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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-150W-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-150W-30K
Rated Inputs	100-277V, 50/60Hz
Rated Power	150W
Rated Light output	18000lm
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.	180329101020+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.



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3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	119.98V~60Hz	120.04V~60Hz
Input Current(A)	1.306	1.311
Total Power(W)	156.66	157.34
Power Factor	1.000	1.000
I-THD	2.34%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	18972.98
Luminaire Efficacy(Lm/W)	-	120.59
Correlated Color Temperature (CCT)(K)	3056	-
Color Rendering Index (CRI)	71.8	-
R9	-19	-
Chromaticity Coordinate (x,y)	x=0.4332 y=0.4031	-
Chromaticity Coordinate (u,v)	u=0.2486 v=0.3470	-
Chromaticity Coordinate (u',v')	u'=0.2486 v'=0.5204	-
Duv	0.00013	-
Zone Lumens between 20-50 °	-	52.70%

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	-
-19	51	64	43	71	92	64	-

3.4 Additional test at 277V

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	276.99V~60Hz	-
Power Factor	0.960	-
I-THD	5.90%	-

Note: N.A.

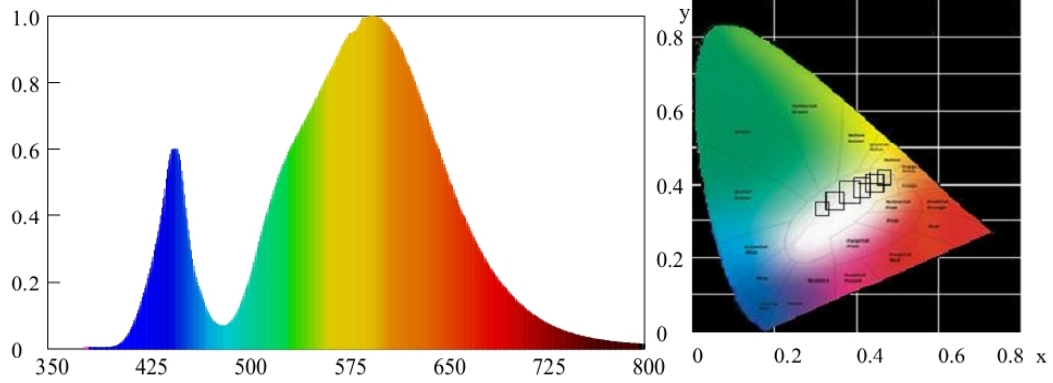


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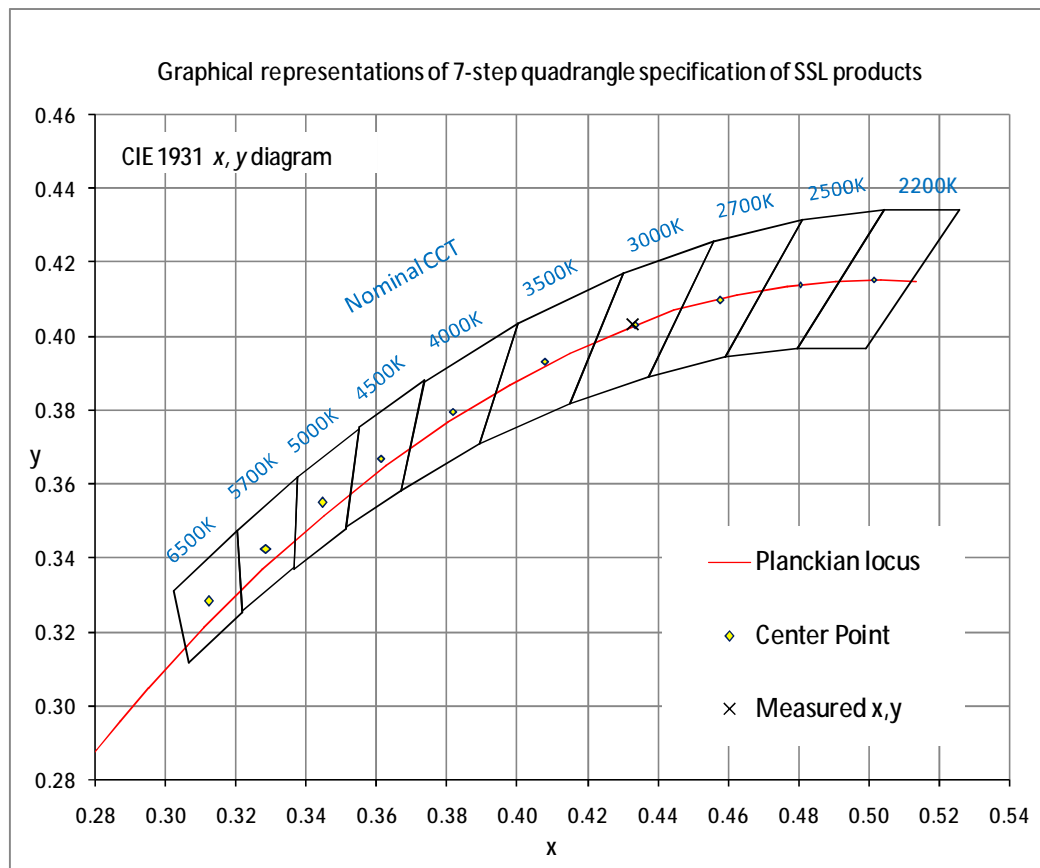


4. Test Data

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)	1.30	Luminous Length	0.24 m (Diameter)
Spacing Criteria (90-270)	1.30	Luminous Width	0.24 m (Diameter)
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	2540.16	13.40	13.40
0-30	5429.3	28.60	28.60
0-40	8952.83	47.20	47.20
0-60	15672.24	82.60	82.60
0-80	18788.75	99.00	99.00
0-90	18916.9	99.70	99.70
10-90	18262.75	96.30	96.30
20-40	6412.67	33.80	33.80
20-50	10007.15	52.70	52.70
40-70	8895.8	46.90	46.90
60-80	3116.5	16.40	16.40
70-80	940.11	5.00	5.00
80-90	128.16	0.70	0.70
90-110	9.98	0.10	0.10
90-120	16.07	0.10	0.10
90-130	22.96	0.10	0.10
90-150	37.16	0.20	0.20
90-180	56.07	0.30	0.30
110-180	46.08	0.20	0.20
0-180	18972.97	100.00	100.00

Total Luminaire Efficiency = 100.00%

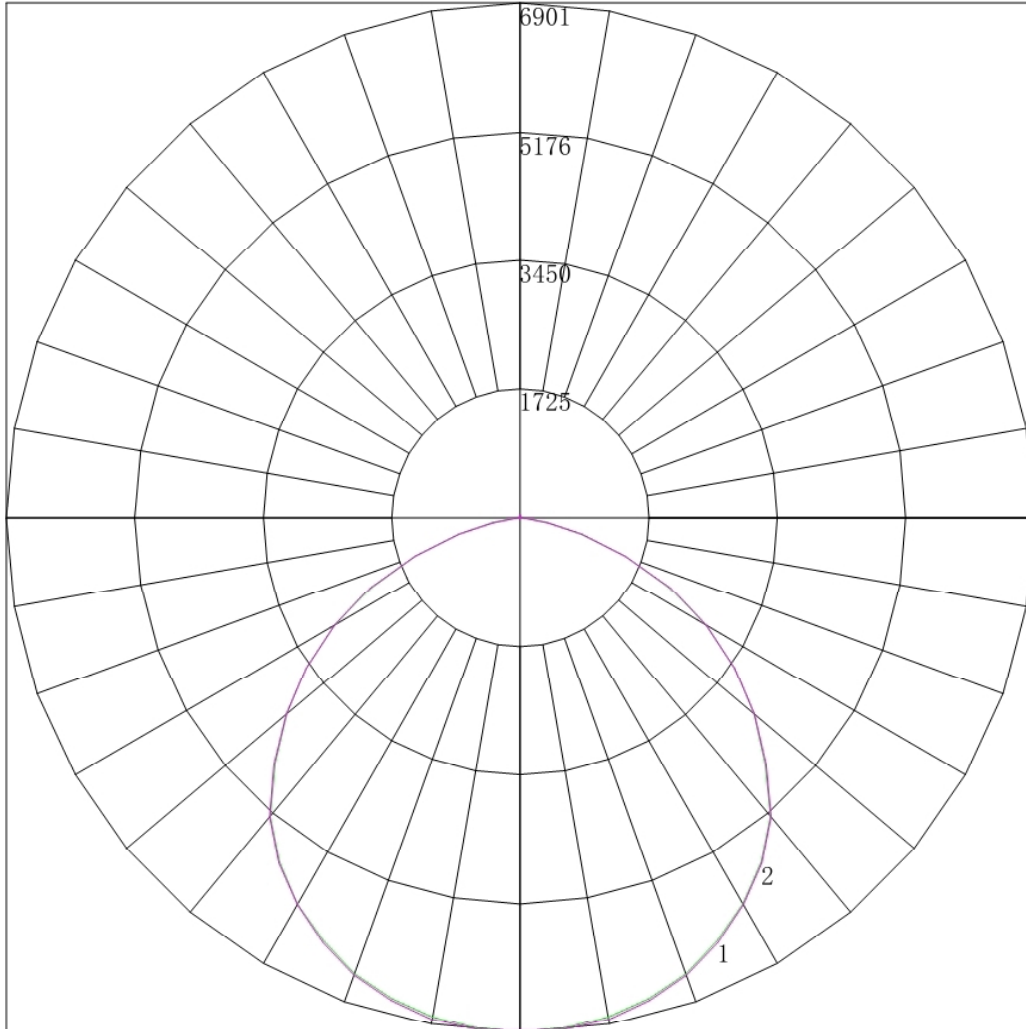
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	654.17
10-20	1885.99
20-30	2889.14
30-40	3523.53
40-50	3594.48
50-60	3124.93
60-70	2176.4
70-80	940.11
80-90	128.16
90-100	4.35
100-110	5.63
110-120	6.09
120-130	6.89
130-140	6.59
140-150	7.62
150-160	8.53
160-170	7.39
170-180	2.98



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4.5 Polar Curves



Maximum Candela = 6900.891 Located At Horizontal Angle = 0, Vertical Angle = 0

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

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



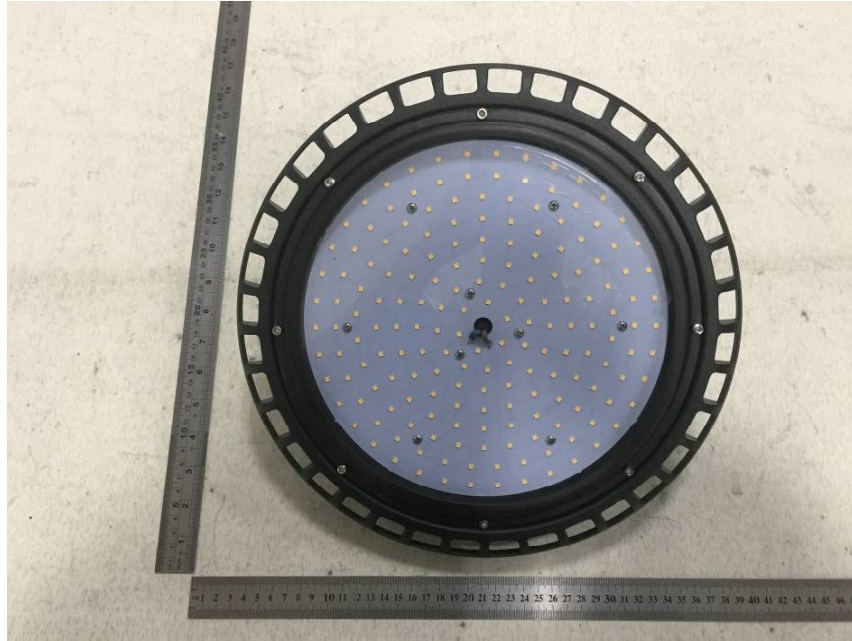
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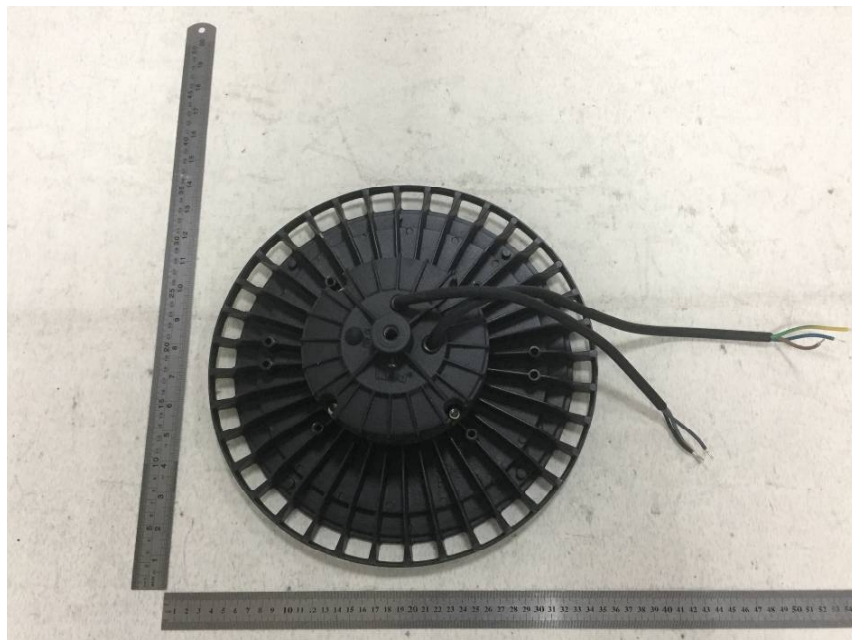
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	6900.891	6900.891	6900.891	6900.891	6900.891	6900.891	6900.891
5	6875.129	6872.733	6875.371	6877.620	6876.045	6875.166	6894.277
10	6799.617	6800.452	6806.127	6804.480	6802.828	6803.525	6828.643
15	6669.914	6674.513	6676.070	6671.940	6677.895	6679.984	6700.898
20	6502.455	6493.810	6498.966	6491.971	6511.702	6503.211	6523.487
25	6255.043	6259.450	6267.048	6267.451	6269.390	6267.002	6284.432
30	5977.426	5978.304	5976.741	5983.977	5982.253	5980.224	5989.476
35	5635.847	5639.067	5648.063	5635.786	5638.995	5635.561	5652.870
40	5225.861	5213.582	5228.164	5223.760	5219.180	5212.162	5240.340
45	4649.751	4642.869	4660.444	4646.620	4649.772	4656.112	4673.555
50	4090.075	4072.821	4087.844	4089.647	4089.708	4087.873	4103.763
55	3511.743	3500.336	3504.835	3494.551	3505.486	3502.569	3512.605
60	2872.558	2872.638	2866.967	2862.221	2893.274	2878.661	2885.517
65	2198.282	2217.227	2213.600	2217.259	2224.505	2207.073	2224.662
70	1493.935	1497.003	1497.155	1491.750	1484.498	1485.302	1506.384
75	847.376	851.170	859.868	849.580	843.003	856.310	851.274
80	370.763	373.227	375.234	370.067	370.248	369.994	375.259
85	48.816	46.939	47.716	48.295	48.682	47.618	47.909
90	3.465	3.459	3.440	3.413	3.439	3.393	3.421
95	3.953	3.880	3.973	3.879	3.927	3.881	3.999
100	4.664	4.701	4.683	4.699	4.660	4.658	4.708
105	5.419	5.410	5.415	5.408	5.414	5.367	5.463
110	5.819	5.876	5.793	5.785	5.769	5.811	5.907
115	5.997	5.987	6.037	5.962	5.991	5.988	6.039
120	6.796	6.718	6.747	6.716	6.746	6.698	6.791
125	7.907	7.849	7.834	7.802	7.833	7.874	7.895
130	8.351	8.292	8.300	8.311	8.321	8.317	8.380
135	7.995	8.049	7.990	8.001	8.032	8.051	8.113
140	9.728	9.667	9.721	9.752	9.697	9.715	9.709
145	12.260	12.195	12.184	12.212	12.226	12.221	12.279
150	14.614	14.656	14.648	14.672	14.623	14.727	14.762
155	18.478	18.447	18.421	18.418	18.550	18.453	18.485
160	22.876	22.860	22.926	22.895	22.855	22.911	23.050
165	26.562	26.540	26.610	26.530	26.561	26.637	26.686
170	29.228	29.179	29.185	29.234	29.268	29.255	29.260
175	32.115	32.128	32.026	32.115	32.152	32.116	32.324
180	33.889	33.889	33.889	33.889	33.889	33.889	33.889

Appendix 1 Product Photo



Picture 1



Picture 2

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