



# LM-79-08 Test Report

For

# ETI Solid State Lighting (Zhuhai) Ltd

No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China 519085

# **Inseparable SSL Luminaire**

Model Name(s): 565132##

Representative (Tested) Model: 56513241

Model Difference: ## can be 41-50 identical to Color 4000K.

Prepare by:

Engineer: Derek Lai

Date: 2019-08-19

Derele Lai

Review by:

Technical Lead: Vincent Yuan

Incer Tuen

Issue Date: 2019-08-29

Revised Date: N/A

Note: 1. The results contained in this report pertain only to the tested samples.

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





### **Product Information:**

Client Name:	ETI Solid State Lighting (Zhuhai) Ltd	
Brand Name:	Commercial Electric	
Model Number:	565132##(##=41-50)	
Product Type:	Inseparable SSL Luminaire	
Rating Input:	120-277Vac, 50/60Hz, 40W	
Declared CCT:	4000 K	
Declared Light Output:	3600 lm	
LED Manufacturer:	SAMSUNG	
LED Model:	SPMWHX228FD5WAW0XX	
LED Quantity:	150 pcs	

### **Test Information:**

Standard Lamp:	Total Spectral Radiant Flux Standard Lamp, trace to NIST.	
	1. D908S for Gonio	
	2. D215S for Integrating Sphere	
Date of Receipt Samples:	2019-07-29	
Quantity of Receipt Samples:	Receipt Samples: 1 pcs	
Sample Number:	190729001-S1	

### **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:	2019-08-29	
Revised Date of Test Report:	N/A	
Test Report No.:	NTCLR19080011	
Remark (If applicable):	N/A	





<b>Test Specification:</b>			
Date of Test	2019-08-01		
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 C78.377-2017 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  $25 \, ^{\circ}\text{C} \pm 1 \, ^{\circ}\text{C}$ , 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 required Voltage and Frequency. It was stabilized before measurement was made. Luminous Flux, Luminaire Efficacy and Zonal Lumen were calculated from the software taken at  $1^{\circ}$  vertical intervals and  $15^{\circ}$  horizonal intervals.

#### 2. Photometric and Electrical Measurements – Integrating Sphere Method:

Photometric parameters were measured using an integrating sphere, as spectroradiometer and software. The ambient temperature condition inside the sphere was measured at 25 °C± 1°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 require Voltage and Frequency. 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 1 nm intervals over the rage of 380 to 780 nm.





## **Integrating Sphere Test Results:**

## **Test Condition:**

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	<b>Test Time (minute)</b>
24.7	41.6	Face Down	90	10

#### **Electrical Data:**

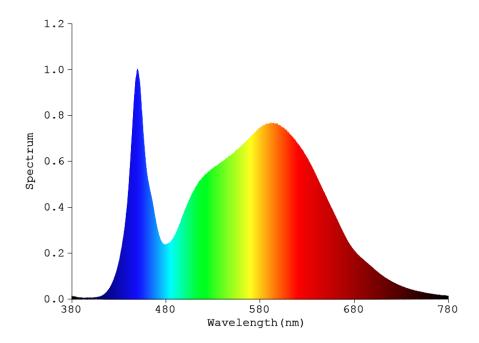
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.3370	39.93	0.9874

### **Color Data:**

Parameter	Result
CCT(K)	4143
Ra	85.5
R9	26
Chromaticity, x	0.3728
Chromaticity, y	0.3665
Chromaticity, u'	0.2241
Chromaticity, v'	0.4958
Duv	-0.00258

Special Color Rendering			
R1	85	R9	26
R2	91	R10	77
R3	94	R11	84
R4	85	R12	65
R5	85	R13	86
R6	86	R14	97
R7	88	R15	81
R8	71	-	-

## Spectrum Diagram:







## **Goniophotemeter Test Results:**

#### **Test Condition:**

Test Ambient (°C)	Test Humidity (%)	Orientation	Stabilization Time (minute)	<b>Test Time (minute)</b>
24.7	41.6	Face Down	90	25

#### **Electrical Data:**

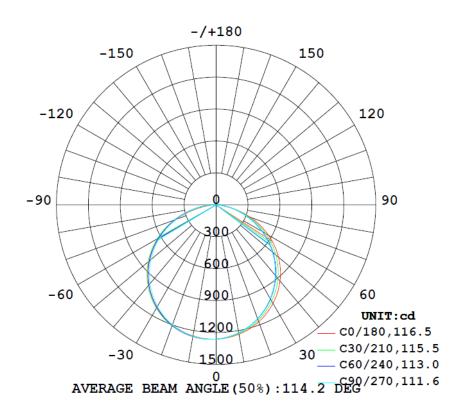
Voltage (V)	Frequency (Hz)	Current (A)	Wattage (W)	Power Factor
120.0	60	0.3370	39.93	0.9874

### **Goniophotometer Data:**

Parameter	Results
Total Luminous (lm)	3704.7
Luminous Efficacy (lm/w)	92.78
Zonal Lumens Distribution (0-60°)	77.6%
Beam Angle (°)	114.2

## **Luminous Intensity Distribution Diagram:**

### LUMINOUS INTENSITY DISTRIBUTION DIAGRAM





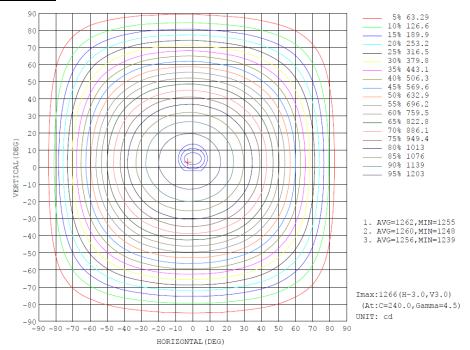


#### **Zonal Flux Diagram:**

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp	
10	1235	1225	1221	1233	1250	1257	1254	1247	0- 10	119.4	119.4	3.22,3.22	
20	1171	1147	1137	1163	1200	1208	1200	1188	10- 20	342.6	462.0	12.5,12.5	
30	1069	1035	1016	1055	1112	1118	1101	1089	20- 30	520.9	982.9	26.5,26.5	
40	934.0	888.5	863.3	913.0	985.2	988.5	964.5	952.7	30- 40	631.4	1614	43.6,43.6	
50	765.8	715.7	687.1	740.2	822.4	825.0	797.3	785.0	40- 50	659.7	2274	61.4,61.4	
60	566.5	519.4	492.3	541.2	623.9	631.4	607.2	590.5	50- 60	600.6	2875	77.6,77.6	
70	341.2	307.7	290.8	323.7	393.6	414.1	401.1	375.4	60- 70	460.0	3335	90,90	
80	113.7	113.3	119.2	120.0	150.5	193.6	200.0	163.0	70- 80	262.0	3597	97.1,97.1	
90	0.0443	19.28	30.46	19.75	0.2111	36.82	55.10	24.96	80- 90	80.45	3677	99.3,99.3	
100	1.020	1.475	1.111	1.708	0.9305	1.574	0.8538	1.631	90-100	8.863	3686	99.5,99.5	
110	3.170	2.305	3.703	2.892	3.749	2.510	2.426	2.258	100-110	2.462	3688	99.6,99.6	
120	2.664	3.659	3.084	4.243	4.258	3.188	2.858	3.185	110-120	2.997	3691	99.6,99.6	
130	2.350	4.662	4.416	5.140	3.450	4.294	3.865	4.240	120-130	3.344	3695	99.7,99.7	
140	2.472	5.600	5.421	5.973	3.270	5.053	5.001	5.088	130-140	3.420	3698	99.8,99.8	
150	2.634	2.065	6.190	2.479	3.093	1.993	5.333	2.583	140-150	2.964	3701	99.9,99.9	
160	2.772	4.452	2.287	5.565	2.074	4.649	3.041	4.763	150-160	1.867	3703	100,100	
170	2.014	5.148	6.057	5.112	2.664	5.628	6.654	4.380	160-170	1.360	3704	100,100	
180	1.412	1.453	1.432	1.689	1.410	1.455	1.430	1.689	170-180	0.3663	3705	100,100	
DEG		LUMINOUS INTENSITY:cd Less than 35% Percent = 13.6 %									UNIT:lm		

## Isocandela Diagram:







## **Luminous Distribution Intensity Data:**

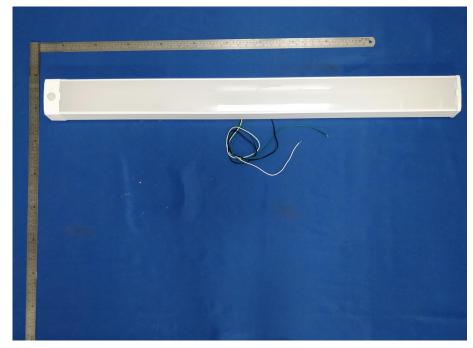
Table1																UNI	r: cd		
C (DEG)																			
γ (DEG)	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270
0	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262
5	1253	1251	1250	1248	1247	1247	1248	1249	1250	1253	1255	1258	1261	1262	1264	1265	1265	1265	1265
10	1235	1232	1227	1225	1222	1221	1221	1224	1228	1233	1239	1245	1250	1253	1256	1257	1258	1256	1254
15	1207	1203	1195	1191	1185	1184	1184	1189	1195	1203	1212	1222	1230	1234	1238	1238	1238	1235	1233
20	1171	1164	1154	1147	1140	1138	1137	1143	1151	1163	1175	1188	1200	1205	1210	1208	1207	1202	1200
25	1125	1117	1104	1094	1085	1081	1080	1088	1098	1114	1129	1147	1161	1166	1171	1168	1166	1159	1156
30	1069	1061	1045	1035	1021	1017	1016	1024	1036	1055	1074	1095	1112	1117	1123	1118	1114	1106	1101
35	1006	996	978	965	950	945	943	952	965	988	1010	1034	1053	1059	1064	1058	1052	1042	1037
40	934	923	904	889	873	865	863	874	888	913	937	964	985	992	996	989	982	970	964
45	854	843	822	805	788	781	778	789	804	830	856	885	908	915	920	911	904	890	884
50	766	755	733	716	697	690	687	698	714	740	767	798	822	829	834	825	817	804	797
55	670	659	637	620	602	595	591	602	617	644	671	702	727	735	741	732	724	711	705
60	567	556	534	519	502	496	492	502	516	541	567	598	624	632	639	631	625	613	607
65	457	447	427	415	399	395	391	400	411	434	457	486	512	521	531	525	522	510	505
70	341	334	317	308	296	294	291	298	305	324	342	368	394	403	416	414	414	405	401
75	224	219	207	203	198	198	197	200	204	216	227	248	271	282	299	301	306	300	298
80	114	112	109	113	116	119	119	120	119	120	122	132	150	163	184	194	202	202	200
85	26.1	32.2	39.8	51.4	58.3	63.9	64.4	64.0	59.0	53.6	44.7	40.5	48.9	62.9	85.6	101	115	118	118
90	0.04	2.89	9.75	19.3	24.9	29.6	30.5	29.6	24.8	19.8	10.8	3.89	0.21	7.41	24.0	36.8	49.5	53.9	55.1
95	0.21	0.31	1.37	5.21	8.54	11.9	12.3	11.8	9.11	5.76	1.04	0.20	0.25	0.31	1.27	6.00	13.9	17.0	18.7
100	1.02	0.89	1.36	1.48	1.40	1.21	1.11	1.33	2.00	1.71	1.59	0.66	0.93	0.76	1.17	1.57	1.27	1.00	0.85
105	2.41	1.97	2.10	2.57	3.90	4.64	1.86	3.58	4.30	3.05	2.23	2.11	2.57	2.05	2.13	2.40	3.09	2.73	1.58
110	3.17	2.49	2.84	2.30	2.76	3.36	3.70	3.58	3.07	2.89	3.30	3.14	3.75	2.98	2.72	2.51	2.48	2.39	2.43
115	3.25	2.66	3.37	3.04	2.64	2.68	2.89	2.94	2.99	3.58	3.98	3.40	4.35	3.20	3.19	2.85	2.77	2.67	2.55
120	2.66	2.19	3.82	3.66	3.44	3.14	3.08	3.29	3.77	4.24	4.44	3.70	4.26	3.08	3.68	3.19	3.21	2.99	2.86
125	2.54	2.99	4.36	4.17	4.02	3.96	3.85	4.09	4.35	4.66	4.96	3.02	3.49	3.22	3.91	3.94	3.75	3.60	3.42
130	2.35	4.77	4.66	4.66	4.60	4.48	4.42	4.56	4.88	5.14	5.24	4.04	3.45	3.67	4.36	4.29	4.37	4.14	3.86
135	2.27	4.33	3.53	5.06	5.13	4.96	4.95	5.12	5.35	5.62	5.16	4.55	2.96	4.07	3.97	4.70	4.32	4.70	4.26
140	2.47	4.43	2.02	5.60	5.58	5.42	5.42	5.59	5.83	5.97	2.82	5.28	3.27	6.11	2.36	5.05	4.87	4.86	5.00
145	2.68	5.33	3.72	4.35	5.89	5.94	6.02	6.07	6.16	5.48	2.33	6.08	3.56	6.60	3.33	4.03	5.18	5.07	5.21
150	2.63	5.49	5.87	2.06	4.60	5.94	6.19	6.18	5.47	2.48	4.67	4.55	3.09	4.41	4.20	1.99	4.61	5.78	5.33
155	2.55	5.15	5.20	3.82	1.63	3.71	4.33	4.13	2.32	3.57	5.04	5.61	2.43	5.73	5.11	3.50	2.56	2.68	3.74
160	2.77	4.77	5.32	4.45	4.22	2.94	2.29	2.74	4.60	5.57	5.10	5.18	2.07	5.07	6.52	4.65	3.87	4.04	3.04
165	1.97	3.99	5.42	4.64	4.18	4.97	6.19	6.56	6.32	5.83	5.14	3.97	2.57	4.04	5.72	6.66	6.62	5.79	4.71
170	2.01	2.20	3.64	5.15	5.18	4.34	6.06	5.83	5.86	5.11	4.71	3.38	2.66	2.73	4.39	5.63	5.98	6.67	6.65
175	1.84	1.94	2.93	3.29	3.34	3.88	5.35	5.10	4.05	4.47	4.05	3.54	2.27	2.14	3.05	4.02	3.92	4.69	5.46
180	1.41	1.44	1.44	1.45	1.47	1.43	1.43	1.57	1.65	1.69	1.69	1.74	1.41	1.44	1.44	1.45	1.47	1.43	1.43

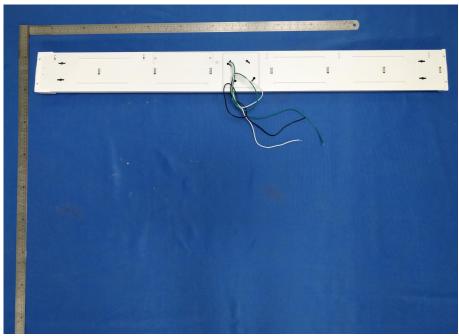
Table2											UNI	T: cd	
C (DEG)													
γ (DEG)	285	300	315	330	345								
0	1262	1262	1262	1262	1262								
5	1263	1262	1259	1258	1256								
10	1252	1251	1247	1243	1239								
15	1229	1228	1222	1219	1214								
20	1195	1193	1188	1185	1179								
25	1150	1148	1143	1140	1134								
30	1094	1093	1089	1087	1080								
35	1030	1030	1025	1024	1017								
40	956	957	953	953	946								
45	876	877	873	873	867								
50	789	790	785	786	779								
55	695	696	691	691	684								
60	598	597	591	590	581								
65	495	493	485	482	472								
70	390	387	375	370	357								
75	287	281	266	256	240								
80	190	180	163	147	129								
85	109	97.8	79.6	60.7	39.9								
90	48.2	39.2	25.0	12.2	2.32								
95	14.5	10.1	3.45	0.79	0.37								
100	0.94	1.23	1.63	1.27	0.90								
105	3.05	2.69	2.05	1.83	2.08								
110	2.35	2.29	2.26	2.42	2.38								
115	2.60	2.62	2.64	2.90	2.49								
120	3.01	3.01	3.19	3.32	3.13								
125	3.35	3.54	3.49	3.77	2.16								
130	3.93	4.24	4.24	4.04	3.05								
135	4.04	4.66	4.67	4.04	4.22								
140	4.47	4.99	5.09	1.92	4.95								
145	4.60	5.25	4.02	2.88	5.75								
150	5.43	4.05	2.58	4.85	6.10								
155	2.68	1.90	3.10	6.86	5.59								
160	2.98	3.06	4.76	6.00	5.24								
165	4.60	5.61	4.08	5.52	3.80								
170	4.97	5.63	4.38	3.23	2.55								
175	3.91	3.66	3.22	2.46	1.74								
180	1.57	1.64	1.69	1.69	1.74								





## **Photo of Sample:**









**Equipment List:** 

<b>Equipment ID</b>	<b>Equipment Name</b>	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2018-11-16	2019-11-15
NTC-F01-006	2.0 meter Integrating Sphere	2018-11-16	2019-11-15
NTC-F01-012	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-013	Standard Lamp	2018-11-13	2019-11-12
NTC-F01-031	Digital Power Meter	2018-08-29	2019-08-28
NTC-F01-019	Temperature & Humidity Meter	2018-11-12	2019-11-11

\*\*\*\*\*\*\*End of Report\*\*\*\*\*\*