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):
545901##

Representative (Tested) Model:
54590141

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

Prepare By:

Engineer: Leo Liu
Date: 2018-02-27

Review By:

Technical Lead: Vincent Yuan
Date: 2018-02-28

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:	545901##(##=41-50)
Product type:	Inseparable SSL Luminaire
Rating Input:	AC120V, 60Hz, 30W
Declared CCT:	4000K
Declared Light output:	2800lm
LED Manufacturer:	Samsung
LED Model:	SPMWHX228FD5WAW0XX
LED Quantity:	75 pcs
Forward current of LED Chip:	160mA
Date of Receipt Samples:	2018-02-07
Quantity of Receipt Samples:	3
Sample Number:	180207001-S1-S3

Laboratory Information:

Test Laboratory:	Dongguan New Testing Centre Co., Ltd
Laboratory Address:	3F, No. 1 the 1st 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:	2018-02-27
Revised Date of Test Report:	N/A
Test Report No.:	NTCR18020021
Remark (*If applicable*)	N/A

Test Specifications:	
Date of Test	2018-02-27
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

1. Photometric and Electrical measurements – Light Distribution Method:

Photometric parameters were measured using the goniophotometer and software. The ambient temperature shall be maintained at 25° C ± 1° 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.

2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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.

Integrating Sphere Test Results

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
24.7 °C	39 %	Face Down	90 mins	25 mins

Electrical Data:

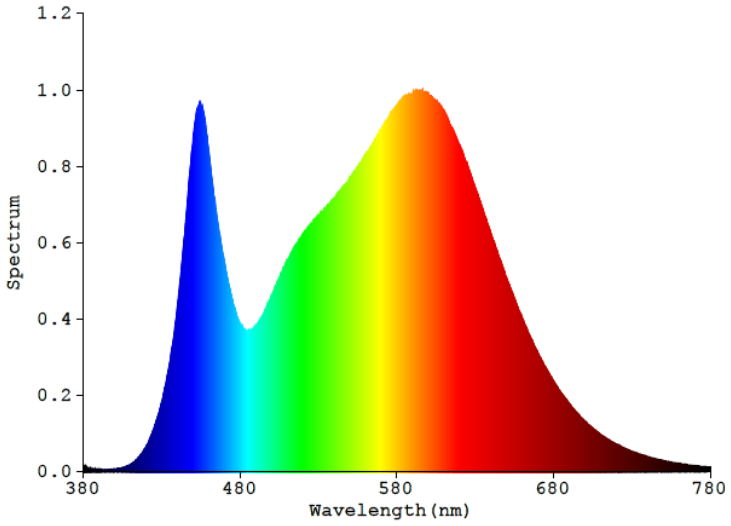
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.2472	28.51	0.9607

Color Data:

Parameter	Result
CCT (K)	4007
Color Rendering Index (CRI)	84.1
R9	12
Chromaticity, x	0.3787
Chromaticity, y	0.3716
Chromaticity u′	0.2260
Chromaticity v′	0.4990
Duv	-0.00194

Special Color Rendering			
R1	83	R9	12
R2	92	R10	81
R3	96	R11	80
R4	81	R12	68
R5	83	R13	86
R6	88	R14	98
R7	85	R15	77
R8	65	-	-

Spectrum Diagram:



Goniophotemeter Test Results:

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
24.7 °C	40 %	Face Down	90 mins	25 mins

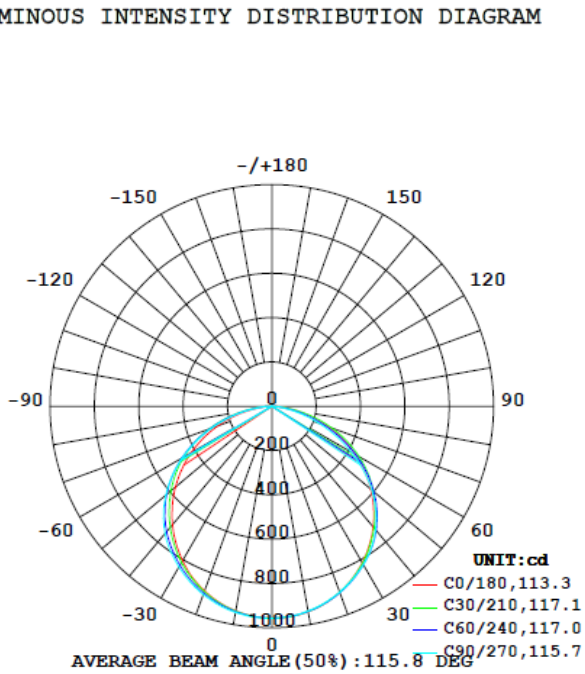
Electrical Data:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.2472	28.51	0.9607

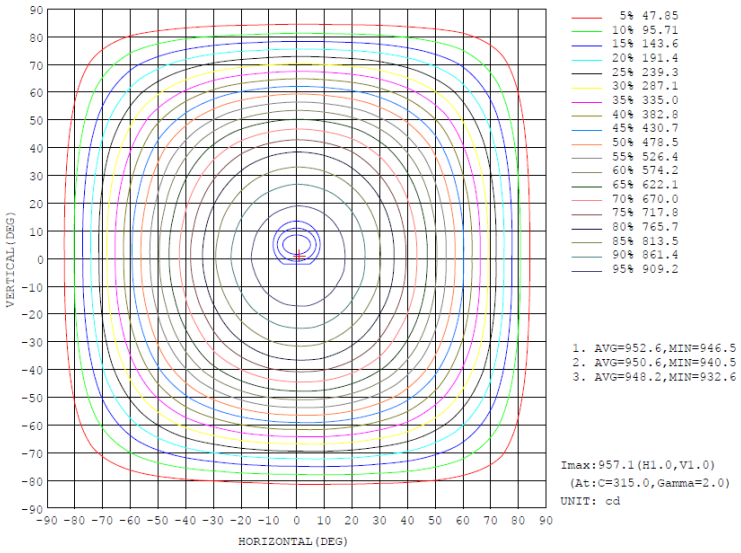
Goniophotometer Data:

Parameter	Result
Total Luminous (lm)	2820.58
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	98.92
Beam Angle (°)	115.8
Center Beam Candle Power (cd)	957

Luminous Intensity Distribution Diagram:



Isocandela Diagram:



Zonal Flux Diagram:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	941.4	939.9	938.3	937.6	937.8	940.2	945.2	944.9	0- 10	90.53	90.53	3.21,3.21
20	894.1	894.6	893.9	887.7	886.9	894.5	904.0	901.6	10- 20	260.1	350.6	12.4,12.4
30	815.8	822.2	825.9	811.1	805.7	820.9	837.8	830.3	20- 30	397.0	747.6	26.5,26.5
40	711.0	727.3	727.8	712.4	697.4	726.8	750.0	734.9	30- 40	485.2	1233	43.7,43.7
50	581.7	604.2	587.8	586.3	567.4	610.7	624.3	620.8	40- 50	511.8	1745	61.9,61.9
60	434.1	451.6	412.7	430.9	419.9	466.2	466.6	476.8	50- 60	468.3	2213	78.5,78.5
70	271.1	275.1	228.2	256.4	260.0	300.8	289.8	309.6	60- 70	357.9	2571	91.1,91.1
80	106.1	98.56	63.14	82.86	99.54	126.8	115.0	133.8	70- 80	200.5	2771	98.3,98.3
90	0.3134	0.1725	0.1698	0.3959	0.3394	7.489	8.744	8.475	80- 90	46.57	2818	99.9,99.9
100	0.0867	0.1420	0.1316	0.1815	0.3068	0.3253	0.2633	0.3013	90-100	0.5439	2818	99.9,99.9
110	0.1415	0.2119	0.1971	0.2401	0.3345	0.3471	0.3029	0.3335	100-110	0.2587	2819	99.9,99.9
120	0.2268	0.3030	0.3037	0.3358	0.2923	0.3424	0.3134	0.3335	110-120	0.2811	2819	99.9,99.9
130	0.3348	0.3990	0.4121	0.4324	0.3984	0.4438	0.4287	0.4317	120-130	0.3188	2819	100,100
140	0.4188	0.4573	0.4808	0.4810	0.5599	0.5914	0.5882	0.5713	130-140	0.3615	2820	100,100
150	0.4663	0.4857	0.5058	0.4995	0.6963	0.7216	0.7277	0.7129	140-150	0.3513	2820	100,100
160	0.5531	0.5687	0.5724	0.5683	0.8028	0.8216	0.8337	0.8235	150-160	0.2987	2820	100,100
170	0.6343	0.6428	0.6314	0.6289	0.8299	0.8369	0.8443	0.8442	160-170	0.2037	2821	100,100
180	0.7706	0.7712	0.7696	0.7659	0.7718	0.7731	0.7700	0.7665	170-180	0.0708	2821	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 13.3 %									UNIT:lm		

Luminous Distribution Intensity Data:

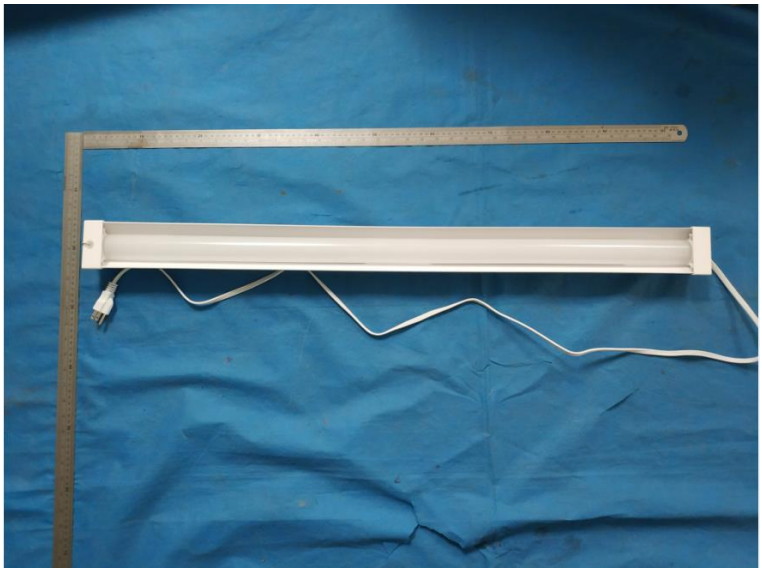
Table--1 UNIT: cd

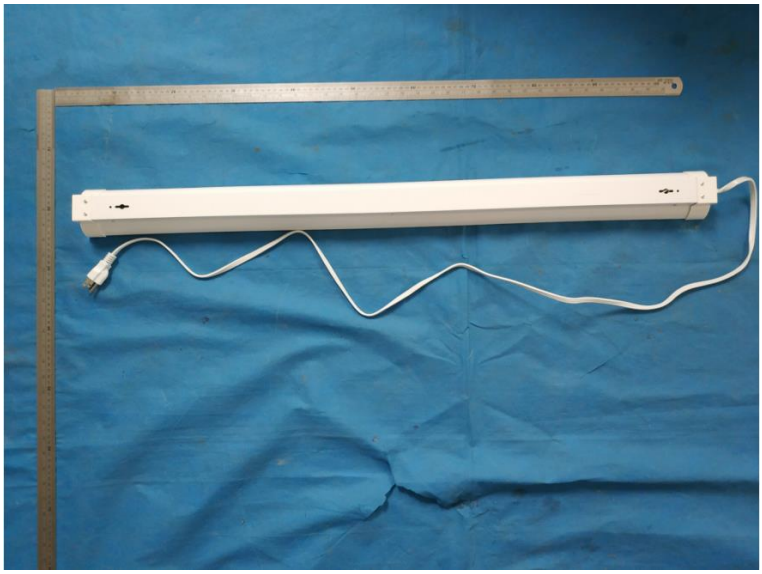
γ (DEG) \ C (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	956	956	956	956	956	957	957	957	956	957	956	956	956	956	956	956	956	957	957
5	953	953	953	952	952	952	951	951	951	951	950	950	951	951	952	952	953	954	955
10	941	941	940	940	940	940	938	938	937	938	936	936	938	938	939	940	942	943	945
15	922	922	921	921	921	921	919	919	917	916	914	914	917	917	919	921	923	926	928
20	894	895	894	895	896	896	894	892	889	888	885	884	887	888	891	895	898	901	904
25	859	860	859	862	864	865	862	860	855	852	848	847	851	851	856	861	867	870	874
30	816	818	818	822	826	828	826	823	817	811	805	802	806	808	815	821	829	833	838
35	766	769	770	777	782	786	782	779	772	764	755	752	754	757	766	776	786	793	797
40	711	714	717	727	732	732	728	725	719	712	700	695	697	701	714	727	739	746	750
45	649	654	660	670	671	669	663	661	657	653	640	633	635	641	655	672	683	687	692
50	582	588	597	604	600	596	588	587	586	586	577	567	567	575	594	611	620	621	624
55	510	517	529	531	523	513	505	504	507	512	508	496	496	506	530	542	548	547	550
60	434	443	453	452	436	424	413	416	420	431	432	423	420	434	458	466	469	465	467
65	354	367	373	365	346	331	320	323	330	345	351	346	342	359	382	385	384	377	379
70	271	288	287	275	254	240	228	231	240	256	266	268	260	283	300	301	297	289	290
75	187	204	200	186	165	151	142	143	152	167	181	185	178	203	215	212	208	199	200
80	106	121	114	98.6	81.1	70.1	63.1	64.7	70.1	82.9	97.1	105	99.5	122	131	127	121	115	115
85	36.4	46.6	36.0	29.1	21.3	20.4	17.7	18.0	17.7	21.9	23.5	34.7	33.6	47.6	50.2	44.6	41.5	38.6	40.2
90	0.31	0.51	0.29	0.17	0.15	0.10	0.17	0.25	0.34	0.40	0.41	0.35	0.34	4.31	3.54	7.49	7.40	8.99	8.74
95	0.06	0.11	0.13	0.12	0.11	0.10	0.11	0.13	0.16	0.18	0.19	0.17	0.28	0.31	0.33	0.32	0.29	0.25	0.26
100	0.09	0.13	0.14	0.14	0.13	0.12	0.13	0.14	0.17	0.18	0.19	0.16	0.31	0.32	0.33	0.33	0.30	0.27	0.26
105	0.11	0.14	0.17	0.17	0.16	0.15	0.16	0.17	0.19	0.21	0.21	0.20	0.33	0.34	0.35	0.35	0.33	0.30	0.29
110	0.14	0.20	0.22	0.21	0.20	0.19	0.20	0.20	0.22	0.24	0.24	0.24	0.33	0.34	0.35	0.35	0.33	0.31	0.30
115	0.18	0.23	0.25	0.25	0.25	0.24	0.25	0.25	0.27	0.28	0.29	0.26	0.31	0.32	0.34	0.34	0.32	0.31	0.30
120	0.23	0.25	0.29	0.30	0.30	0.29	0.30	0.31	0.32	0.34	0.34	0.30	0.29	0.32	0.34	0.34	0.33	0.32	0.31
125	0.28	0.30	0.35	0.36	0.36	0.35	0.36	0.36	0.37	0.39	0.38	0.34	0.33	0.36	0.38	0.39	0.36	0.36	0.36
130	0.33	0.35	0.38	0.40	0.41	0.40	0.41	0.42	0.43	0.43	0.42	0.38	0.40	0.42	0.44	0.44	0.44	0.43	0.43
135	0.38	0.40	0.41	0.44	0.45	0.46	0.46	0.46	0.46	0.46	0.45	0.42	0.48	0.50	0.51	0.52	0.52	0.52	0.52
140	0.42	0.43	0.44	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.46	0.45	0.56	0.57	0.57	0.59	0.58	0.59	0.59
145	0.44	0.46	0.47	0.47	0.48	0.49	0.49	0.49	0.49	0.49	0.48	0.47	0.63	0.64	0.64	0.66	0.66	0.66	0.66
150	0.47	0.47	0.48	0.49	0.49	0.50	0.51	0.51	0.50	0.50	0.49	0.48	0.70	0.71	0.71	0.72	0.72	0.73	0.73
155	0.51	0.52	0.52	0.52	0.52	0.53	0.54	0.54	0.53	0.53	0.53	0.52	0.75	0.76	0.77	0.77	0.78	0.78	0.79
160	0.55	0.56	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.56	0.80	0.81	0.81	0.82	0.82	0.83	0.83
165	0.59	0.59	0.60	0.60	0.60	0.59	0.59	0.60	0.60	0.60	0.59	0.59	0.83	0.83	0.84	0.85	0.85	0.86	0.86
170	0.63	0.64	0.64	0.64	0.64	0.64	0.63	0.63	0.63	0.63	0.63	0.64	0.83	0.83	0.83	0.84	0.84	0.85	0.84
175	0.70	0.70	0.70	0.70	0.69	0.69	0.69	0.69	0.68	0.68	0.69	0.69	0.82	0.82	0.82	0.82	0.81	0.81	0.81
180	0.77	0.77	0.77	0.77	0.76	0.76	0.77	0.77	0.76	0.77	0.76	0.77	0.77	0.77	0.77	0.77	0.76	0.76	0.77

Table--2 UNIT: cd

γ (DEG) \ C (DEG)	285	300	315	330	345
0	957	956	957	956	956
5	955	955	955	954	953
10	945	945	945	943	942
15	928	928	927	925	923
20	904	903	902	900	896
25	873	873	869	866	862
30	836	835	830	826	820
35	796	793	785	779	772
40	749	745	735	726	717
45	691	691	681	669	657
50	625	627	621	607	592
55	550	555	552	541	522
60	468	476	477	471	448
65	382	392	395	394	371
70	293	303	310	311	293
75	202	214	221	226	213
80	119	126	134	139	130
85	40.1	45.9	50.3	57.1	54.3
90	9.30	8.11	8.47	5.74	4.16
95	0.28	0.30	0.30	0.28	0.24
100	0.27	0.29	0.30	0.30	0.27
105	0.30	0.31	0.33	0.32	0.28
110	0.30	0.32	0.33	0.32	0.28
115	0.30	0.32	0.33	0.32	0.26
120	0.32	0.32	0.33	0.31	0.27
125	0.36	0.37	0.37	0.35	0.32
130	0.43	0.44	0.43	0.41	0.39
135	0.52	0.51	0.50	0.48	0.47
140	0.59	0.58	0.57	0.56	0.54
145	0.66	0.65	0.64	0.63	0.62
150	0.73	0.72	0.71	0.70	0.69
155	0.79	0.78	0.77	0.76	0.75
160	0.84	0.83	0.82	0.81	0.80
165	0.87	0.86	0.86	0.84	0.83
170	0.86	0.86	0.84	0.83	0.82
175	0.82	0.83	0.82	0.81	0.81
180	0.77	0.76	0.77	0.76	0.77

Photo of Sample:





Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2017-11-18	2018-11-17
NTC-F01-006	2.0 meter Integrating Sphere	2017-11-18	2018-11-17
NTC-F01-013	Standard Lamp	2017-11-18	2018-11-17
NTC-F01-031	Digital Power Meter	2017-11-18	2018-11-17
NTC-F01-019	Temperature & Humidity Meter	2017-11-23	2018-11-22

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