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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:

Parking Garage Luminaires

Models No.:

LT-YC-40W-40K-UNV-SM-CG

Test Date:	Jan. 7, 2019 to Jan. 8, 2019
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-045 Rev.1.0
Test Note:	

Complied by:		**Reviewed by:**	
Kargel Yuan	Kargel Yuan	**Lin Qiu**	Lin
Project Engineer		**Technical Manager**	
Jan. 15, 2019		**Jan. 15, 2019**	

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1. General

1.1 Product Information

Brand Name	LI-TIAN LIGHTING
Product Type	Parking Garage Luminaires
Model Number	LT-YC-40W-40K-UNV-SM-CG
Rated Inputs	100-277VAC, 50/60Hz
Rated Power	37.3W
Rated Light output	5979lm
Declared CCT	4000K
Power Supply	LF-GLD040YA(P)1000U
LED Package, Array or Module	Model: L130-4070003000X21, manufactured by Philips Lumileds
Receipt Samples	1 unit
Sample Code of lab.	181228106003+4000K PCB+40W driver
Date of Receipt Samples	Dec. 28, 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-987	APW-120N	2019-01-08	2020-01-07
AC Power supply	LC-I-989	APW-120N	2019-01-08	2020-01-07
Power analyzer	LC-I-928	WT210	2019-01-02	2020-01-01
Power analyzer	LC-I-954	WT210	2019-01-08	2020-01-07
Multimeter	LC-I-972	Fluke 17B	2018-08-01	2019-07-31
Photometric colorimetric electric system* (2 meter sphere)	LC-I-956	HAAS-2000	Before use	Before use
Standard lamp**	LC-PL-I-011	D204C	2018-11-21	2019-11-20
Luminous Flux Standard Lamp***	LC-PL-I-003	24V100W	2018-11-21	2019-11-20
Goniophotometer(with mirror)	LC-I-902	GMS2000	2018-05-06	2019-05-05
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:

* Bandwidth of spectroradiometer is 1 nm.

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

*** 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	120.01 V~60Hz
Input Current(A)	0.315	0.313
Total Power(W)	37.45	37.30
Power Factor	0.992	0.992
I-THD	8.48 %	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-*	5979.02
Luminaire Efficacy(lm/W)	-	160.30
Correlated Color Temperature (CCT)(K)	3924	-
Color Rendering Index (CRI)	73.0	-
R9	-15	-
Chromaticity Coordinate (x,y)	x = 0.3852 y = 0.3835	-
Chromaticity Coordinate (u,v)	u = 0.2255 v = 0.3368	-
Chromaticity Coordinate (u',v')	u' = 0.2255 v' = 0.5052	-
Duv	0.0018	-
Zone Lumens between 60-80 °	-	38.40%
Zone Lumens between 70-80 °	-	12.10%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
71	78	83	73	70	68	83	58
R9	R10	R11	R12	R13	R14	R15	-
-15	47	67	37	72	90	67	-

3.4 Electrical data on 277V

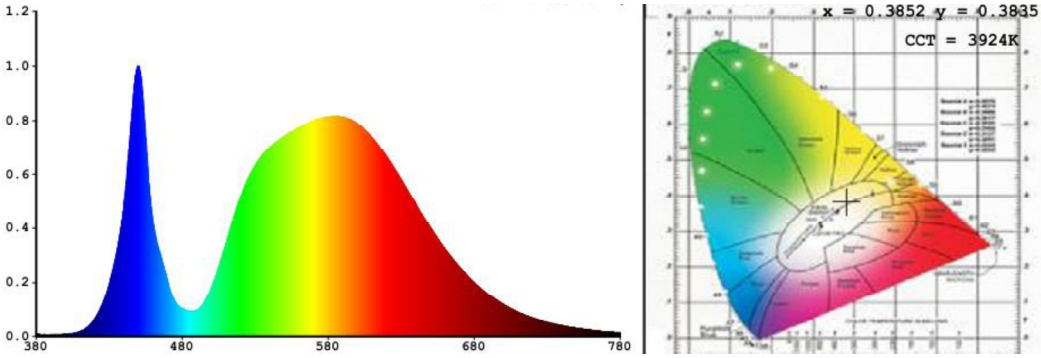
Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.00 V~60Hz	-
Power Factor	0.904	-
I-THD	7.59 %	-

Note:

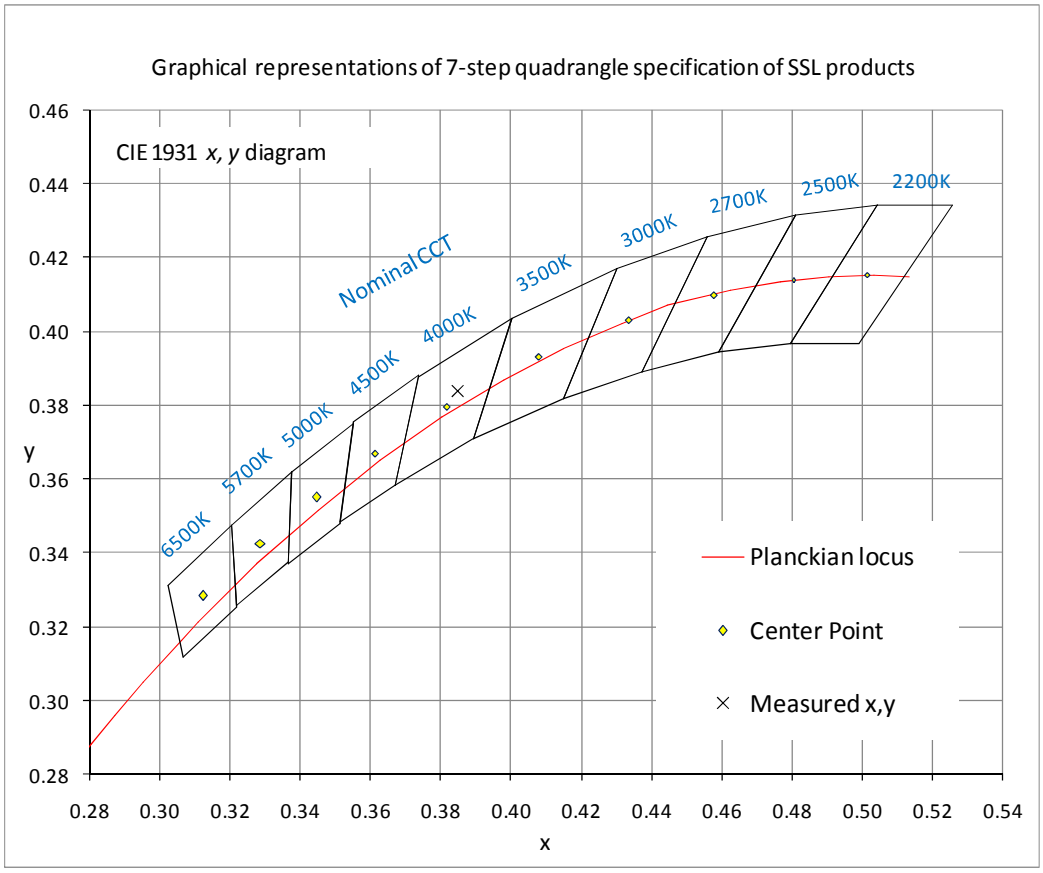
*Self-absorption is 1.

4. Test Data

4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data

CIE Type	Direct	Basic Luminous Shape	Circular
Spacing Criteria (0-180)	2.36	Luminous Length	0.15 m (Diameter)
Spacing Criteria (90-270)	2.36	Luminous Width	0.15 m (Diameter)
Spacing Criteria (Diagonal)	2.58	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

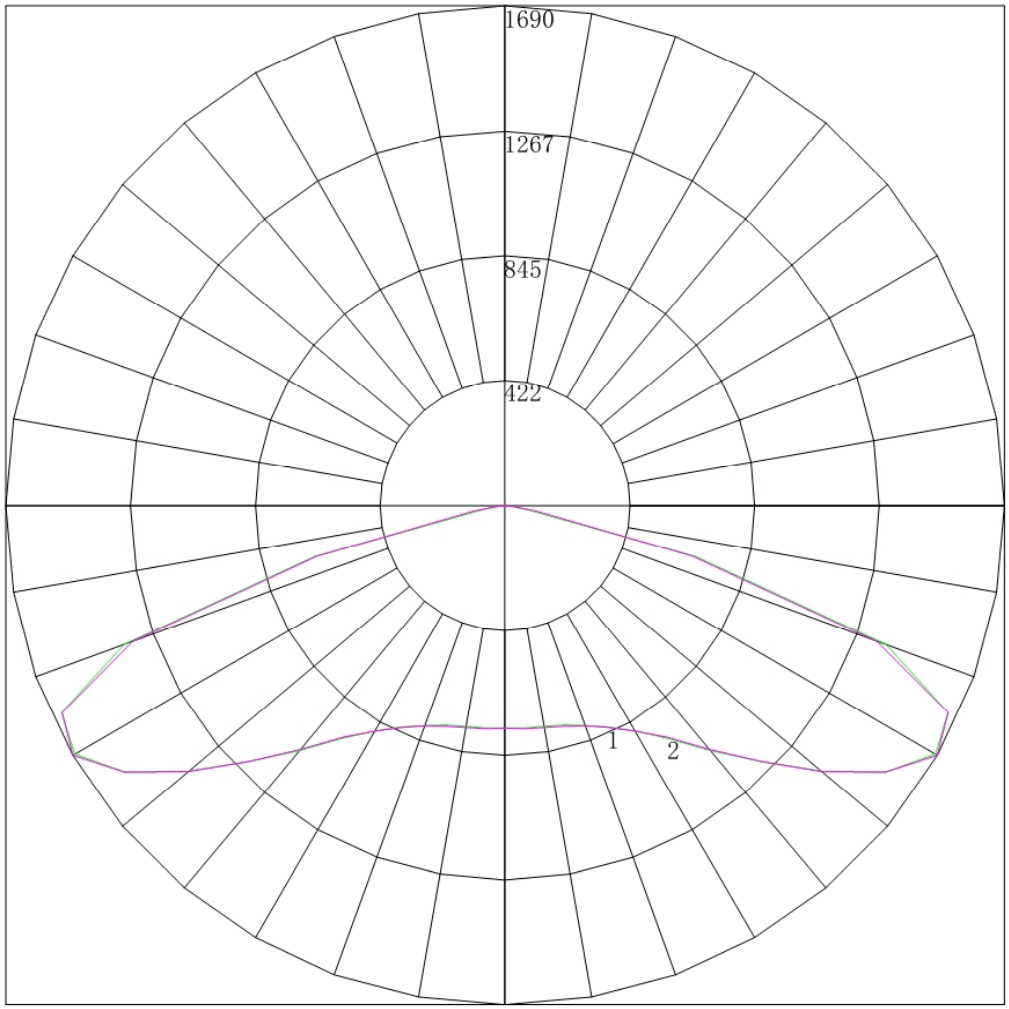
Zone	Lumens	%Lamp	%Fixt
0-20	291.10	4.90	4.90
0-30	675.33	11.30	11.30
0-40	1284.1	21.50	21.50
0-60	3631.14	60.70	60.70
0-80	5924.98	99.10	99.10
0-90	5965.45	99.80	99.80
10-90	5893.35	98.60	98.60
20-40	993.00	16.60	16.60
20-50	1944.8	32.50	32.50
40-70	3914.7	65.50	65.50
60-80	2293.83	38.40	38.40
70-80	726.18	12.10	12.10
80-90	40.48	0.70	0.70
90-110	4.68	0.10	0.10
90-120	7.10	0.10	0.10
90-130	9.02	0.20	0.20
90-150	11.54	0.20	0.20
90-180	13.57	0.20	0.20
110-180	8.89	0.10	0.10
0-180	5979.03	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	72.10
10-20	218.99
20-30	384.23
30-40	608.76
40-50	951.80
50-60	1395.25
60-70	1567.65
70-80	726.18
80-90	40.48
90-100	2.06
100-110	2.62
110-120	2.42
120-130	1.93
130-140	1.34
140-150	1.18
150-160	0.99
160-170	0.75
170-180	0.29

4.5 Polar Curves

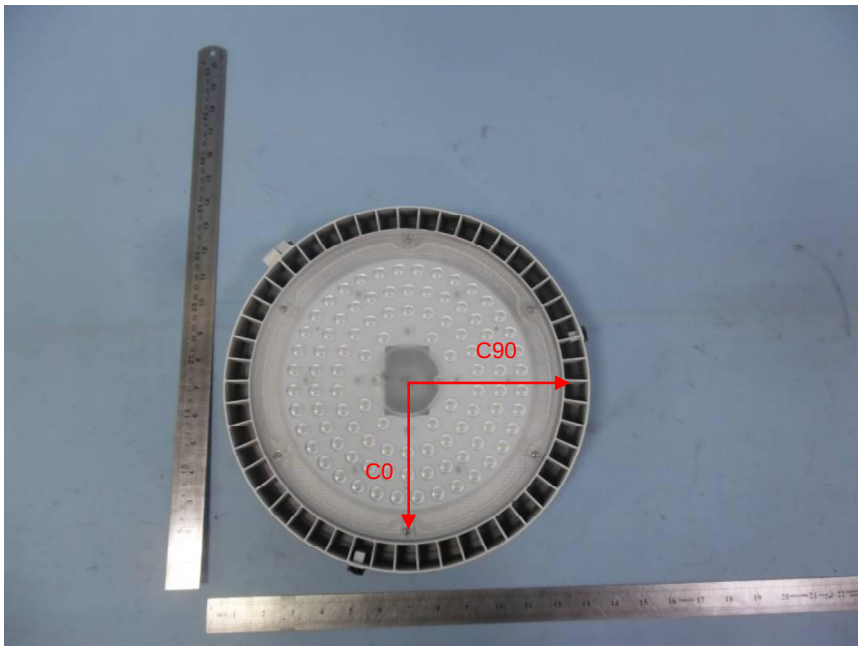


Maximum Candela = 1689.784 Located At Horizontal Angle = 90, Vertical Angle = 60
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

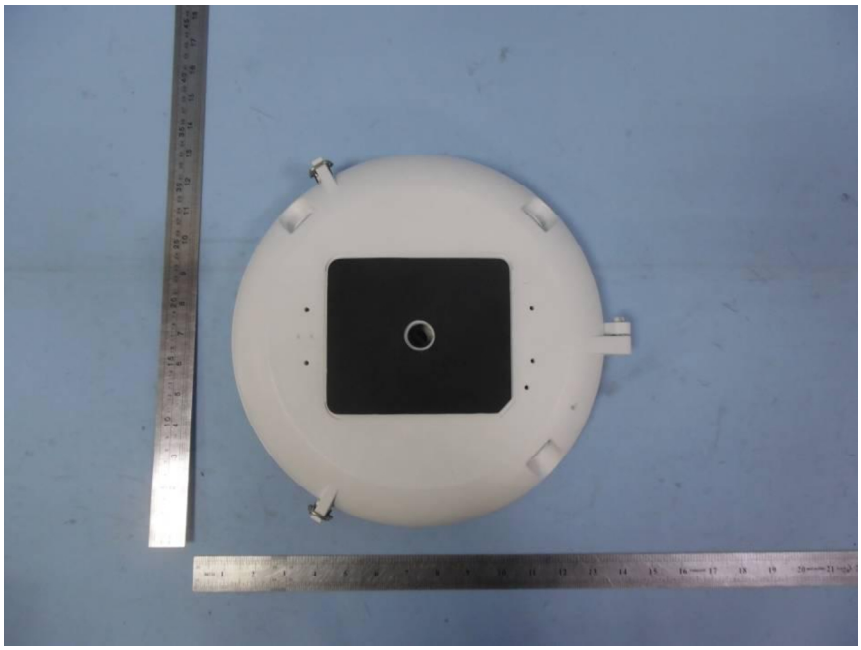
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	752.707	752.707	752.707	752.707	752.707	752.707	752.707
5	756.725	753.496	752.733	754.376	752.210	753.519	758.324
10	757.808	757.485	758.067	758.139	756.547	758.219	762.544
15	769.186	770.466	768.710	768.944	766.594	768.500	772.609
20	792.753	790.029	788.941	789.926	786.411	786.684	791.763
25	825.576	824.466	822.722	823.038	820.089	819.734	827.816
30	881.153	881.846	877.900	876.168	874.621	873.917	880.869
35	962.013	962.756	959.407	954.447	954.184	954.465	957.331
40	1079.849	1074.903	1071.260	1071.722	1067.963	1066.449	1074.666
45	1223.645	1224.461	1214.919	1217.521	1215.523	1214.234	1222.408
50	1395.839	1396.896	1391.796	1393.473	1392.839	1390.110	1399.745
55	1569.839	1569.194	1567.871	1568.217	1566.282	1567.848	1571.138
60	1682.348	1682.513	1676.736	1680.364	1680.625	1682.509	1689.784
65	1655.485	1651.546	1644.423	1644.810	1640.095	1646.505	1654.676
70	1371.640	1361.849	1333.543	1341.728	1351.148	1346.126	1340.390
75	669.228	664.046	636.979	666.300	662.317	656.698	657.342
80	75.307	93.058	101.430	90.668	91.604	103.283	109.846
85	23.703	25.287	26.330	25.440	25.387	26.082	28.205
90	1.580	1.645	1.688	1.711	1.843	2.025	2.382
95	1.761	1.758	1.755	1.778	1.798	1.776	1.803
100	2.212	2.164	2.183	2.206	2.247	2.203	2.162
105	2.573	2.547	2.565	2.521	2.561	2.540	2.611
110	2.664	2.592	2.633	2.611	2.561	2.541	2.656
115	2.438	2.434	2.453	2.409	2.404	2.406	2.476
120	2.212	2.254	2.295	2.229	2.292	2.293	2.340
125	2.167	2.164	2.160	2.139	2.157	2.204	2.249
130	1.941	1.938	1.913	1.958	1.977	2.001	2.022
135	1.580	1.600	1.575	1.553	1.573	1.551	1.661
140	1.806	1.780	1.778	1.756	1.775	1.799	1.797
145	1.896	1.916	1.868	1.891	1.887	1.889	1.886
150	2.077	1.961	1.958	1.981	1.977	1.934	1.977
155	2.122	2.141	2.115	2.116	2.112	2.113	2.067
160	2.438	2.434	2.475	2.409	2.427	2.383	2.425
165	2.664	2.682	2.633	2.656	2.696	2.675	2.649
170	2.935	2.907	2.858	2.904	2.876	2.900	2.963
175	3.070	3.065	3.083	3.061	3.078	3.103	3.143
180	3.196	3.196	3.196	3.196	3.196	3.196	3.196

Appendix A Product Photo



Picture 1



Picture 2

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