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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:

Parking Garage Luminaires

Models No.:

LT-YC-75W-40K-UNV-SM-CG

Test Date: Jan. 7, 2019 to Jan. 9, 2019

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
Product Type	Parking Garage Luminaires
Model Number	LT-YC-75W-40K-UNV-SM-CG
Rated Inputs	100-277VAC, 50/60Hz
Rated Power	70.08W
Rated Light output	10191lm
Declared CCT	4000K
Power Supply	WP-HHA-075U0421800
LED Package, Array or Module	Model: L130-4070003000X21, manufactured by Philips Lumileds
Receipt Samples	1 unit
Sample Code of lab.	181228106003+4000K PCB+75W 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 $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$; 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	120.00 V~60Hz	120.00 V~60Hz
Input Current(A)	0.587	0.587
Total Power(W)	70.12	70.08
Power Factor	0.995	0.996
I-THD	14.36 %	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	10191.48
Luminaire Efficacy(lm/W)	-	145.43
Correlated Color Temperature (CCT)(K)	3963	-
Color Rendering Index (CRI)	73.1	-
R9	-14	-
Chromaticity Coordinate (x,y)	x = 0.3827 y = 0.3800	-
Chromaticity Coordinate (u,v)	u = 0.2253 v = 0.3355	-
Chromaticity Coordinate (u',v')	u' = 0.2253 v' = 0.5033	-
Duv	0.0007	-
Zone Lumens between 60-80 °	-	37.60%
Zone Lumens between 70-80 °	-	11.40%

3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
71	79	83	72	70	68	83	58
R9	R10	R11	R12	R13	R14	R15	-
-14	47	67	39	72	90	67	-

3.4 Electrical data on 277V

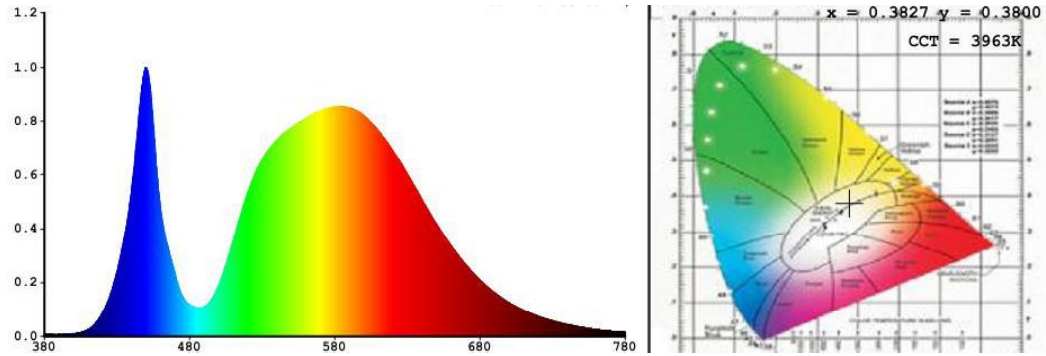
Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	277.00 V~60Hz	-
Power Factor	0.969	-
I-THD	14.59 %	-

Note:

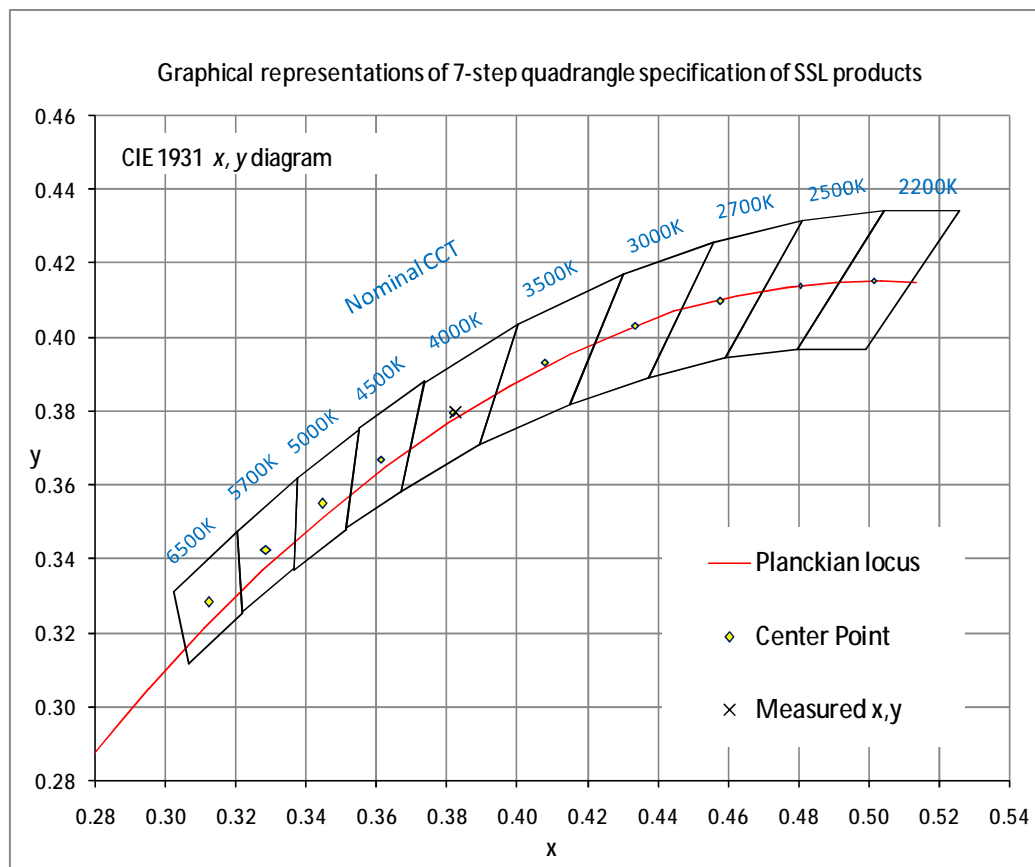
*Self-absorption is 1.

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)	2.42	Luminous Length	0.15 m (Diameter)
Spacing Criteria (90-270)	2.40	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	495.50	4.90	4.90
0-30	1150.99	11.30	11.30
0-40	2195.54	21.50	21.50
0-60	6266.01	61.50	61.50
0-80	10094.52	99.00	99.00
0-90	10167.63	99.80	99.80
10-90	10044.93	98.60	98.60
20-40	1700.04	16.70	16.70
20-50	3349.57	32.90	32.90
40-70	6736.21	66.10	66.10
60-80	3828.51	37.60	37.60
70-80	1162.78	11.40	11.40
80-90	73.11	0.70	0.70
90-110	8.21	0.10	0.10
90-120	12.45	0.10	0.10
90-130	15.89	0.20	0.20
90-150	20.34	0.20	0.20
90-180	23.86	0.20	0.20
110-180	15.65	0.20	0.20
0-180	10191.49	100.00	100.00

Total Luminaire Efficiency = 100.00%

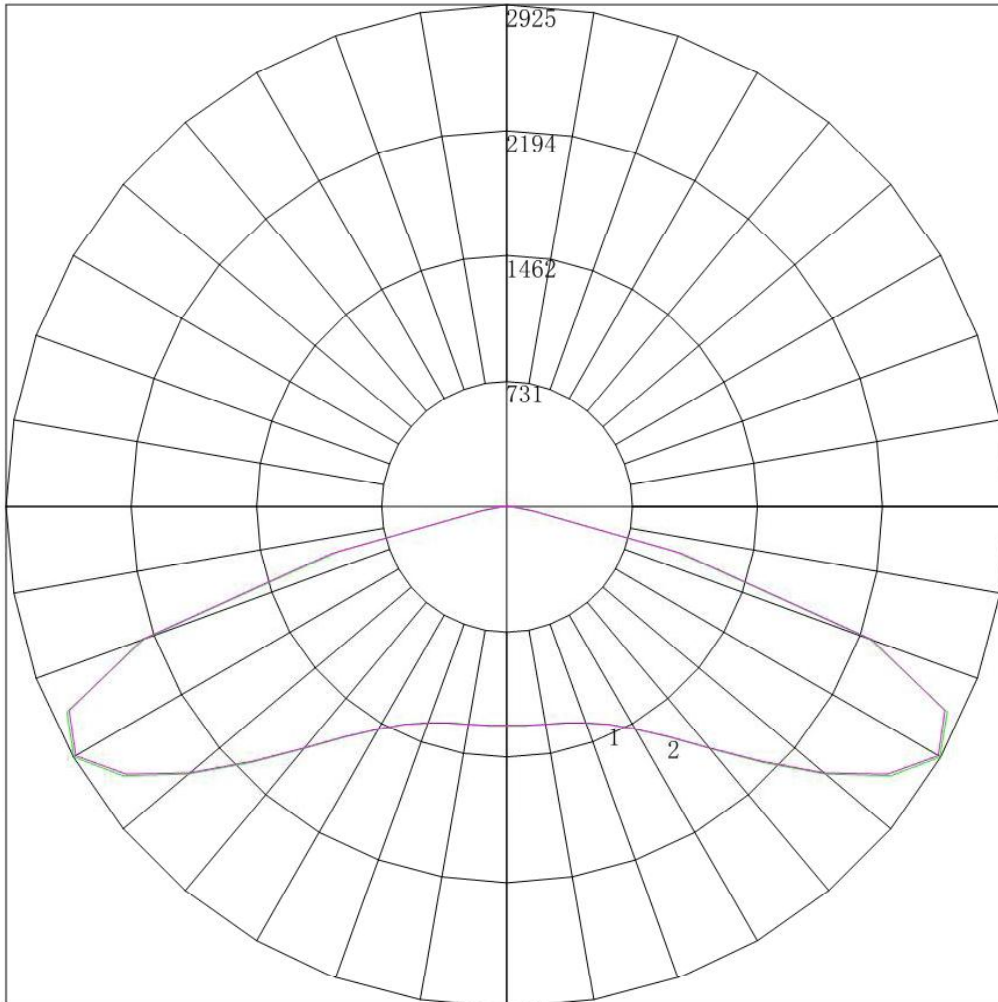
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	122.70
10-20	372.80
20-30	655.49
30-40	1044.55
40-50	1649.53
50-60	2420.95
60-70	2665.73
70-80	1162.78
80-90	73.11
90-100	3.70
100-110	4.50
110-120	4.24
120-130	3.44
130-140	2.39
140-150	2.07
150-160	1.72
160-170	1.30
170-180	0.50



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4.5 Polar Curves



Maximum Candela = 2924.864 Located At Horizontal Angle = 15, Vertical Angle = 60
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)



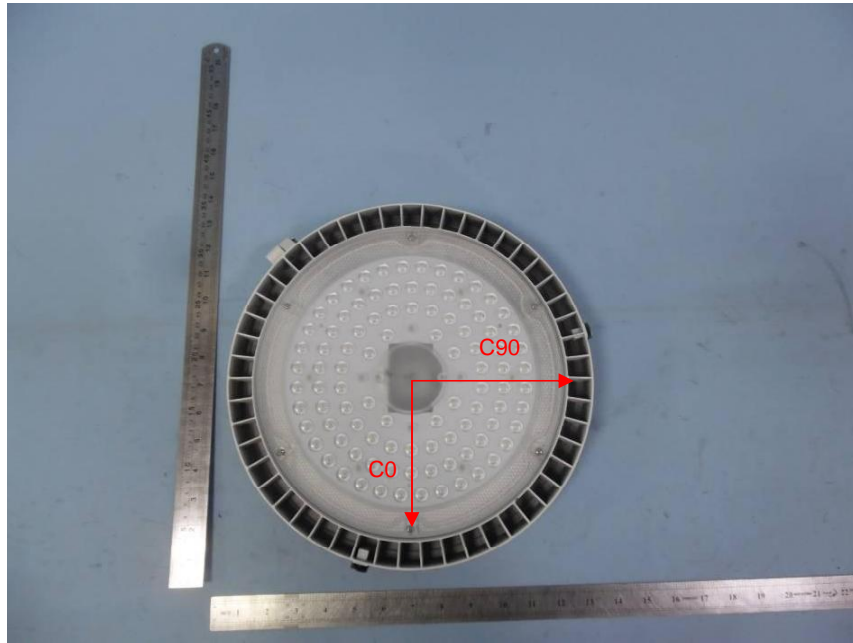
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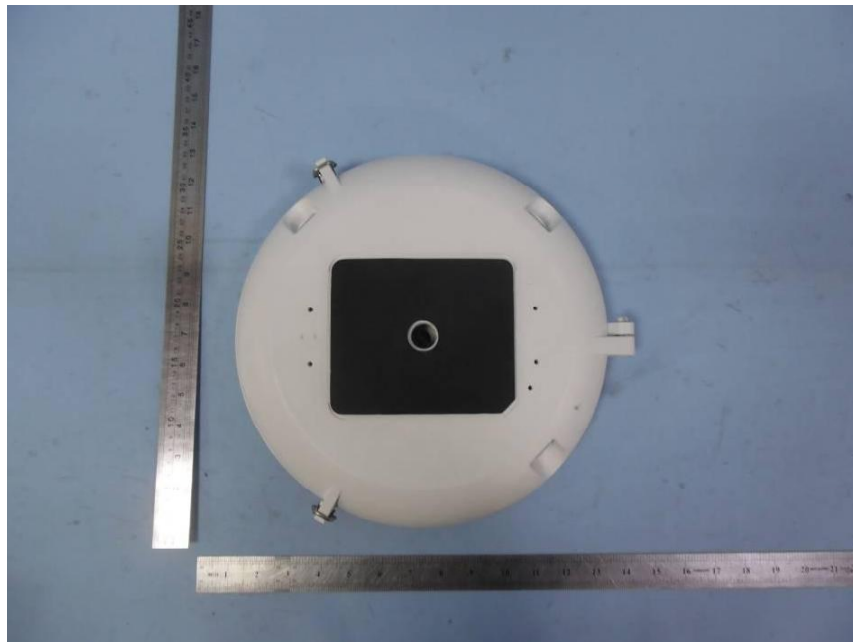
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	1280.346	1280.346	1280.346	1280.346	1280.346	1280.346	1280.346
5	1282.149	1284.405	1283.049	1282.818	1284.171	1280.569	1283.920
10	1292.518	1290.046	1290.936	1289.792	1292.053	1287.984	1290.577
15	1308.748	1309.664	1310.087	1308.687	1307.364	1307.967	1310.234
20	1344.363	1344.163	1343.210	1344.676	1344.067	1341.193	1345.518
25	1403.421	1404.822	1402.245	1402.935	1403.965	1400.700	1404.509
30	1500.800	1500.206	1502.293	1497.407	1498.988	1499.509	1502.863
35	1642.810	1643.391	1642.901	1638.667	1641.521	1646.591	1639.781
40	1841.624	1847.472	1842.770	1844.481	1847.554	1845.765	1839.354
45	2113.472	2116.031	2113.621	2113.057	2108.756	2113.865	2101.656
50	2428.600	2435.551	2434.049	2424.602	2419.736	2417.213	2413.840
55	2736.514	2739.282	2728.113	2721.067	2718.076	2705.954	2716.393
60	2920.000	2924.864	2920.097	2906.189	2897.982	2881.298	2907.608
65	2837.499	2825.873	2832.218	2811.709	2806.759	2781.338	2822.128
70	2249.622	2239.348	2200.553	2197.380	2215.453	2207.506	2265.372
75	1012.465	1000.947	1002.834	992.038	1036.290	1007.171	1057.032
80	147.420	156.249	169.399	153.990	206.931	218.987	154.788
85	40.304	44.894	44.910	44.652	45.311	44.597	43.784
90	3.066	3.540	3.674	4.050	4.281	4.270	2.606
95	3.111	2.999	2.997	3.059	2.995	3.054	2.966
100	3.787	3.743	3.808	3.757	3.738	3.728	3.728
105	4.418	4.442	4.394	4.431	4.323	4.356	4.400
110	4.508	4.510	4.552	4.476	4.481	4.468	4.535
115	4.283	4.284	4.304	4.251	4.278	4.266	4.265
120	4.057	4.014	4.056	4.049	4.008	3.997	3.996
125	3.922	3.924	3.921	3.914	3.896	3.885	3.859
130	3.471	3.450	3.493	3.487	3.445	3.480	3.452
135	2.795	2.886	2.862	2.879	2.882	2.874	2.823
140	3.156	3.112	3.132	3.104	3.130	3.121	3.138
145	3.336	3.360	3.290	3.307	3.265	3.278	3.317
150	3.516	3.450	3.425	3.419	3.490	3.458	3.498
155	3.652	3.653	3.628	3.621	3.670	3.638	3.720
160	4.148	4.194	4.191	4.184	4.143	4.176	4.211
165	4.644	4.668	4.642	4.656	4.661	4.558	4.658
170	4.914	4.961	4.980	4.926	4.976	4.985	5.016
175	5.320	5.254	5.273	5.308	5.314	5.254	5.375
180	5.528	5.528	5.528	5.528	5.528	5.528	5.528

Appendix A Product Photo



Picture 1



Picture 2

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