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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-006-200W-30K

Test Date: Apr. 10, 2018 to Apr. 11, 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	LI-TIAN LIGHTING
Category	Indoor
General Application	High Bay
Product Type	High Bay Luminaires for Commercial and Industrial Buildings
Model Number	LT-GK-006-200W-30K
Rated Inputs	100-277V, 50/60Hz
Rated Power	200W
Rated Light output	24000lm
Declared CCT	3000K
Power Supply	N/A
LED Package, Array or Module	Model: 2835 0.5W White SMD LED, manufactured by Wincens Optoelectronics (Shenzhen)co.,Ltd
Receipt Samples	1 unit
Sample Code of lab.	180329101011+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	120.09V~60Hz	119.97V~60Hz
Input Current(A)	1.632	1.627
Total Power(W)	195.47	194.60
Power Factor	0.997	0.997
I-THD	5.74%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	23605.82
Luminaire Efficacy(Lm/W)	-	121.30
Correlated Color Temperature (CCT)(K)	2951	-
Color Rendering Index (CRI)	82.4	-
R9	7	-
Chromaticity Coordinate (x,y)	x=0.4371 y=0.3985	-
Chromaticity Coordinate (u,v)	u=0.2531 v=0.3461	-
Chromaticity Coordinate (u',v')	u'=0.2531 v'=0.5192	-
Duv	-0.00225	-
Zone Lumens between 20-50 °	-	47.70%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
82	93	94	79	82	92	80	57
R9	R10	R11	R12	R13	R14	R15	-
7	84	78	73	85	97	74	-

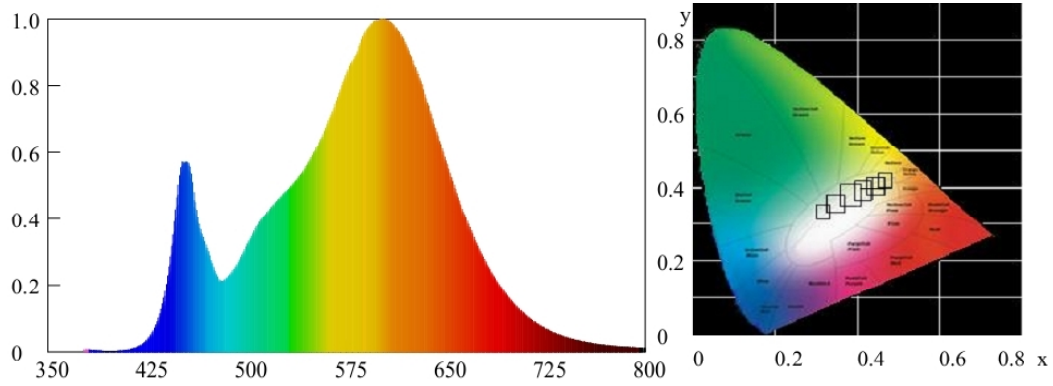
3.4 Additional test at 277V

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.00V~60Hz	-
Power Factor	0.945	-
I-THD	11.93%	-

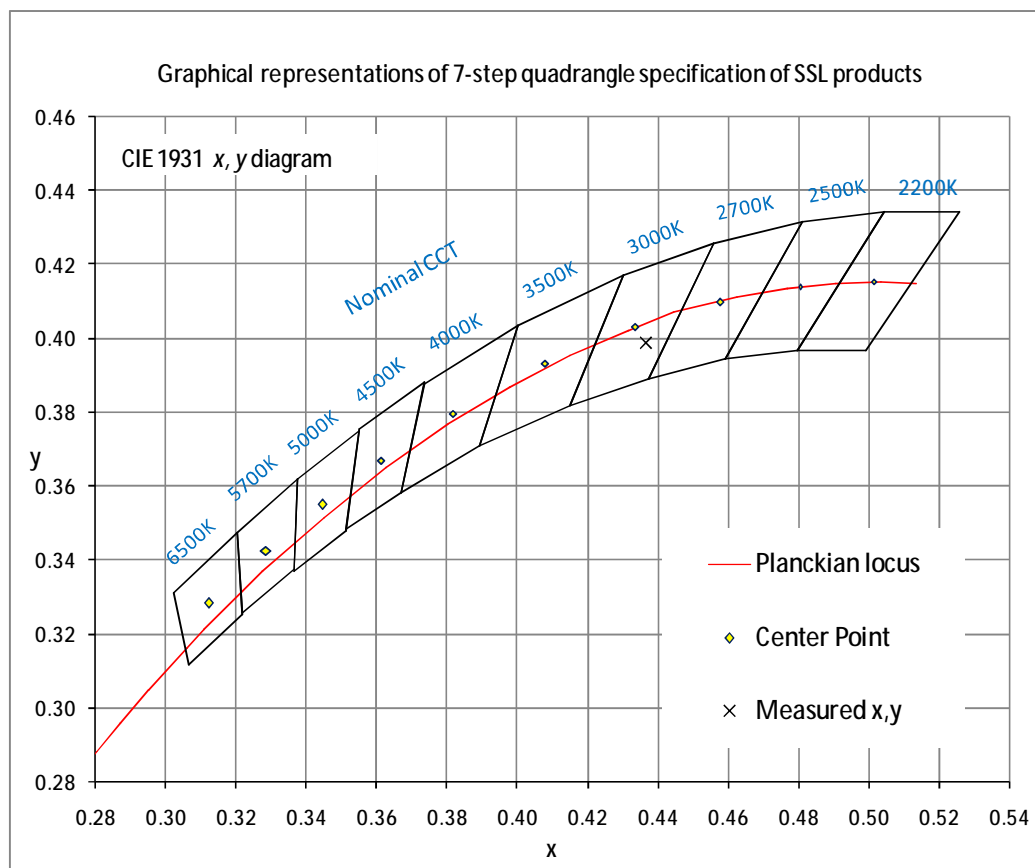
Note: N.A.

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	Rectangular w/Sides
Spacing Criteria (0-180)	1.20	Luminous Length	0.58 m
Spacing Criteria (90-270)	1.28	Luminous Width	0.39 m
Spacing Criteria (Diagonal)	1.36	Luminous Height	0.02 m
Test Distance	29.79 m	-	-

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	2973.16	12.60	12.60
0-30	6279.15	26.60	26.60
0-40	10212.72	43.30	43.30
0-60	17861.68	75.70	75.70
0-80	22407.98	94.90	94.90
0-90	23117.49	97.90	97.90
10-90	22345.49	94.70	94.70
20-40	7239.56	30.70	30.70
20-50	11266.8	47.70	47.70
40-70	10458.04	44.30	44.30
60-80	4546.3	19.30	19.30
70-80	1737.22	7.40	7.40
80-90	709.51	3.00	3.00
90-110	278.84	1.20	1.20
90-120	338.00	1.40	1.40
90-130	379.69	1.60	1.60
90-150	438.16	1.90	1.90
90-180	488.34	2.10	2.10
110-180	209.50	0.90	0.90
0-180	23605.83	100.00	100.00

Total Luminaire Efficiency = 100.00%

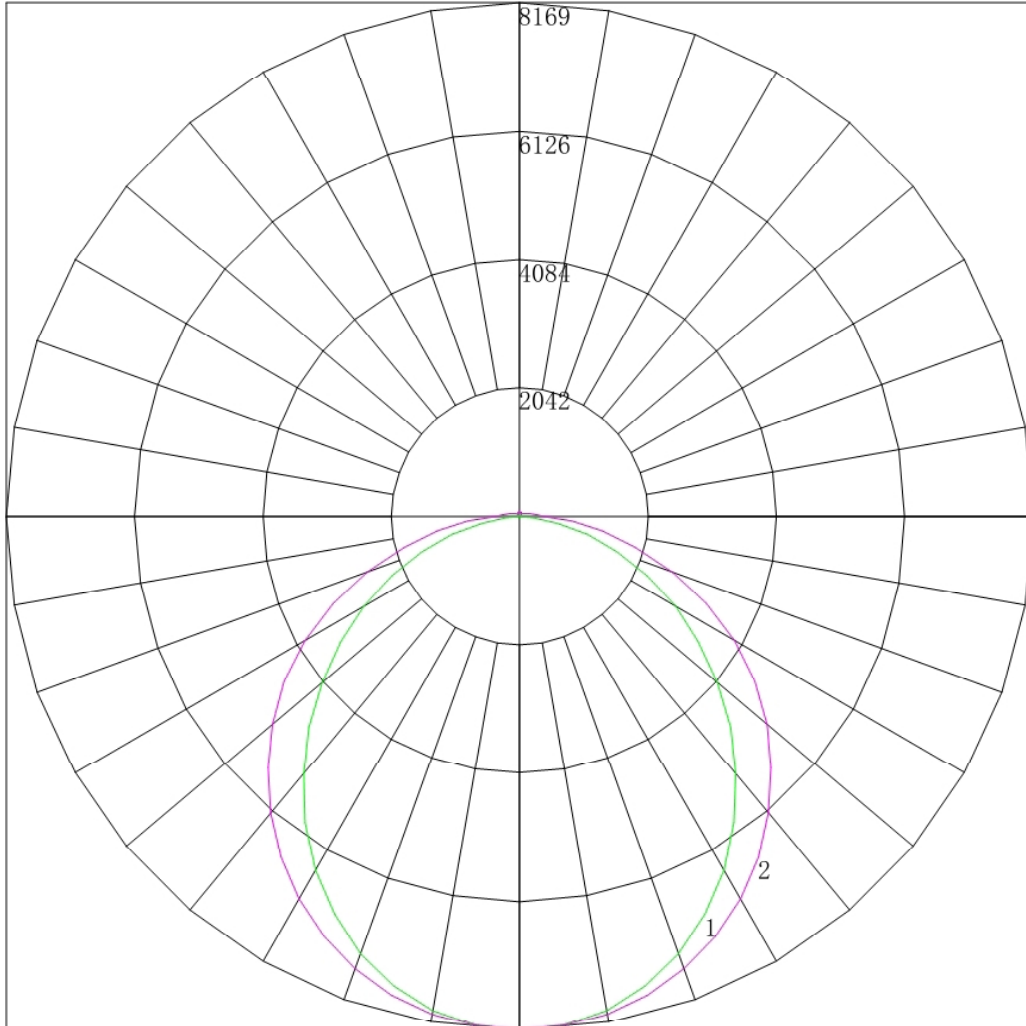
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	772.01
10-20	2201.15
20-30	3305.99
30-40	3933.57
40-50	4027.25
50-60	3621.71
60-70	2809.08
70-80	1737.22
80-90	709.51
90-100	180.29
100-110	98.55
110-120	59.16
120-130	41.69
130-140	30.18
140-150	28.29
150-160	26.55
160-170	17.67
170-180	5.96



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4.5 Polar Curves



Maximum Candela = 8168.536 Located At Horizontal Angle = 0, Vertical Angle = 0

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

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



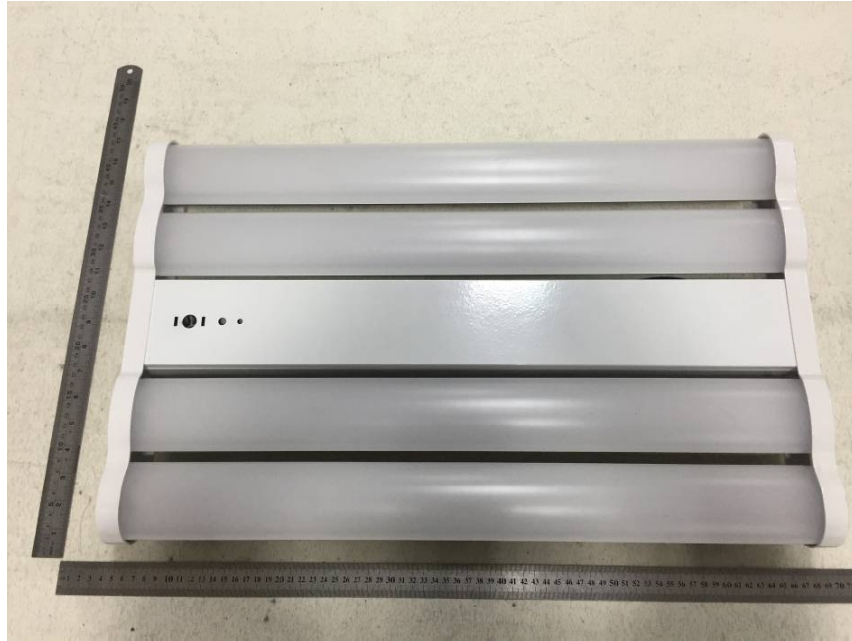
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4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	8168.536	8168.536	8168.536	8168.536	8168.536	8168.536	8168.536
5	8121.467	8120.577	8123.285	8129.333	8133.786	8136.802	8131.608
10	7972.271	7973.593	7991.083	8007.513	8023.776	8035.605	8039.479
15	7725.830	7740.017	7770.156	7805.515	7838.510	7864.726	7878.349
20	7397.685	7417.180	7465.604	7526.659	7584.631	7633.918	7652.671
25	6976.736	7013.083	7082.752	7180.027	7271.197	7340.322	7369.116
30	6498.951	6537.935	6644.224	6769.165	6884.062	6975.703	7026.371
35	5949.674	5998.399	6135.161	6299.828	6445.136	6564.251	6617.291
40	5348.446	5422.670	5582.398	5788.852	5970.799	6105.530	6160.133
45	4746.773	4822.518	4998.807	5235.792	5450.848	5612.651	5656.677
50	4103.362	4187.952	4401.235	4659.698	4895.266	5065.611	5139.856
55	3469.274	3557.829	3796.127	4087.812	4333.722	4495.040	4570.966
60	2856.057	2957.235	3195.233	3498.649	3737.201	3900.287	3947.315
65	2240.175	2351.089	2617.848	2911.702	3128.714	3255.171	3272.484
70	1648.982	1772.635	2068.634	2328.741	2494.337	2557.440	2581.602
75	1121.908	1255.495	1550.192	1731.738	1847.491	1883.323	1899.837
80	614.683	800.105	1039.042	1187.694	1270.065	1326.547	1327.554
85	227.348	412.533	568.731	703.672	781.593	824.439	828.383
90	9.014	73.669	167.980	249.154	339.861	362.020	395.087
95	8.703	31.927	99.616	171.588	226.369	259.894	270.800
100	12.122	22.025	68.141	126.891	174.862	204.946	214.484
105	14.254	14.099	48.444	94.133	134.997	160.738	169.968
110	19.715	16.164	39.682	71.120	103.677	126.052	133.507
115	23.179	18.829	28.015	56.812	79.838	97.890	104.526
120	26.420	26.710	25.708	51.541	67.134	78.405	82.668
125	30.106	34.748	27.194	34.353	62.086	70.194	73.052
130	30.994	35.636	28.015	34.818	41.104	61.494	65.397
135	32.814	37.879	32.984	33.268	38.978	40.235	42.202
140	38.187	43.274	42.411	35.483	39.244	42.565	43.716
145	44.049	47.959	50.995	43.921	40.838	42.432	43.094
150	48.578	51.956	53.790	55.350	48.809	44.540	44.606
155	53.906	54.864	57.295	63.656	62.618	57.877	57.330
160	52.707	54.664	59.313	64.830	68.085	70.483	71.226
165	54.350	54.886	57.583	62.726	66.205	68.840	72.252
170	59.057	59.682	59.313	61.131	63.527	63.514	61.212
175	63.142	63.545	63.727	62.704	62.773	61.761	59.251
180	65.128	65.128	65.128	65.128	65.128	65.128	65.128

Appendix 1 Product Photo



Picture 1



Picture 2

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