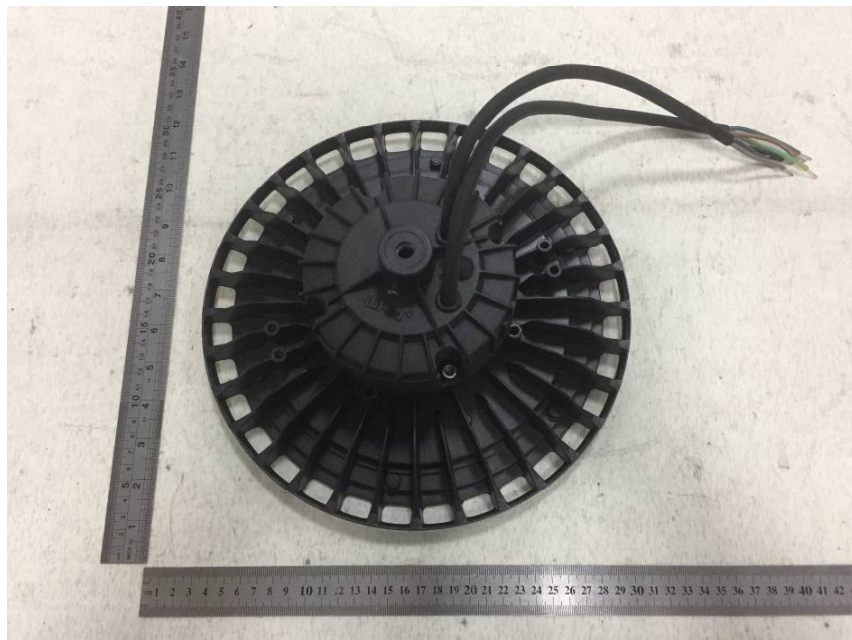
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	4436.143	4436.143	4436.143	4436.143	4436.143	4436.143	4436.143
5	4422.826	4414.201	4420.392	4422.839	4420.398	4420.411	4439.286
10	4370.448	4367.208	4374.675	4375.635	4374.938	4379.832	4397.569
15	4286.999	4282.951	4288.765	4291.605	4295.764	4288.207	4319.453
20	4163.156	4163.017	4171.557	4170.115	4177.105	4176.843	4191.252
25	4004.691	4006.035	4018.831	4015.784	4020.081	4025.957	4049.309
30	3826.251	3824.894	3829.703	3832.214	3832.013	3839.833	3852.337
35	3563.029	3562.127	3569.771	3570.156	3572.767	3574.755	3592.323
40	3214.583	3202.719	3211.234	3209.410	3219.879	3213.543	3239.745
45	2869.244	2858.650	2864.953	2863.749	2871.673	2876.975	2890.753
50	2524.793	2518.299	2517.993	2517.621	2522.366	2520.471	2541.677
55	2164.362	2154.006	2155.486	2155.571	2159.738	2160.596	2168.246
60	1768.642	1759.057	1769.244	1771.374	1764.194	1761.628	1767.721
65	1347.177	1336.579	1347.208	1347.998	1348.033	1353.222	1357.696
70	908.402	909.438	900.728	896.667	901.361	903.788	902.209
75	509.486	505.768	516.497	505.782	513.529	510.065	510.282
80	205.384	204.427	201.501	200.426	196.311	197.104	199.138
85	37.242	37.001	35.865	36.163	33.259	32.199	34.046
90	3.196	3.015	2.796	2.547	2.460	2.349	2.575
95	2.219	2.239	2.175	2.150	2.129	2.129	2.180
100	2.708	2.661	2.664	2.616	2.572	2.618	2.668
105	3.152	3.082	3.108	3.060	2.994	3.084	2.979
110	3.373	3.304	3.307	3.370	3.327	3.283	3.378
115	3.329	3.437	3.418	3.392	3.460	3.416	3.422
120	3.817	3.791	3.774	3.813	3.770	3.749	3.775
125	4.439	4.412	4.462	4.390	4.413	4.393	4.481
130	4.705	4.700	4.684	4.745	4.702	4.725	4.744
135	4.439	4.501	4.506	4.501	4.502	4.526	4.566
140	5.371	5.366	5.394	5.410	5.456	5.435	5.408
145	6.925	6.873	6.859	6.895	6.942	6.900	7.003
150	8.301	8.270	8.302	8.270	8.295	8.320	8.288
155	10.520	10.487	10.589	10.465	10.579	10.560	10.592
160	13.139	13.170	13.141	13.214	13.174	13.178	13.295
165	15.447	15.476	15.495	15.542	15.503	15.574	15.601
170	17.045	17.050	17.093	17.117	17.077	17.127	17.154
175	18.643	18.691	18.602	18.624	18.674	18.702	18.710
180	19.799	19.799	19.799	19.799	19.799	19.799	19.799

Appendix 1 Product Photo



Picture 1



Picture 2

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