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Test report of

IES LM-79-08

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

Rendered to:

Elec-Tech International Co., Ltd.

No.1 Jinfeng Road, Tangjiawan Town, Xiangzhou District,
Zhuhai City, Guangdong Province, P.R.China

For products:

LED shop light

Models No.:

541031##(##=61~70)

(Where XX denotes CCT and could be 61-70 which refers 4000K)

Test Date: Jan. 4, 2016 to Jan. 4, 2016

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	ETI, Commercial Electric
Product Type	LED shop light
Model Number	541031##(##=61~70)
Rated Inputs	120VAC/60Hz
Rated Power	35W
Rated Light output	3200lm
Declared CCT	4000K
Power Supply	LED driver
LED Package, Array or Module	Model: 67-21S Series, manufactured by Everlight Electronics Co., LTD.
Receipt Samples	1 unit
Date of Receipt Samples	Sep. 27, 2016
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2011	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	2016-02-04	2017-02-03
AC Power supply	LC-I-987	APW-110N	2016-02-04	2017-02-03
Power analyzer	LC-I-928	WT210	2016-01-24	2017-01-24
Power analyzer	LC-I-954	WT210	2016-02-04	2017-02-03
Multimeter	LC-I-972	Fluke 17B	2016-08-10	2017-08-09
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-002	24V100W	2016-10-08	2017-10-07
Luminous Flux Standard Lamp	LC-PL-I-001	110V/200W	2016-09-24	2017-09-23
Goniophotometer(with mirror)	LC-I-902	GMS2000	2016-05-07	2017-05-07
Wireless temperature transmitter	LC-I-978	DWRF-B	2016-02-03	2017-02-02
Wireless temperature transmitter	LC-I-979	DWRF-B	2016-02-03	2017-02-02

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	120.00V~60Hz	119.97V~60Hz
Input Current(A)	0.283	0.281
Total Power(W)	33.05	32.86
Power Factor	0.974	0.973
I-THD	-	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	3344.92
Luminaire Efficacy(Lm/W)	-	101.79
Correlated Color Temperature (CCT)(K)	4038	-
Color Rendering Index (CRI)	85.1	-
R9	21	-
Chromaticity Coordinate (x,y)	x = 0.3776 y = 0.3716	-
Chromaticity Coordinate (u,v)	u = 0.2253 v = 0.3326	-
Chromaticity Coordinate (u',v')	u' = 0.2253 v' = 0.4989	-
Duv	-0.00159	-
Zone Lumens between 0-60 °	-	%

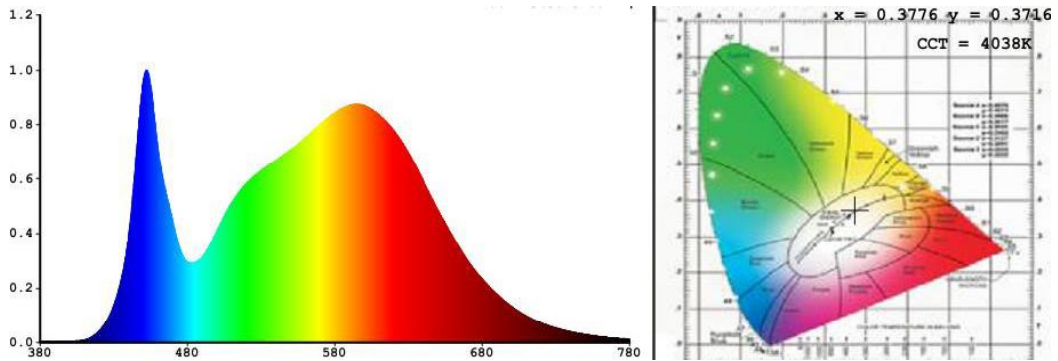
3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
84	91	95	83	84	87	87	69
R9	R10	R11	R12	R13	R14	R15	-
21	78	82	64	86	98	79	-

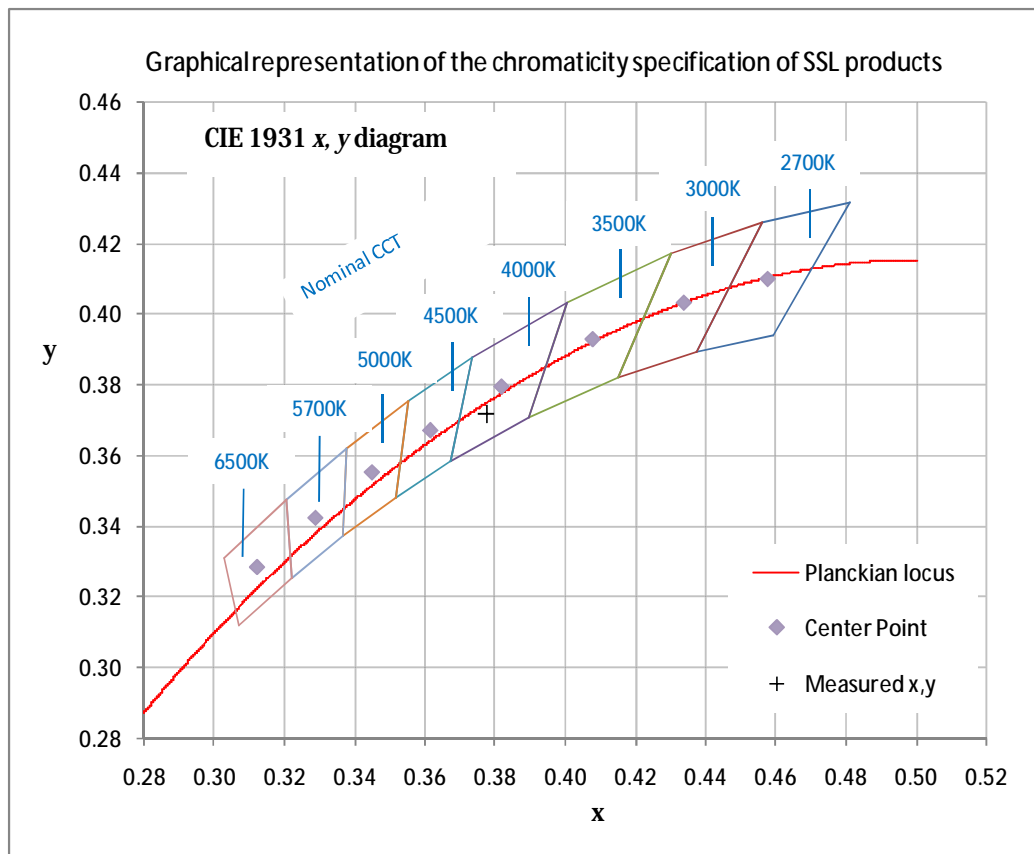
Note: N.A.

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)	1.26	Luminous Length	1.22 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.13 m
Spacing Criteria (Diagonal)	1.42	Luminous Height	0.04 m
Test Distance	29.65 m		

4.4 Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-20	405.13	12.10	12.10
0-30	862.44	25.80	25.80
0-40	1419.99	42.50	42.50
0-60	2562.15	76.60	76.60
0-80	3249.52	97.10	97.20
0-90	3320.62	99.30	99.30
10-90	3215.95	96.10	96.10
20-40	1014.86	30.30	30.30
20-50	1605.86	48.00	48.00
40-70	1574.91	47.10	47.10
60-80	687.37	20.50	20.60
70-80	254.62	7.60	7.60
80-90	71.10	2.10	2.10
90-110	8.19	0.20	0.20
90-120	10.41	0.30	0.30
90-130	12.42	0.40	0.40
90-150	17.26	0.50	0.50
90-180	24.20	0.70	0.70
110-180	16.00	0.50	0.50
0-180	3344.81	100.00	100.00

Total Luminaire Efficiency = 100.00%

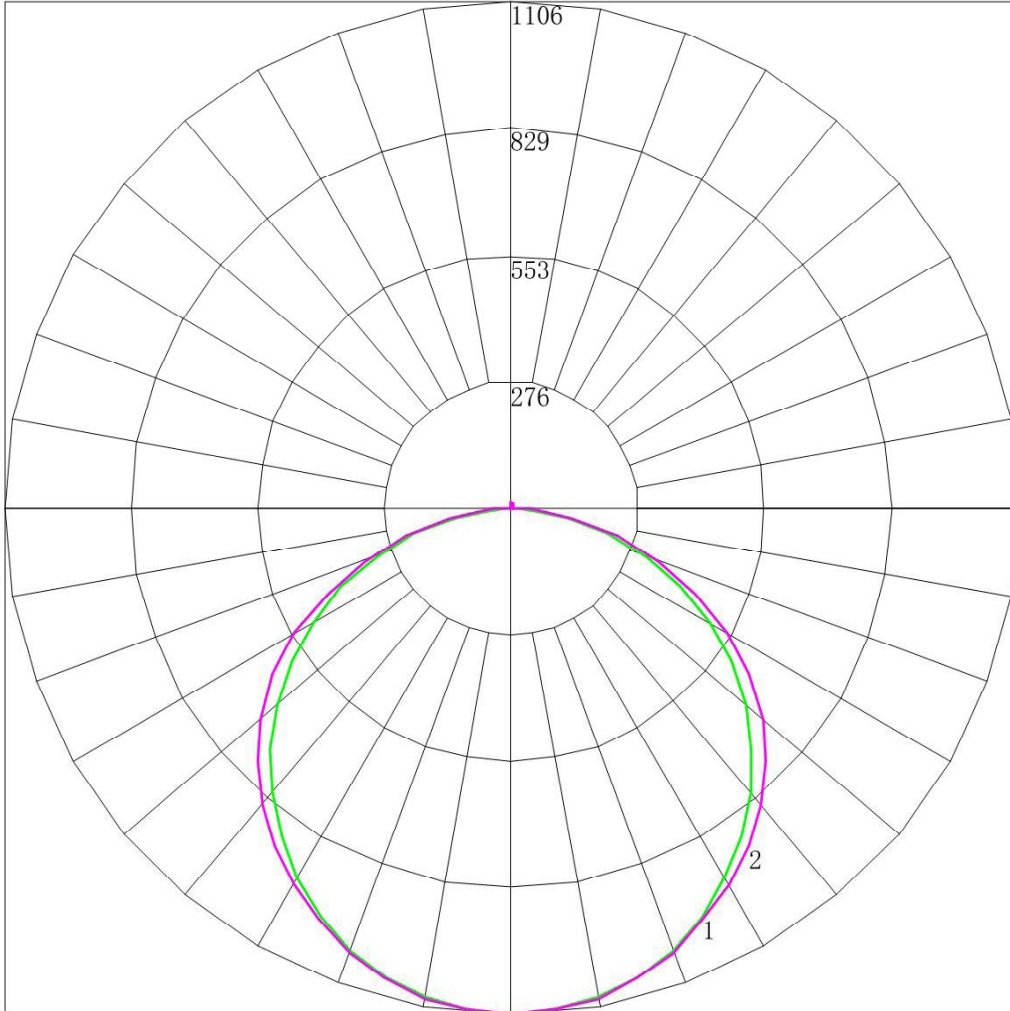
ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	104.66
10-20	300.47
20-30	457.31
30-40	557.55
40-50	591.00
50-60	551.16
60-70	432.75
70-80	254.62
80-90	71.10
90-100	5.45
100-110	2.74
110-120	2.22
120-130	2.01
130-140	2.08
140-150	2.76
150-160	3.20
160-170	2.67
170-180	1.07



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4.5 Polar Curves



Maximum Candela = 1105.835 Located At Horizontal Angle = 0, Vertical Angle = 0

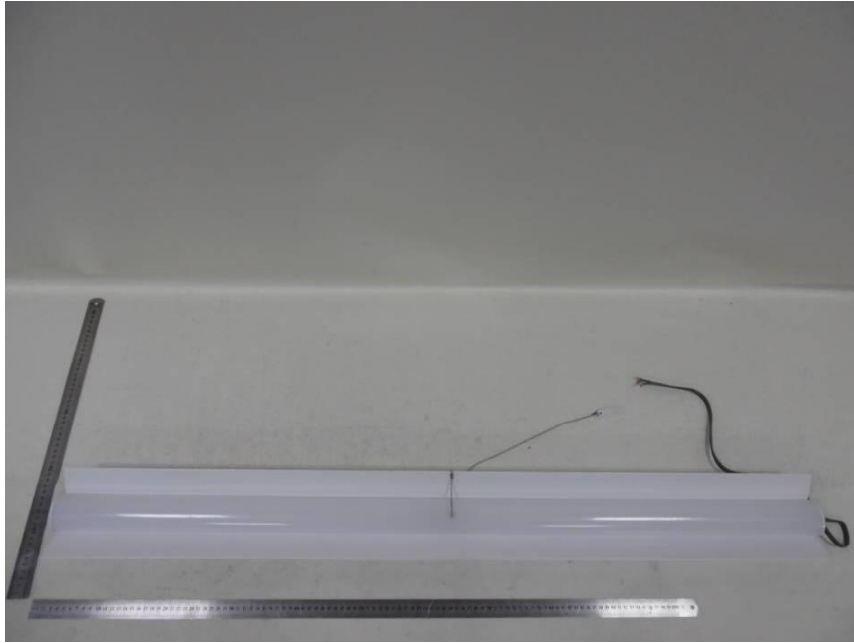
1 - Vertical Plane Through Horizontal Angles (0 - 180)

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

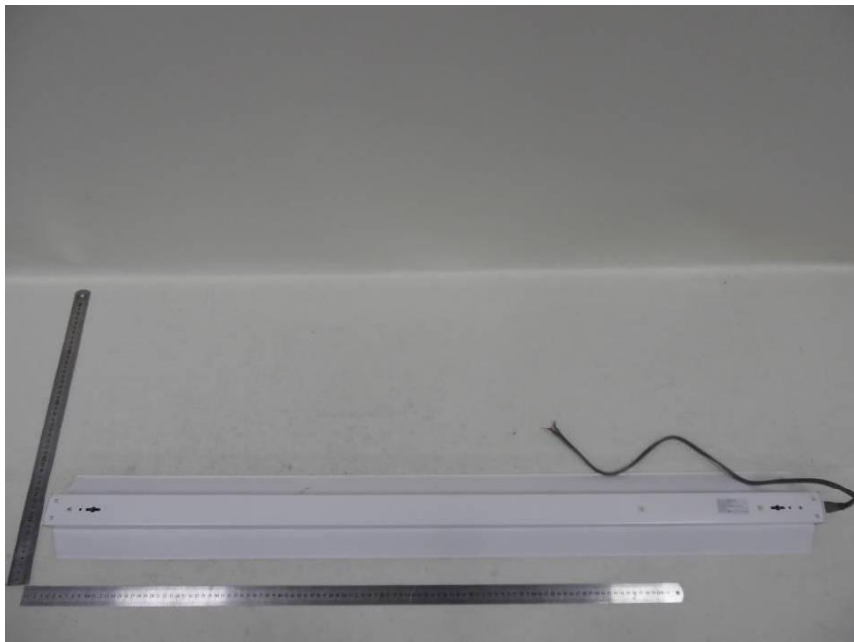
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
0	1105.835	1105.835	1105.835	1105.835	1105.835	1105.835	1105.835
5	1100.003	1100.438	1101.325	1101.140	1101.407	1101.062	1100.312
10	1086.013	1085.847	1086.419	1087.827	1088.300	1088.720	1088.151
15	1061.060	1062.393	1062.996	1064.864	1066.100	1066.201	1064.943
20	1028.081	1032.029	1031.466	1034.341	1033.820	1034.943	1033.515
25	984.797	988.034	988.663	994.074	993.668	995.700	992.922
30	935.855	938.864	939.710	945.224	947.288	952.401	949.932
35	876.915	881.686	882.178	891.461	896.465	902.807	900.220
40	814.159	818.692	819.826	832.439	840.436	848.550	846.654
45	743.904	749.468	751.694	768.125	777.502	786.568	782.212
50	667.685	673.134	678.996	697.902	707.554	717.339	717.941
55	587.914	593.466	601.445	621.733	634.913	644.019	636.029
60	499.064	505.876	519.769	542.453	550.752	549.653	546.067
65	409.777	414.272	433.741	453.311	450.446	448.580	442.574
70	315.095	322.581	345.482	353.506	348.869	343.786	341.522
75	218.922	231.087	250.674	250.829	244.290	240.292	237.601
80	128.011	144.748	152.217	149.021	143.001	136.803	133.980
85	51.836	63.629	62.426	57.040	50.373	45.043	41.577
90	11.578	16.588	13.559	9.805	7.111	5.036	3.768
95	3.026	4.169	4.599	4.259	3.425	2.420	1.798
100	2.763	3.028	3.553	3.429	2.901	2.224	1.756
105	2.544	2.765	2.986	2.905	2.574	2.049	1.756
110	2.237	2.501	2.615	2.577	2.356	1.940	1.713
115	2.149	2.414	2.441	2.359	2.138	1.853	1.756
120	2.193	2.414	2.463	2.359	2.138	1.918	1.841
125	2.324	2.392	2.463	2.337	2.225	2.049	1.927
130	2.237	2.282	2.310	2.293	2.203	2.027	1.884
135	2.675	2.677	2.746	2.664	2.574	2.529	2.441
140	3.421	3.423	3.465	3.428	3.294	3.248	3.211
145	4.473	4.432	4.424	4.433	4.318	4.273	4.282
150	5.657	5.683	5.579	5.569	5.519	5.516	5.438
155	7.148	7.109	6.996	6.988	6.979	6.911	6.808
160	8.464	8.447	8.391	8.386	8.332	8.306	8.264
165	9.780	9.764	9.568	9.609	9.531	9.483	9.420
170	10.657	10.642	10.527	10.570	10.579	10.442	10.319
175	11.534	11.475	11.399	11.443	11.407	11.446	11.475
180	11.883	11.883	11.883	11.883	11.883	11.883	11.883

Appendix 1 Product Photo



Picture 1



Picture 2

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