

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):

546763##

546765##

Representative (Tested) Model:

54676341

**Model Difference: All model is identical to each other, except 546763## has
Emergency Power Pack. ##=41-50 intends CCT is 4000K.**

Prepare By:



Engineer: Leo Liu

Date: 2017-07-31

Review By:



Technical Lead: Vincent Yuan

Date: 2017-07-31

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
Model Number:	546763##, 546765##(##=41-50)
Product type:	Inseparable SSL Luminaire
Rating Input:	AC120-277V, 50/ 60Hz, 45W
Declared CCT:	4000K
Declared Light output:	3600 lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX228F
LED Quantity:	110 pcs
Forward current of LED Chip:	150mA
Date of Receipt Samples:	2017-06-30
Quantity of Receipt Samples:	1
Sample Number:	170630001-S1

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1 st 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:	2017-07-31
Revised Date of Test Report:	N/A
Test Report No.:	NTCR17070053
Remark (If applicable)	N/A

Test Specifications:	
Date of Test	2017-07-28
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

Test Methods
<p>1. Photometric and Electrical measurements – Light Distribution Method:</p> <p>Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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 1° vertical intervals and 22.5° Vertical intervals.</p>
<p>2. Photometric and Electrical Measurements – Integrating Sphere Method:</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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
25.2 °C	40 %	Face Down	90 min	25 min

Electrical Data:

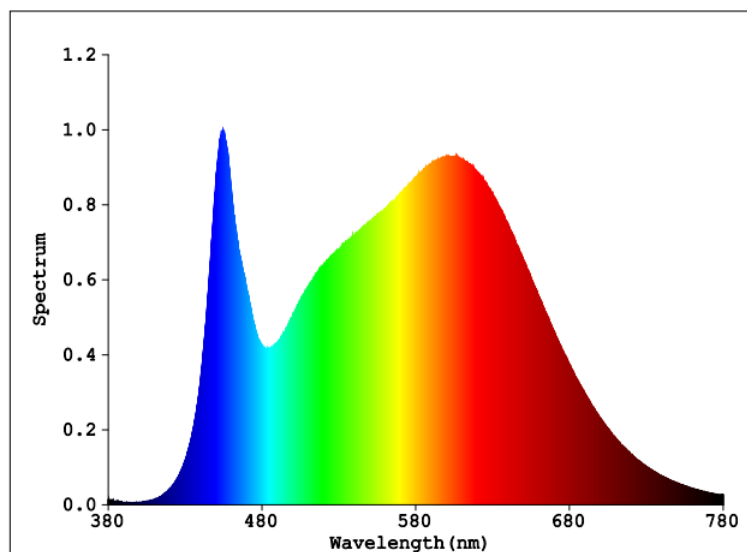
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.3853	44.97	0.9726

Color Data:

Parameter	Result
CCT (K)	3973
Color Rendering Index (CRI)	90.8
R9	51
Chromaticity, x	0.3805
Chromaticity, y	0.3733
Chromaticity u'	0.2265
Chromaticity v'	0.5001
Duv	-0.00163

Special Color Rendering			
R1	91	R9	51
R2	97	R10	91
R3	97	R11	89
R4	89	R12	72
R5	90	R13	93
R6	93	R14	99
R7	90	R15	88
R8	79	-	-

Spectrum Diagram:



Goniophotometer Test Results:

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.1 °C	40 %	Face Down	90 min	25 min

Electrical Data:

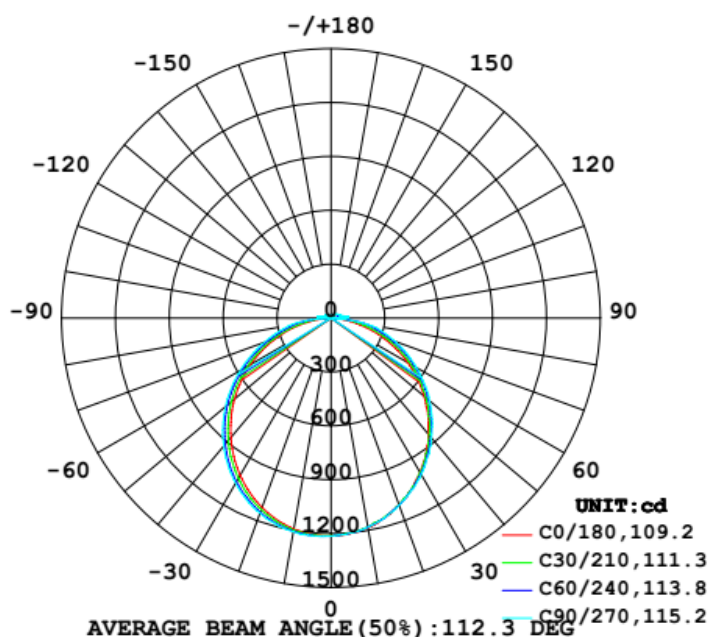
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.3853	44.97	0.9726

Goniophotometer Data:

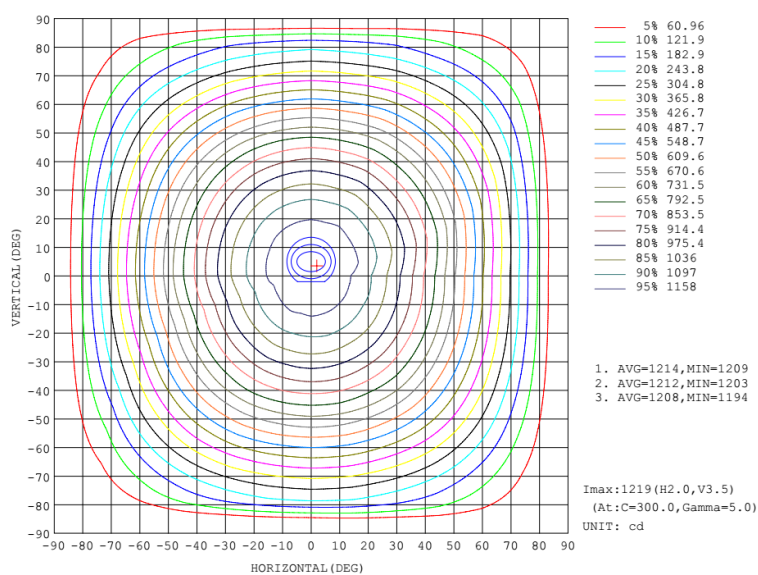
Parameter	Result
Total Luminous (lm)	3658.3
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	81.35
Beam Angle (°)	112.3
Center Beam Candle Power (cd)	1220

Luminous Intensity Distribution Diagram:

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



Isocandela Diagram:



Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

y	C0	C45	C90	C135	C180	C225	C270	C315	y	zone	total	%lum, lamp
10	1184	1182	1182	1181	1192	1202	1208	1205	0- 10	114.8	114.8	3.14,3.14
20	1105	1108	1109	1104	1122	1145	1156	1147	10- 20	328.4	443.2	12.1,12.1
30	992.7	1001	1005	992.3	1011	1043	1062	1046	20- 30	496.2	939.5	25.7,25.7
40	843.3	860.0	870.4	856.1	866.9	906.2	929.7	910.6	30- 40	596.7	1536	42,42
50	676.6	705.2	715.6	694.6	701.7	739.5	767.0	746.9	40- 50	619.1	2155	58.9,58.9
60	491.2	529.1	548.6	518.3	516.5	552.3	585.1	563.2	50- 60	563.7	2719	74.3,74.3
70	298.2	348.8	379.3	338.5	322.1	357.0	395.5	369.3	60- 70	441.0	3160	86.4,86.4
80	108.8	182.1	208.7	170.1	129.9	179.8	231.8	187.3	70- 80	276.4	3436	93.9,93.9
90	1.305	9.241	24.30	26.86	3.448	1.938	1.965	2.577	80- 90	84.19	3520	96.2,96.2
100	1.887	41.34	71.20	40.32	2.737	31.02	58.57	30.90	90-100	38.79	3559	97.3,97.3
110	2.215	39.99	52.16	33.86	3.842	24.69	37.91	24.16	100-110	31.42	3591	98.2,98.2
120	2.150	28.32	43.55	28.65	3.257	21.09	31.98	20.49	110-120	24.44	3615	98.8,98.8
130	2.150	22.90	35.39	23.30	2.931	16.72	25.38	16.06	120-130	18.32	3633	99.3,99.3
140	2.150	17.67	27.11	18.07	3.126	12.47	18.86	12.08	130-140	12.30	3646	99.7,99.7
150	2.410	12.39	19.20	13.04	3.257	8.880	12.66	8.883	140-150	7.505	3653	99.9,99.9
160	2.410	2.480	11.56	2.872	3.322	2.547	7.507	2.806	150-160	3.563	3657	100,100
170	3.713	3.325	5.225	3.720	3.322	3.133	2.871	3.263	160-170	1.135	3658	100,100
180	3.778	3.067	2.611	3.002	3.322	3.002	2.611	3.263	170-180	0.3353	3658	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 15.1 %								UNIT:lm			

Luminous Distribution Intensity Data:

Table--1

UNIT: cd

C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
γ (DEG)	0	1213	1212	1212	1213	1214	1214	1214	1211	1217	1215	1215	1213	1212	1212	1213	1214	1214	1214
5	1205	1205	1201	1203	1201	1203	1203	1201	1206	1205	1202	1204	1208	1210	1211	1214	1215	1217	1216
10	1184	1183	1181	1182	1182	1180	1182	1180	1184	1181	1179	1181	1192	1194	1198	1202	1205	1207	1208
15	1151	1148	1148	1149	1153	1150	1152	1149	1151	1149	1146	1152	1163	1167	1172	1179	1183	1186	1188
20	1105	1109	1106	1108	1108	1110	1109	1108	1110	1104	1103	1100	1122	1129	1134	1145	1151	1153	1156
25	1056	1052	1054	1057	1057	1064	1058	1060	1060	1052	1051	1048	1071	1079	1088	1099	1106	1111	1114
30	993	993	991	1001	1001	1003	1005	1002	1002	992	987	986	1011	1020	1030	1043	1053	1058	1062
35	921	923	922	933	936	940	940	938	936	928	917	913	943	952	964	977	989	996	1000
40	843	848	851	860	865	872	870	868	863	856	846	843	867	878	891	906	918	924	930
45	764	767	770	786	787	796	796	794	790	779	765	755	787	796	810	825	839	846	852
50	677	682	691	705	708	717	716	714	711	695	680	672	702	709	725	739	753	761	767
55	584	595	603	619	625	636	633	628	624	609	593	583	611	620	634	648	661	671	677
60	491	502	512	529	537	548	549	543	536	518	500	488	517	525	539	552	568	576	585
65	396	408	424	440	450	463	465	457	448	431	408	392	420	428	442	454	472	481	489
70	298	310	329	349	363	377	379	371	361	339	315	294	322	329	344	357	376	387	395
75	201	215	236	262	279	296	298	290	273	250	222	198	225	231	247	263	284	297	307
80	109	127	151	182	205	214	209	203	193	170	136	110	130	138	157	180	206	221	232
85	34.8	52.3	75.7	79.0	63.6	55.6	43.4	40.9	39.3	45.3	45.4	36.9	50.3	60.2	85.3	99.3	108	107	113
90	1.30	2.39	6.40	9.24	15.6	17.6	24.3	26.3	29.6	26.9	25.4	12.1	3.45	3.36	1.63	1.94	1.93	2.04	1.97
95	1.30	9.92	30.1	54.0	76.2	91.6	95.3	89.6	73.9	51.9	28.3	10.1	2.35	9.28	24.8	44.5	62.6	71.9	70.4
100	1.89	9.27	23.9	41.3	56.7	68.2	71.2	66.7	55.7	40.3	24.3	9.67	2.74	8.37	18.1	31.0	45.2	55.5	58.6
105	2.08	8.95	22.4	36.7	47.1	56.1	57.3	54.5	47.4	36.8	22.5	9.35	3.26	8.30	16.5	26.8	34.6	40.1	42.8
110	2.21	8.63	20.7	34.0	43.9	50.6	52.2	49.6	43.6	33.9	21.3	8.70	3.84	7.72	15.3	24.7	31.8	36.3	37.9
115	2.21	7.91	19.2	31.1	40.4	46.5	48.1	45.8	40.5	31.3	19.7	7.99	3.78	7.20	13.9	23.0	29.3	33.6	34.9
120	2.15	7.65	17.5	28.3	36.9	42.7	43.6	41.9	37.2	28.6	18.1	7.86	3.26	6.36	12.8	21.1	26.8	30.6	32.0
125	2.15	7.33	15.9	25.6	33.4	38.3	39.3	38.0	33.6	25.9	16.6	7.40	2.93	6.04	10.9	19.0	24.2	27.6	28.9
130	2.15	3.70	14.5	22.9	30.0	33.9	35.4	33.9	30.3	23.3	15.3	5.54	2.93	5.58	9.95	16.7	21.5	24.4	25.4
135	2.15	3.63	13.0	20.3	26.4	29.9	31.2	30.0	26.7	20.7	13.9	3.57	3.00	3.63	8.64	14.3	18.9	21.8	22.2
140	2.15	4.68	11.4	17.7	23.0	25.8	27.1	25.9	23.3	18.1	12.3	3.71	3.13	3.63	7.35	12.5	15.2	18.0	18.9
145	2.41	4.79	9.89	15.0	19.8	22.1	23.1	22.1	20.0	15.4	10.7	4.81	3.06	4.34	6.43	10.6	13.2	15.3	15.4
150	2.41	3.82	2.47	12.4	16.3	18.2	19.2	18.3	16.5	13.0	3.07	4.03	3.26	4.28	4.41	8.88	10.8	12.7	12.7
155	2.41	3.31	2.53	9.67	13.1	14.3	15.3	14.5	13.4	10.1	2.99	3.57	3.32	4.28	3.18	7.32	8.42	10.1	9.92
160	2.41	3.44	5.01	2.48	3.21	10.6	11.6	10.8	5.50	2.87	5.14	3.77	3.32	4.28	3.64	2.55	6.52	7.90	7.51
165	3.26	3.83	4.62	4.89	2.54	2.42	2.35	2.60	2.56	5.15	5.14	4.61	3.32	4.15	3.45	2.94	2.61	2.35	2.22
170	3.71	4.15	3.84	3.33	4.76	4.37	5.22	4.74	4.79	3.72	4.82	4.81	3.32	3.96	3.51	3.13	2.94	2.94	2.87
175	3.78	4.15	3.51	2.94	3.07	2.74	3.00	2.60	3.21	3.00	4.43	4.55	3.32	3.96	3.58	3.00	2.94	2.74	2.61
180	3.78	4.15	3.45	3.07	2.87	2.81	2.61	2.60	3.01	3.00	4.30	4.55	3.32	3.96	3.58	3.00	2.94	2.74	2.61

Table--2

UNIT: cd

C (DEG)	285	300	315	330	345														
γ (DEG)	0	1211	1217	1215	1215	1215													
5	1212	1220	1216	1213	1213														
10	1205	1209	1205	1200	1198														
15	1185	1189	1182	1177	1173														
20	1153	1157	1147	1141	1135														
25	1111	1113	1102	1095	1086														
30	1058	1060	1046	1039	1029														
35	996	998	982	974	962														
40	926	927	911	902	889														
45	847	847	832	822	810														
50	763	763	747	736	725														
55	672	672	657	646	635														
60	579	580	563	553	541														
65	484	482	466	456	445														
70	389	385	369	359	346														
75	299	292	275	262	248														
80	223	210	187	170	153														
85	111	114	107	91.5	70.7														
90	2.11	1.85	2.58	5.20	8.48														
95	69.8	60.9	44.6	24.5	7.81														
100	55.1	45.5	30.9	17.0	6.88														
105	40.3	34.1	26.2	15.5	6.75														
110	36.1	31.3	24.2	14.3	6.36														
115	33.4	28.9	22.4	13.2	6.36														
120	30.7	26.3	20.5	12.0	5.91														
125	27.7	23.9	18.5	10.5	5.84														
130	24.2	21.2	16.1	9.31	5.01														
135	21.8	18.3	14.0	8.13	3.90														
140	17.9	15.1	12.1	7.09	3.90														
145	15.3	12.8	10.6	6.31	4.74														
150	12.7	10.6	8.88	3.65	4.74														
155	10.2	8.52	7.25	3.91	4.42														
160	7.93	6.41	2.81	4.23	4.29														
165	2.54	2.62	3.32	3.84	3.83														
170	3.05	2.82	3.26	3.84	4.03														
175	2.79	2.82	3.26	3.84	4.68														
180	2.79	2.82	3.26	3.84	4.81														

Photo of Sample:



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

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