LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP19010012
Version: 1.0
Date of Issue: Jan. 15, 2019
Total pages: 11

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-FC-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	**Lin Qiu**
Project Engineer	**Technical Manager**
Jan. 15, 2019	**Jan. 15, 2019**

Table of Contents

1. General

1.1 Product Information

Brand Name	LI-TIAN LIGHTING
Product Type	Parking Garage Luminaires
Model Number	LT-FC-40W-40K-UNV-SM-CG
Rated Inputs	100-277VAC, 50/60Hz
Rated Power	37.49W
Rated Light output	5769lm
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.	181228106001+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	120.02 V~60Hz
Input Current(A)	0.316	0.315
Total Power(W)	37.65	37.49
Power Factor	0.992	0.993
I-THD	8.62 %	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-*	5769.06
Luminaire Efficacy(lm/W)	-	153.88
Correlated Color Temperature (CCT)(K)	3933	-
Color Rendering Index (CRI)	73.0	-
R9	-15	-
Chromaticity Coordinate (x,y)	x = 0.3847 y = 0.3830	-
Chromaticity Coordinate (u,v)	u = 0.2254 v = 0.3367	-
Chromaticity Coordinate (u',v')	u' = 0.2254 v' = 0.5050	-
Duv	0.0017	-
Zone Lumens between 60-80 °	-	28.30%
Zone Lumens between 70-80 °	-	5.10%

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	38	72	90	67	-

3.4 Electrical data on 277V

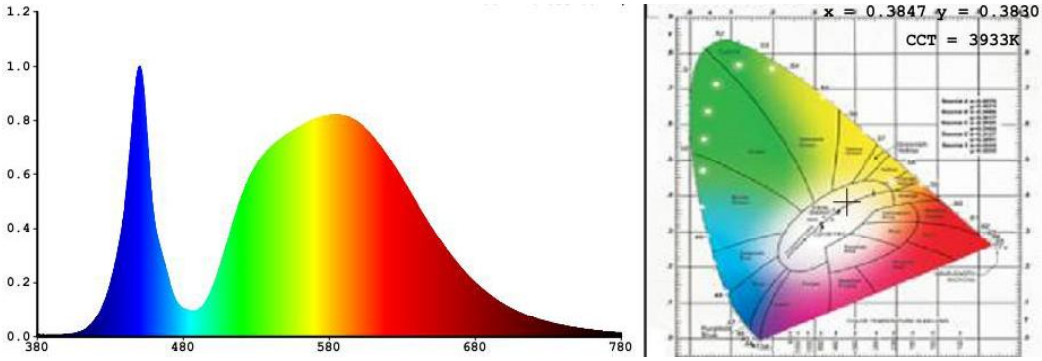
Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.00 V~60Hz	-
Power Factor	0.904	-
I-THD	7.52 %	-

Note:

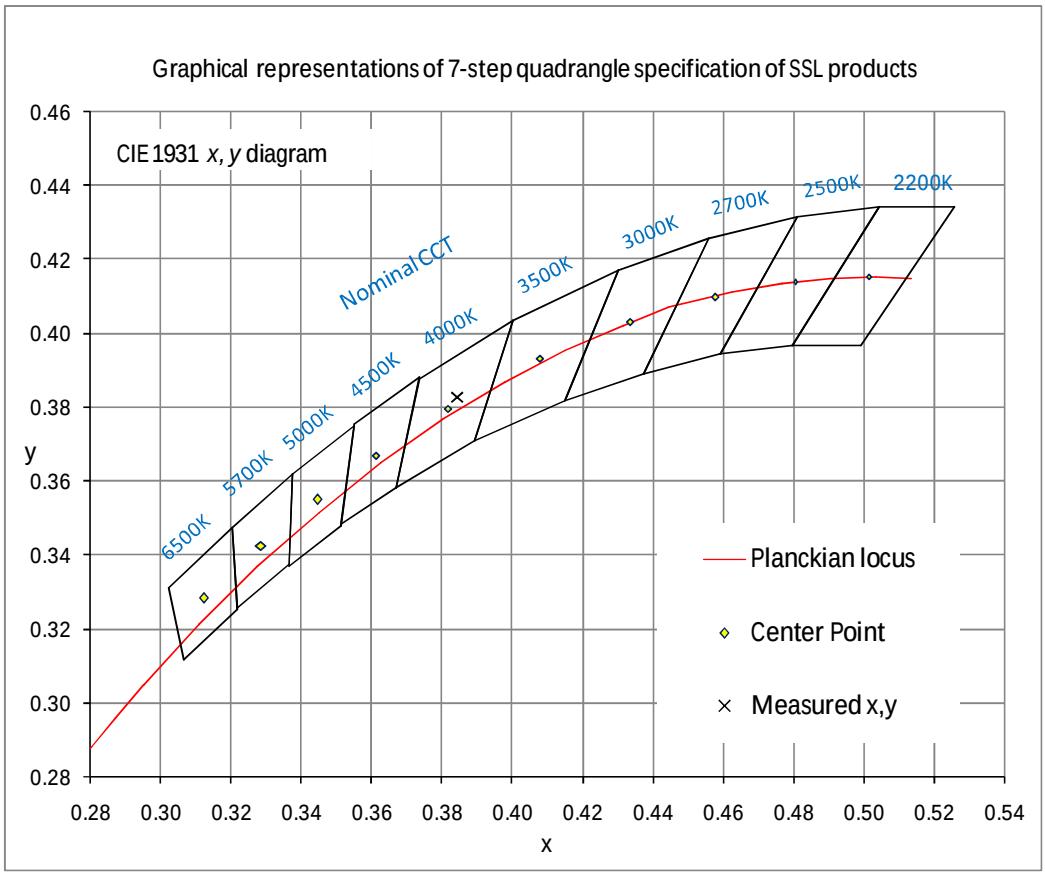
*Self-absorption is 1.

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
Spacing Criteria (0-180)	2.90	Luminous Length	0.21 m
Spacing Criteria (90-270)	3.02	Luminous Width	0.21 m
Spacing Criteria (Diagonal)	2.96	Luminous Height	0.00 m
Test Distance	30.00 m		

4.4 Zonal Lumen Summary

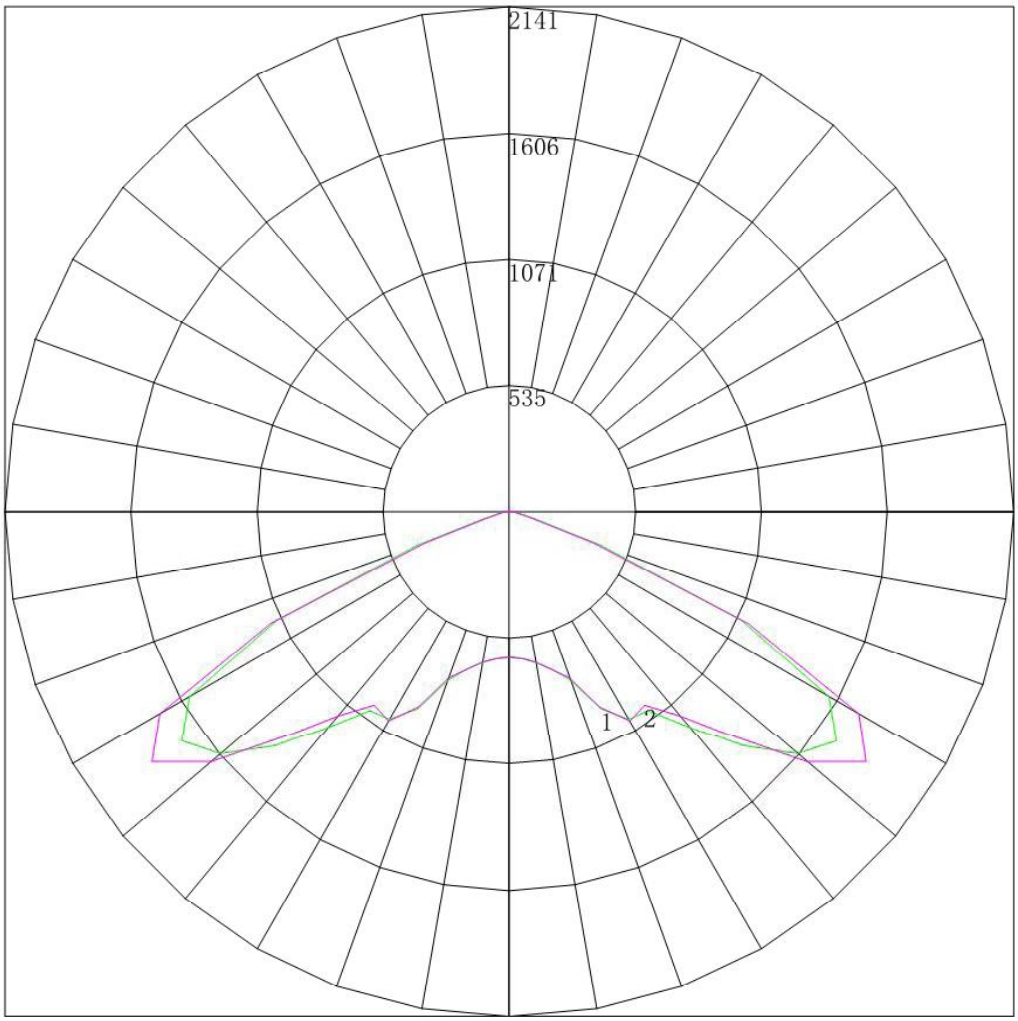
Zone	Lumens	%Lamp	%Fixt
0-20	258.93	4.50	4.50
0-30	694.15	12.00	12.00
0-40	1378.84	23.90	23.90
0-60	4095.32	71.00	71.00
0-80	5725.85	99.30	99.30
0-90	5758.21	99.80	99.80
10-90	5697.82	98.80	98.80
20-40	1119.9	19.40	19.40
20-50	2208.14	38.30	38.30
40-70	4051.1	70.20	70.20
60-80	1630.53	28.30	28.30
70-80	295.91	5.10	5.10
80-90	32.36	0.60	0.60
90-110	2.86	0.00	0.00
90-120	4.75	0.10	0.10
90-130	6.53	0.10	0.10
90-150	9.06	0.20	0.20
90-180	10.85	0.20	0.20
110-180	7.99	0.10	0.10
0-180	5769.07	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	60.39
10-20	198.54
20-30	435.22
30-40	684.69
40-50	1088.24
50-60	1628.25
60-70	1334.62
70-80	295.91
80-90	32.36
90-100	1.13
100-110	1.73
110-120	1.89
120-130	1.78
130-140	1.38
140-150	1.16
150-160	0.91
160-170	0.65
170-180	0.24

4.5 Polar Curves

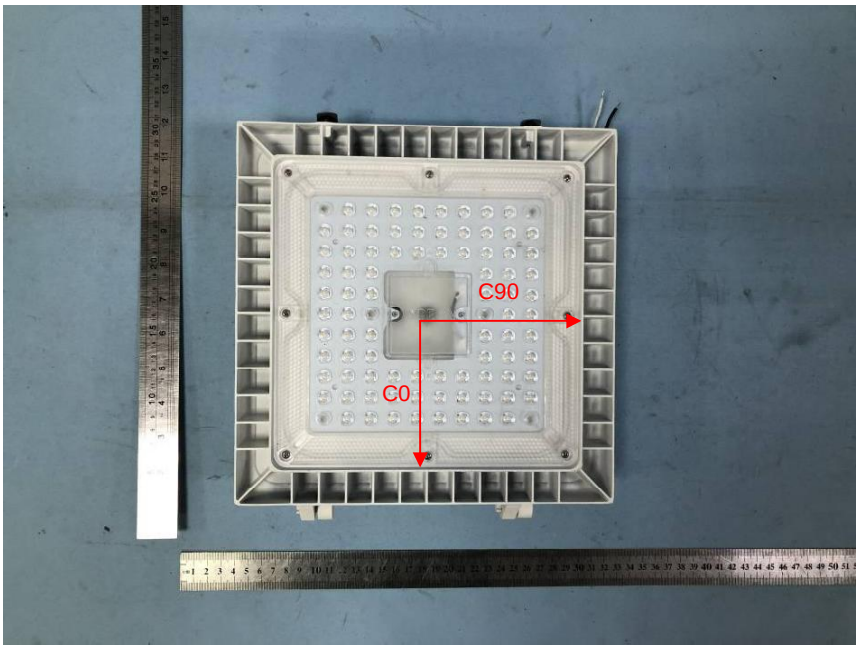


Maximum Candela = 2141.417 Located At Horizontal Angle = 45, Vertical Angle = 60
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

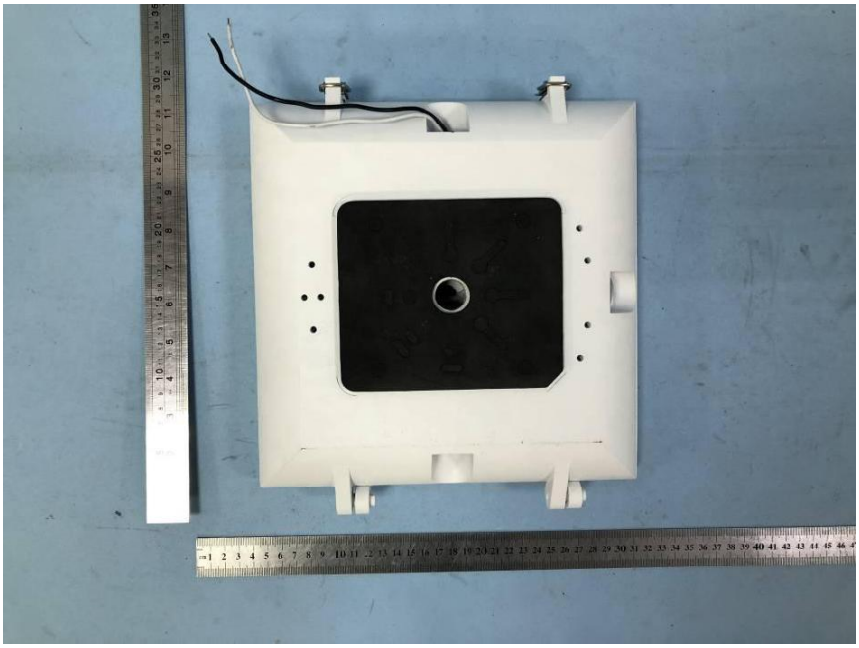
4.6 Candela Tabulation

	0	15	30	45	60	75	90
0	618.083	618.083	618.083	618.083	618.083	618.083	618.083
5	625.741	623.927	624.604	624.843	623.270	624.174	625.338
10	649.617	648.411	648.657	648.933	647.354	649.426	648.765
15	689.261	687.270	688.665	690.800	690.114	691.799	693.379
20	760.890	756.890	755.195	757.642	755.162	752.432	750.623
25	922.619	933.188	947.791	954.139	950.526	926.247	912.538
30	1017.223	1048.651	1129.448	1184.087	1138.369	1060.614	1025.563
35	1030.738	1039.893	1061.537	1068.490	1049.118	1020.903	1002.325
40	1195.170	1190.594	1187.172	1189.126	1163.451	1140.807	1131.277
45	1408.255	1406.200	1398.443	1399.348	1380.432	1367.342	1353.914
50	1599.716	1614.832	1654.646	1681.585	1672.804	1650.012	1650.926
55	1697.474	1741.479	1873.542	2001.862	1962.285	1878.130	1850.948
60	1568.857	1665.100	1884.236	2141.417	2039.993	1784.749	1713.521
65	1085.699	1220.728	1575.571	1876.471	1607.452	1200.894	1118.373
70	410.448	515.167	852.373	1086.847	778.006	461.378	381.975
75	109.921	126.523	263.514	349.298	190.517	113.020	97.797
80	44.284	56.165	73.044	73.963	67.527	57.484	45.698
85	17.930	26.721	37.107	26.650	33.396	25.251	17.683
90	0.676	0.741	0.967	1.305	1.170	1.059	1.125
95	0.721	0.786	1.056	1.170	1.035	0.812	0.634
100	1.036	1.146	1.438	1.598	1.373	1.150	1.041
105	1.351	1.550	1.843	1.958	1.823	1.510	1.402
110	1.622	1.752	2.023	2.183	2.048	1.781	1.672
115	1.622	1.729	2.000	2.116	2.026	1.803	1.761
120	1.712	1.774	2.000	2.161	1.981	1.848	1.760
125	1.802	1.976	2.113	2.161	2.093	1.893	1.848
130	1.892	1.954	2.023	2.071	2.003	1.939	1.892
135	1.667	1.640	1.641	1.711	1.666	1.601	1.620
140	1.802	1.797	1.821	1.801	1.868	1.803	1.802
145	1.847	1.797	1.820	1.868	1.891	1.848	1.847
150	1.847	1.887	1.865	1.868	1.913	1.893	1.848
155	1.982	1.909	1.933	1.936	1.913	1.939	1.938
160	2.117	2.111	2.135	2.116	2.093	2.096	2.117
165	2.298	2.336	2.315	2.318	2.318	2.322	2.297
170	2.433	2.403	2.427	2.476	2.453	2.434	2.432
175	2.523	2.470	2.495	2.499	2.498	2.525	2.522
180	2.630	2.630	2.630	2.630	2.630	2.630	2.630

Appendix A Product Photo



Picture 1



Picture 2

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