

## LM-79-08 Test Report

For

### ELEC-TECH INTERNATIONAL CO LTD

No.1 Jinfeng Road, Tangjiawan Town, Xiangzhou District, Zhuhai City, Guangdong  
Province, P.R. China 519085

### Inseparable SSL Luminaire

Model name(s):

546921##

Representative (Tested) Model:

54692141

**Model Difference: ##=41-50 intends CCT is 4000K**

Prepare By:



Engineer: Leo Liu

Date: 2017-09-14

Review By:



Technical Lead: Vincent Yuan

Date: 2017-09-15

Note: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

**Product Information:**

Client Name:	ELEC-TECH INTERNATIONAL CO LTD
Brand Name:	ETI, Commercial Electric
Model Number:	546921##(##=41-50)
Product type:	Inseparable SSL Luminaire
Rating Input:	AC120V, 60Hz, 8.5 W
Declared CCT:	4000K
Declared Light output:	600lm
LED Manufacturer:	SAMSUNG
LED Model:	SPMWHX228F
LED Quantity:	22 pcs
Forward current of LED Chip:	150 mA
Date of Receipt Samples:	2017-09-06
Quantity of Receipt Samples:	3
Sample Number:	170906009-S1

**Laboratory Information:**

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 <sup>st</sup> North Industry Road, Songshan Lake Science & Technology Park, Dongguan, Guangdong, China
Laboratory Contact Name:	Neil Zhong
Laboratory Contact E-mail:	Neil_ntc@163.com

**Report Information**

Issued Date of Test Report:	2017-09-15
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17090013
Remark (If applicable)	N/A

<b>Test Specifications:</b>	
Date of Test`	2017-09-12
Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate
Reference Standard	IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products CIE 13.3-1995 Method of Measuring and Specifying Color Rendering Properties of Light Sources CIE 15-2004 Technical Report Colorimetry

<b>Test Methods</b>
<p><b>1. Photometric and Electrical measurements – Light Distribution Method:</b></p> <p>Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at <math>25^{\circ}\text{C} \pm 1^{\circ}\text{C}</math>, measured at a point not more than 1 m from the sample and at the same height as the sample. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at <math>1^{\circ}</math> vertical intervals and <math>22.5^{\circ}</math> Vertical intervals.</p>
<p><b>2. Photometric and Electrical Measurements – Integrating Sphere Method:</b></p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at <math>25^{\circ}\text{C} \pm 1^{\circ}\text{C}</math>. The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. The sample was operated at 120 Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at least 5 nm intervals over the range of 380 to 780 nm.</p>

**Integrating Sphere Test Results**

**Test Condition:**

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
24.9 °C	51 %	Face Down	90 mins	25 mins

**Electrical Data:**

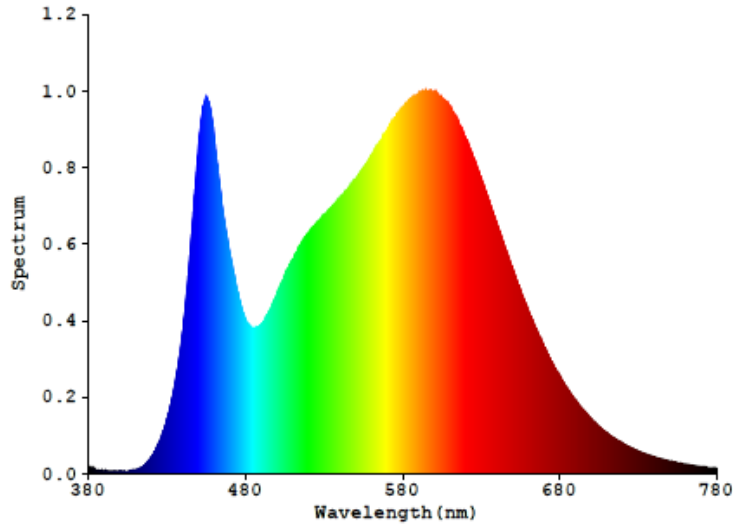
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.0674	7.67	0.9493

**Color Data:**

Parameter	Result
CCT (K)	3959
Color Rendering Index (CRI)	84.9
R9	17
Chromaticity, x	0.3813
Chromaticity, y	0.3745
Chromaticity u'	0.2266
Chromaticity v'	0.5007
Duv	-0.00134

Special Color Rendering			
R1	84	R9	17
R2	93	R10	83
R3	96	R11	81
R4	82	R12	67
R5	84	R13	87
R6	89	R14	98
R7	85	R15	78
R8	66	-	-

**Spectrum Diagram:**



**Goniophotometer Test Results:**

**Test Condition:**

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.2 °C	50 %	Face Down	90 mins	25 mins

**Electrical Data:**

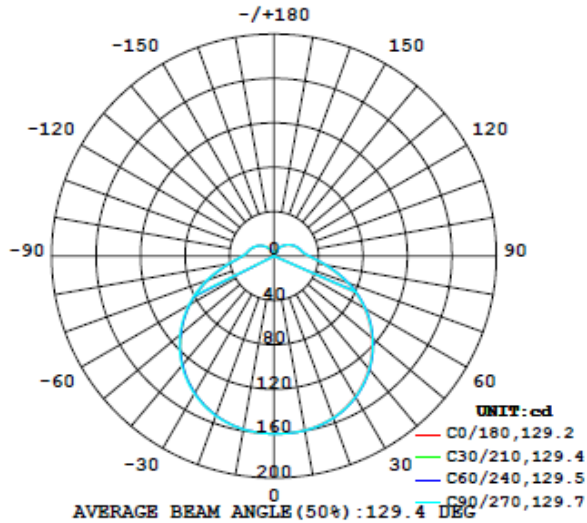
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.0674	7.67	0.9493

**Goniophotometer Data:**

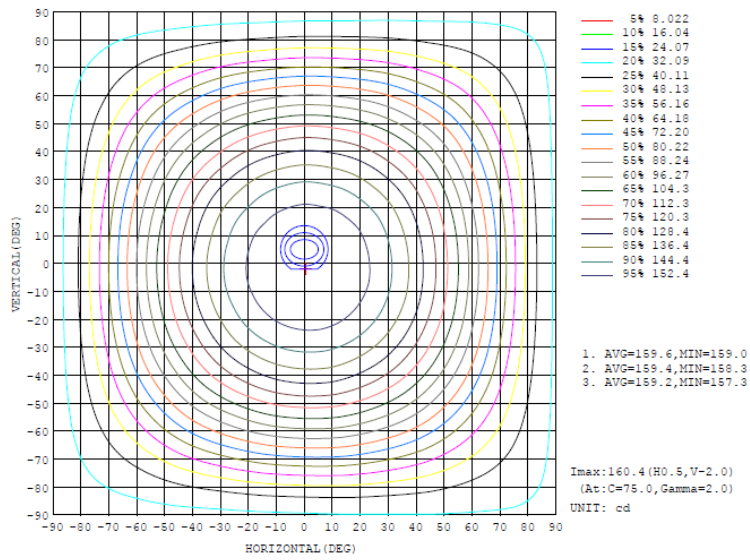
Parameter	Result
Total Luminous (lm)	685.96
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	89.39
Zonal Lumens Distribution (0-90°)	84.2%
Beam Angle (°)	129.4

**Luminous Intensity Distribution Diagram:**

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



**Isocandela Diagram:**



**Zonal Flux Diagram:**

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	◆ zone	◆ total	◆lum,lamp
10	159.2	159.6	159.4	158.8	158.4	158.3	158.7	158.9	0- 10	15.23	15.23	2,222,2.22
20	154.9	155.5	155.2	154.1	153.0	152.5	153.4	154.0	10- 20	44.41	59.64	8,69,8.69
30	145.9	146.9	146.4	144.7	142.9	142.2	143.4	144.6	20- 30	69.18	128.8	18,8,18.8
40	132.4	133.7	133.0	130.6	128.5	127.4	129.0	130.6	30- 40	86.51	215.3	31,4,31.4
50	114.8	116.4	115.5	112.8	110.0	108.9	110.6	112.5	40- 50	94.28	309.6	45,1,45.1
60	93.56	95.39	94.24	91.31	88.28	86.95	88.82	91.04	50- 60	91.51	401.1	58,5,58.5
70	69.67	71.63	70.22	67.35	64.19	62.83	64.69	67.02	60- 70	78.64	479.7	69,9,69.9
80	46.19	47.96	46.86	44.25	41.77	40.75	42.24	44.00	70- 80	58.45	538.2	78,5,78.5
90	30.74	31.89	31.24	29.77	28.38	28.02	28.80	29.56	80- 90	39.42	577.6	84,2,84.2
100	24.96	25.62	25.41	24.57	23.85	23.74	24.15	24.40	90-100	29.10	606.7	88,4,88.4
110	22.17	22.77	22.57	21.82	21.17	21.05	21.45	21.71	100-110	24.61	631.3	92,92
120	18.98	19.55	19.24	18.66	18.07	17.92	18.33	18.55	110-120	20.16	651.5	95,95
130	15.41	15.92	15.69	15.11	14.51	14.34	14.75	14.96	120-130	15.20	666.7	97,2,97.2
140	11.58	12.04	11.82	11.33	10.73	10.57	10.94	11.15	130-140	10.27	677.0	98,7,98.7
150	7.584	7.949	7.754	7.348	6.877	6.738	7.053	7.249	140-150	5.891	682.8	99,5,99.5
160	3.650	3.912	3.770	3.469	3.127	3.016	3.239	3.406	150-160	2.524	685.4	99,9,99.9
170	0.5653	0.6668	0.6452	0.5240	0.4401	0.4030	0.4097	0.4895	160-170	0.5646	685.9	100,100
180	0.0341	0.0380	0.0350	0.0241	0.0241	0.0250	0.0250	0.0238	170-180	0.0238	686.0	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 19.5 %									UNIT:lm		

**Luminous Distribution Intensity Data:**

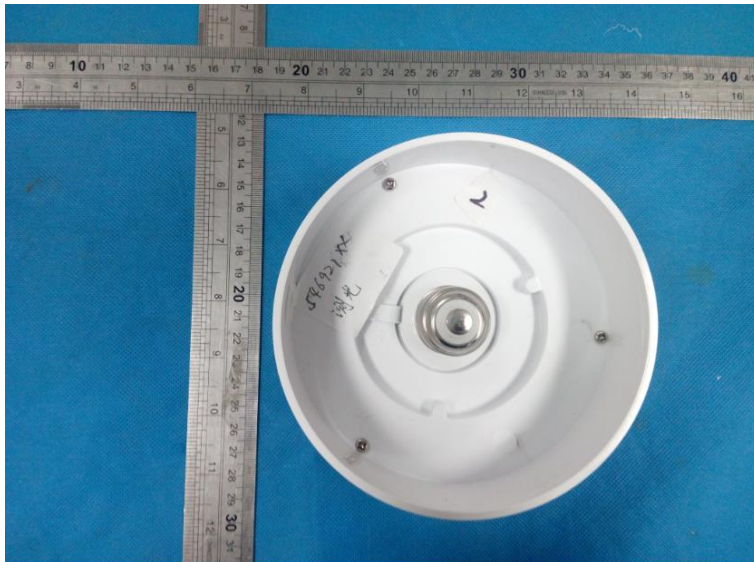
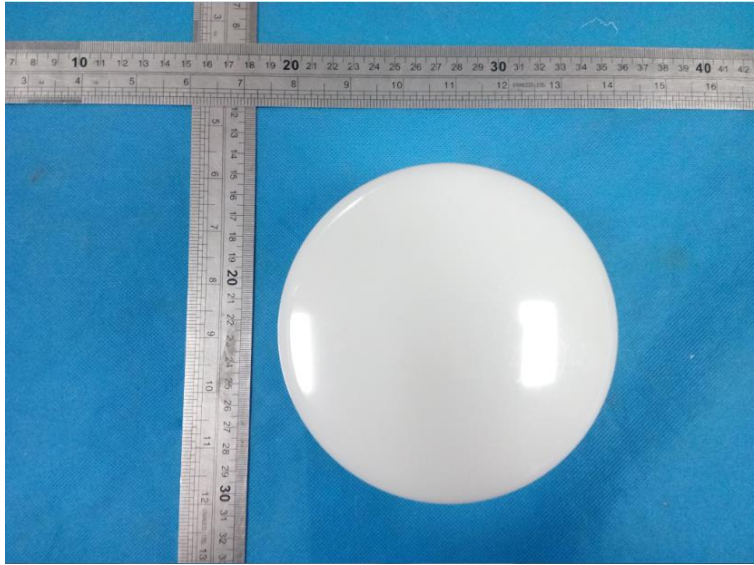
Table--1 UNIT: cd

C (DEG) y (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
5	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
10	159	160	160	160	160	160	160	159	159	159	159	159	158	158	158	158	158	159	159
15	158	158	158	158	158	158	158	157	157	157	156	156	156	156	156	156	156	156	157
20	155	155	156	155	156	155	155	154	154	154	153	153	153	153	152	153	153	153	153
25	151	152	152	152	152	152	151	150	150	149	149	149	148	148	148	148	148	148	149
30	146	147	147	147	147	147	146	146	145	145	144	143	143	142	142	142	142	143	143
35	140	140	141	141	141	141	140	140	139	138	137	137	136	136	136	135	136	136	137
40	132	133	134	134	134	133	132	131	131	130	129	128	128	128	127	128	128	128	129
45	124	125	125	126	125	126	125	124	123	122	121	120	120	119	119	119	119	119	120
50	115	116	116	116	116	115	115	114	113	111	111	110	109	109	109	109	110	111	111
55	105	106	106	106	106	106	105	105	103	102	101	100	99.5	98.6	98.6	98.3	98.8	99.1	100
60	93.6	94.6	95.0	95.4	95.2	95.3	94.2	93.5	92.1	91.3	89.8	89.2	88.3	87.3	87.3	87.0	87.6	87.8	88.8
65	81.9	83.2	83.4	84.0	83.7	83.7	82.6	81.9	80.4	79.6	78.0	77.3	76.6	75.5	75.4	74.9	75.6	75.9	76.9
70	69.7	70.8	71.1	71.6	71.3	71.4	70.3	69.6	68.1	67.4	65.7	65.0	64.2	63.2	63.1	62.8	63.5	63.6	64.7
75	57.5	58.6	58.8	59.4	59.1	59.1	58.1	57.4	56.0	55.2	53.7	53.0	52.3	51.3	51.3	51.0	51.6	51.8	52.8
80	46.2	47.2	47.4	48.0	47.7	47.7	46.9	46.2	45.0	44.2	43.0	42.4	41.8	41.0	40.9	40.7	41.3	41.5	42.2
85	37.1	37.9	38.1	38.6	38.4	38.5	37.8	37.2	36.3	35.7	34.6	34.2	33.7	33.1	33.1	33.0	33.5	33.6	34.2
90	30.7	31.3	31.5	31.9	31.8	31.8	31.3	30.9	30.2	29.8	29.1	28.7	28.4	28.0	28.0	28.0	28.3	28.4	28.8
95	26.9	27.3	27.5	27.8	27.8	27.8	27.4	27.1	26.7	26.3	25.9	25.6	25.4	25.2	25.2	25.2	25.4	25.5	25.7
100	25.0	25.2	25.4	25.6	25.7	25.6	25.4	25.1	24.8	24.6	24.2	24.1	23.9	23.7	23.7	23.9	24.0	24.1	24.1
105	23.6	23.9	24.0	24.2	24.3	24.3	24.1	23.8	23.5	23.3	22.9	22.8	22.6	22.4	22.4	22.4	22.6	22.7	22.9
110	22.2	22.4	22.6	22.8	22.8	22.8	22.6	22.4	22.1	21.8	21.5	21.3	21.2	21.0	21.0	21.1	21.2	21.3	21.4
115	20.6	20.9	21.0	21.2	21.2	21.2	21.0	20.8	20.5	20.3	20.0	19.8	19.7	19.5	19.5	19.7	19.8	19.9	19.9
120	19.0	19.2	19.3	19.5	19.6	19.5	19.3	19.1	18.9	18.7	18.3	18.2	18.1	17.9	17.9	18.1	18.2	18.3	18.3
125	17.2	17.5	17.6	17.8	17.8	17.8	17.6	17.4	17.1	16.9	16.6	16.5	16.3	16.1	16.1	16.1	16.3	16.4	16.6
130	15.4	15.6	15.7	15.9	15.9	15.9	15.7	15.5	15.3	15.1	14.8	14.7	14.5	14.3	14.3	14.3	14.5	14.6	14.7
135	13.6	13.8	13.9	14.0	14.0	14.0	13.8	13.7	13.4	13.3	13.0	12.9	12.6	12.5	12.5	12.5	12.6	12.7	12.9
140	11.6	11.8	11.9	12.0	12.0	12.0	11.8	11.7	11.5	11.3	11.1	10.9	10.7	10.6	10.6	10.7	10.8	10.9	10.9
145	9.60	9.80	9.89	10.0	9.98	9.96	9.78	9.69	9.46	9.35	9.10	8.97	8.79	8.63	8.63	8.64	8.78	8.85	8.99
150	7.58	7.77	7.85	7.95	7.92	7.91	7.75	7.65	7.47	7.35	7.13	7.00	6.88	6.74	6.74	6.74	6.86	6.92	7.05
155	5.58	5.74	5.81	5.90	5.88	5.86	5.72	5.64	5.48	5.36	5.17	5.04	4.95	4.83	4.82	4.82	4.92	4.98	5.10
160	3.65	3.78	3.83	3.91	3.90	3.88	3.77	3.70	3.56	3.47	3.30	3.20	3.13	3.03	3.02	3.02	3.09	3.13	3.24
165	1.91	2.00	2.04	2.09	2.09	2.10	2.02	1.97	1.85	1.77	1.65	1.59	1.54	1.47	1.46	1.45	1.45	1.45	1.50
170	0.57	0.61	0.63	0.67	0.66	0.68	0.65	0.62	0.55	0.52	0.48	0.46	0.44	0.42	0.42	0.40	0.39	0.38	0.41
175	0.13	0.12	0.12	0.13	0.13	0.14	0.15	0.16	0.17	0.19	0.21	0.23	0.24	0.24	0.23	0.24	0.23	0.21	0.20
180	0.03	0.03	0.03	0.04	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.04

Table--2 UNIT: cd

C (DEG) y (DEG)	285	300	315	330	345														
0	160	160	160	160	160														
5	160	160	160	160	160														
10	159	159	159	159	159														
15	157	157	157	157	158														
20	153	154	154	154	155														
25	149	150	150	151	151														
30	143	144	145	145	146														
35	137	138	138	139	139														
40	129	130	131	132	132														
45	121	121	122	123	123														
50	111	112	113	114	114														
55	100	102	102	103	104														
60	89.2	90.4	91.0	92.5	93.0														
65	77.4	78.6	79.3	80.7	81.2														
70	65.1	66.4	67.0	68.4	69.1														
75	53.2	54.3	54.9	56.3	56.9														
80	42.6	43.6	44.0	45.1	45.7														
85	34.4	35.1	35.4	36.3	36.7														
90	28.9	29.3	29.6	30.1	30.5														
95	25.8	26.0	26.2	26.5	26.8														
100	24.2	24.3	24.4	24.7	24.8														
105	22.9	23.0	23.1	23.3	23.5														
110	21.5	21.6	21.7	21.9	22.1														
115	20.0	20.1	20.2	20.4	20.5														
120	18.3	18.5	18.5	18.8	18.9														
125	16.6	16.7	16.8	17.0	17.1														
130	14.7	14.9	15.0	15.2	15.3														
135	12.9	13.0	13.1	13.3	13.4														
140	11.0	11.1	11.1	11.4	11.5														
145	9.01	9.13	9.20	9.36	9.46														
150	7.09	7.19	7.25	7.41	7.50														
155	5.13	5.24	5.28	5.42	5.50														
160	3.27	3.37	3.41	3.52	3.59														
165	1.62	1.71	1.74	1.82	1.87														
170	0.41	0.32	0.49	0.53	0.55														
175	0.18	0.16	0.15	0.11	0.12														
180	0.04	0.03	0.03	0.03	0.03														





**Equipment List:**

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2016-12-03	2017-12-02
NTC-F01-006	2.0 meter Integrating Sphere	2016-12-03	2017-12-02
NTC-F01-013	Standard Lamp	2016-12-27	2017-12-26
NTC-F01-031	Digital Power Meter	2016-12-05	2017-12-04
NTC-F01-019	Temperature & Humidity Meter	2016-11-28	2017-11-27



NVLAP LAB CODE 600150-0

Report No: NTCR17090013

Report Version: V1.1

**\*\*\*\*\*END OF DATASHEET\*\*\*\*\***