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LCTECH (ZHONGSHAN) TESTING SERVICE CO., LTD. *LABORATORY*

Test report of

IES LM-79-08

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

Rendered to:

Zhongshan Litian Lighting Co., Ltd.
Block B 4/F, No.2 Yihui NO.2 Road Maohui Industry, Sisha, Henglan Town, Zhongshan City, Guangdong Provice, China 528478

For products:

High Bay Luminaires for Commercial and Industrial Buildings

Models No.:
LT-GK-006-140W-40K

Test Date:	Aug. 17, 2018
Test Item:	Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd** 2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China Tel:+86-760-22833366 Fax:+86-760-22833399 E-mail:Service@lccert.com http://www.lccert.com
Template No.:	LC-RT-PL-001 Rev.1.1
Test Note:	

Complied by:	**Reviewed by:**
Kargel Yuan	**Richard Li**
Project Engineer	**Technical Manager**
Aug. 22, 2018	**Aug. 22, 2018**

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1. General

1.1 Product Information

Brand Name	LI-TIAN LIGHTING
Product Type	High Bay Luminaires for Commercial and Industrial Buildings
Model Number	LT-GK-006-140W-40K
Rated Inputs	100-277VAC, 50/60Hz
Rated Power	140W
Rated Light output	18200lm
Declared CCT	4000K
Power Supply	SS-150E-38B
LED Package, Array or Module	Model: JK3030AWT-00-0000-000B0HH422E, manufactured by Cree, Inc.
Receipt Samples	1 unit
Sample Code of lab.	180813112001+4000K PCB
Date of Receipt Samples	Aug. 13, 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	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	2018-08-08	2019-08-07
Photometric colorimetric electric system[1] (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp[2]	LC-PL-I-011	D204C	2017-09-07	2018-09-06
Luminous Flux Standard Lamp[3]	LC-PL-I-003	24V100W	2017-09-22	2018-09-21
Goniophotometer(with mirror)	LC-I-902	GMS2000	2018-05-07	2019-05-06
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

Note:

1, Bandwidth of spectroradiometer is 1 nm.

2, halogen lamp, 100W, omni-directional type, and its traceability to NIM.

3, halogen lamp, 100W, omni-directional type, and its traceability to NIM.

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°C ± 1°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	120.00 V~60Hz	119.96 V~60Hz
Input Current(A)	1.161	1.160
Total Power(W)	138.90	138.62
Power Factor	0.997	0.996
I-THD	4.74 %	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-****	20426.50
Luminaire Efficacy(Lm/W)	-	147.36
Correlated Color Temperature (CCT)(K)	3957	-
Color Rendering Index (CRI)	74.7	-
R9	-11	-
Chromaticity Coordinate (x,y)	x = 0.3833 y = 0.3813	-
Chromaticity Coordinate (u,v)	u = 0.2252 v = 0.3360	-
Chromaticity Coordinate (u',v')	u' = 0.2252 v' = 0.5040	-
Duv	0.00129	-
Zone Lumens between 20-50 °	-	46.16%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
73	81	86	73	71	71	84	59
R9	R10	R11	R12	R13	R14	R15	-
-11	52	68	41	74	91	68	-

3.4 Electrical data on 277V

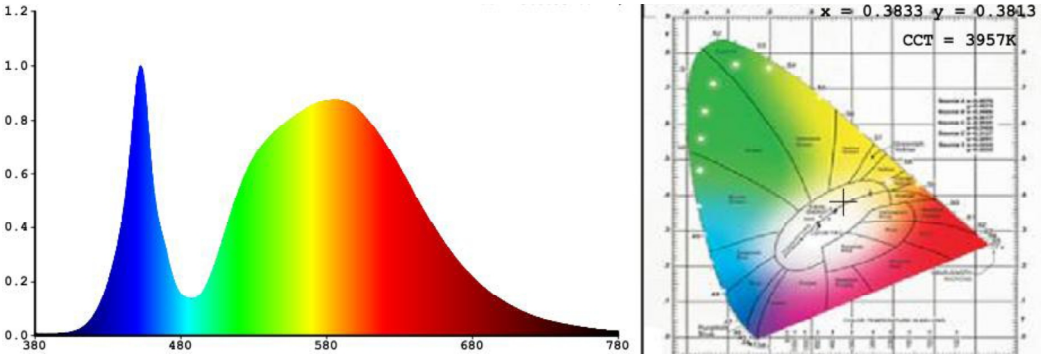
Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.00 V~60Hz	-
Power Factor	0.922	-
I-THD	11.72 %	-

Note:

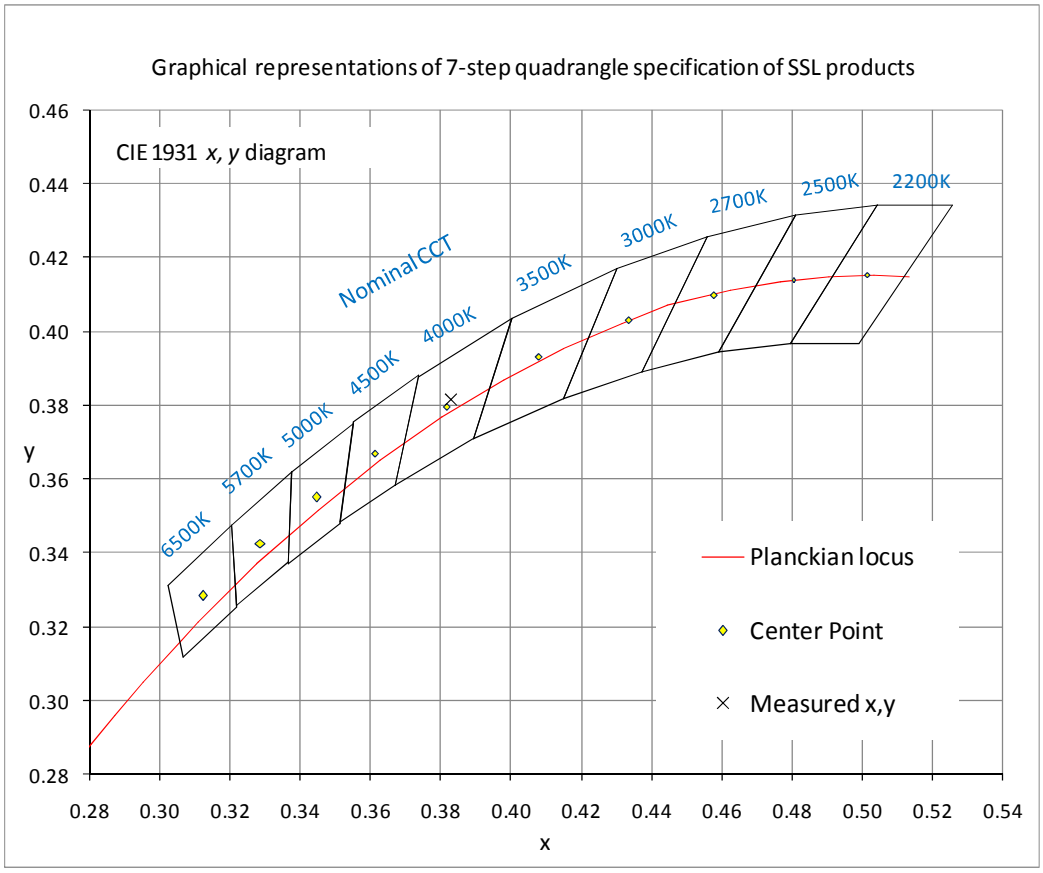
****, Self-absorption is 1.

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)	1.20	Luminous Length	0.58 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.24 m
Spacing Criteria (Diagonal)	1.36	Luminous Height	0.03 m
Test Distance	29.79 m		

4.4 Zonal Lumen Summary

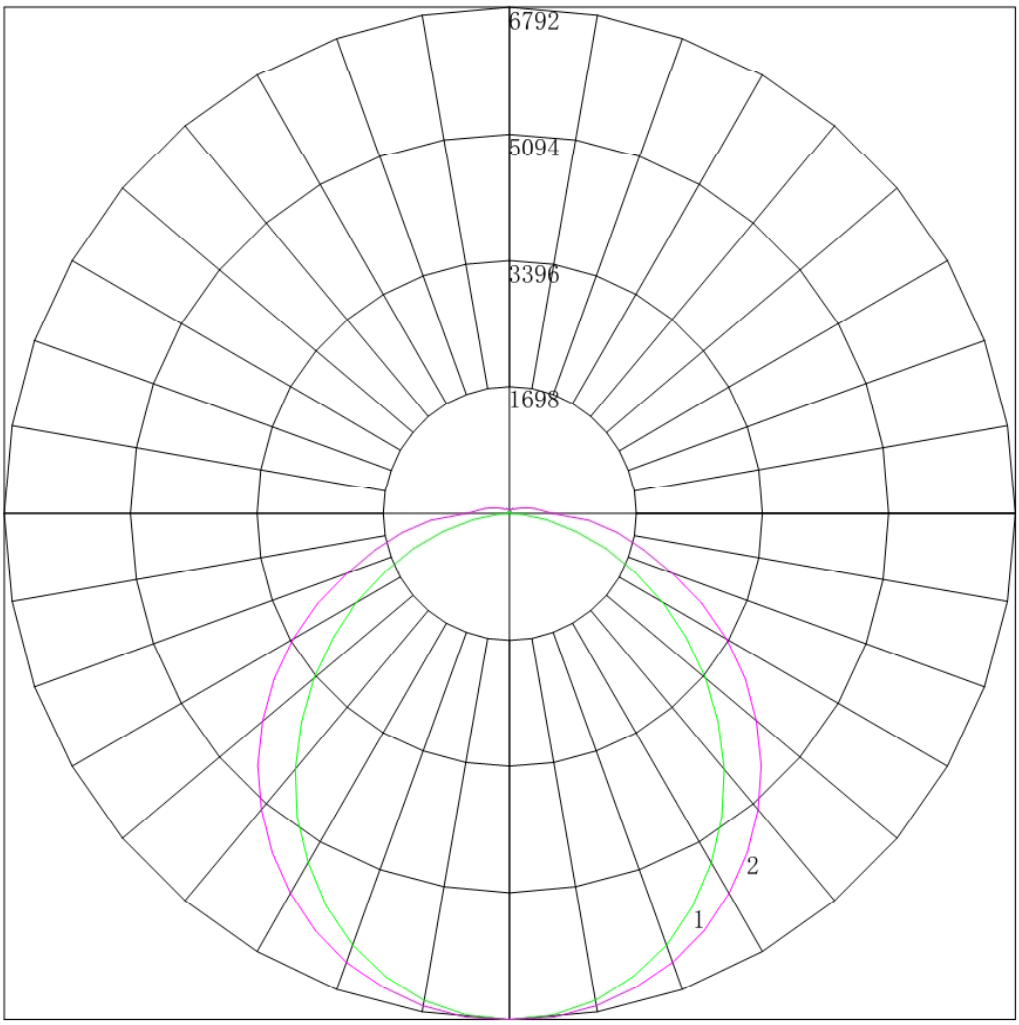
Zone	Lumens	%Lamp	%Fixt
0-20	2476.02	12.10	12.10
0-30	5235.78	25.60	25.60
0-40	8527.2	41.70	41.70
0-60	14949.54	73.20	73.20
0-80	18914.06	92.60	92.60
0-90	19714.31	96.50	96.50
10-90	19072.05	93.40	93.40
20-40	6051.18	29.60	29.60
20-50	9428.83	46.20	46.20
40-70	8810.25	43.10	43.10
60-80	3964.52	19.40	19.40
70-80	1576.61	7.70	7.70
80-90	800.25	3.90	3.90
90-110	440.12	2.20	2.20
90-120	531.88	2.60	2.60
90-130	591.64	2.90	2.90
90-150	672.91	3.30	3.30
90-180	712.20	3.50	3.50
110-180	272.08	1.30	1.30
0-180	20426.51	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	642.26
10-20	1833.76
20-30	2759.75
30-40	3291.43
40-50	3377.65
50-60	3044.69
60-70	2387.91
70-80	1576.61
80-90	800.25
90-100	284.16
100-110	155.95
110-120	91.76
120-130	59.76
130-140	44.73
140-150	36.54
150-160	23.45
160-170	12.22
170-180	3.61

4.5 Polar Curves

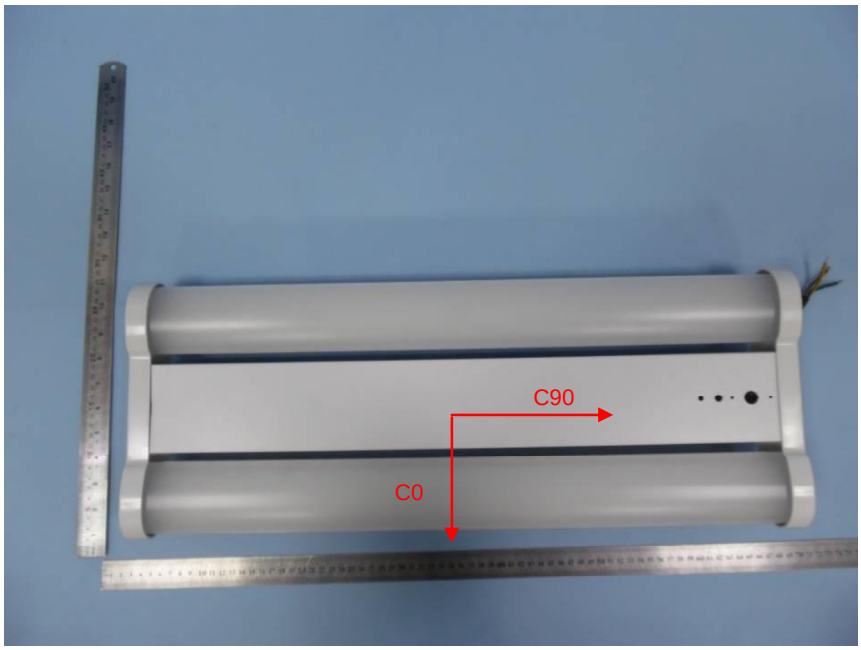


Maximum Candela = 6792.497 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

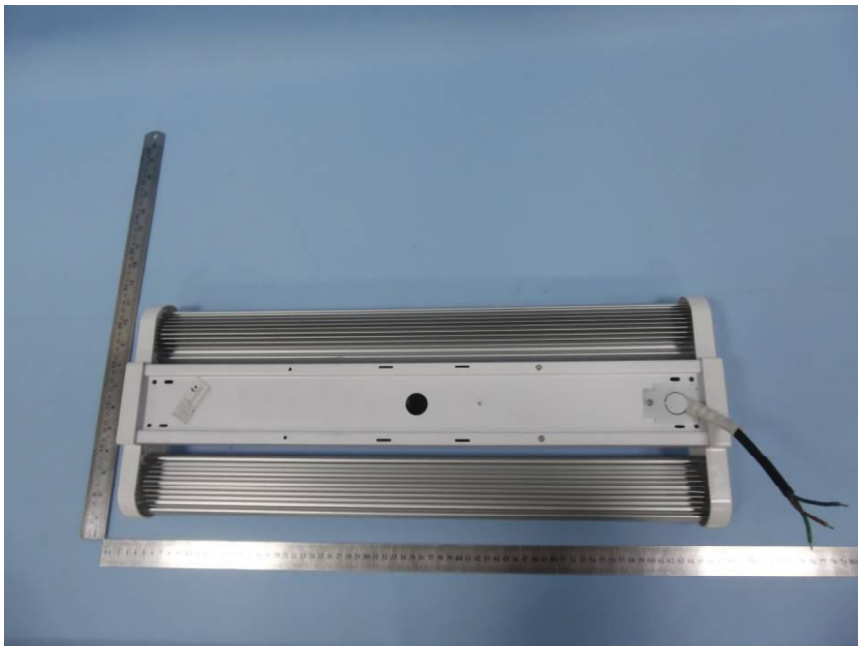
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	6792.497	6792.497	6792.497	6792.497	6792.497	6792.497	6792.497
5	6751.242	6751.164	6755.149	6759.234	6766.157	6764.373	6783.603
10	6632.355	6633.617	6649.996	6663.878	6678.060	6687.528	6708.127
15	6429.184	6443.183	6463.698	6504.210	6531.750	6552.218	6578.533
20	6166.569	6179.421	6217.601	6278.016	6325.674	6367.080	6409.021
25	5821.887	5845.882	5913.700	5995.049	6069.574	6125.694	6177.836
30	5415.544	5447.682	5538.661	5657.976	5758.360	5836.469	5892.530
35	4975.486	5005.712	5135.167	5267.455	5399.556	5500.078	5564.617
40	4479.091	4523.069	4670.757	4846.779	5003.563	5124.489	5189.251
45	3958.298	4031.992	4185.230	4393.276	4575.035	4716.127	4782.392
50	3429.519	3495.573	3691.032	3926.470	4119.059	4260.149	4330.289
55	2889.207	2982.935	3180.383	3434.167	3644.710	3789.778	3864.459
60	2381.278	2472.965	2682.852	2942.297	3161.509	3307.224	3365.307
65	1859.331	1938.603	2199.323	2467.296	2671.222	2798.313	2849.345
70	1374.469	1487.109	1748.810	1983.763	2188.686	2296.046	2331.620
75	918.975	1056.045	1327.530	1560.168	1729.323	1811.212	1865.753
80	500.610	669.869	930.905	1167.274	1336.120	1427.417	1467.347
85	181.879	379.838	614.823	840.484	969.127	1041.356	1068.192
90	16.768	123.168	289.096	414.711	500.554	537.267	579.127
95	12.909	47.395	158.951	274.470	362.125	416.005	431.061
100	13.441	31.708	107.353	202.930	278.898	324.146	340.704
105	15.216	29.042	75.341	149.021	214.486	255.207	268.304
110	16.369	32.220	59.312	111.877	164.639	199.355	210.857
115	17.744	32.643	50.331	87.394	126.545	153.824	164.680
120	18.454	31.598	49.086	71.916	100.935	121.713	128.968
125	19.075	31.198	53.577	63.911	84.002	100.121	105.013
130	20.628	31.287	54.222	62.514	72.602	82.803	87.089
135	25.197	31.154	49.642	66.484	68.618	72.992	74.892
140	30.254	34.043	48.775	67.171	74.129	74.188	74.503
145	34.291	36.487	47.975	60.673	73.775	79.326	79.344
150	37.973	38.042	47.730	55.662	64.589	71.973	74.772
155	34.158	36.820	45.329	51.426	56.488	61.521	63.237
160	29.988	32.819	43.862	48.343	52.371	55.121	55.736
165	30.298	32.464	38.571	45.216	48.365	50.669	51.338
170	34.113	34.620	36.681	39.738	43.561	45.821	48.943
175	35.888	36.242	36.503	36.812	36.832	37.914	34.564
180	35.511	35.511	35.511	35.511	35.511	35.511	35.511

Appendix A Product Photo



Picture 1



Picture 2

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