LM-79-08 Test Report

For

ELEC-TECH INTERNATIONAL CO LTD

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

LED Tube Lamp

Model name(s):
542171##-

Representative (Tested) Model:
54217131

Model Difference: ##=31-40 intends CCT, 3500K.

Prepare By:

Engineer: Derek Lai

Date: 2018-05-14

Review By:

Technical Lead: Vincent Yuan

Date: 2018-05-15

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
Model Number:	542171##(##=31-40)
Product type:	Replacement Lamps (“Plug and Play”) (UL type A)
Rating Input:	120-277Vac, 50/60Hz, 16W
Declared CCT:	3500K
Declared Light Output	2000lm
LED Manufacturer:	EVERLIGHT
LED Model:	67-21S
LED Quantity:	90 pcs
Forward current of LED Chip:	150mA
Date of Receipt Samples:	2018-03-10
Quantity of Receipt Samples:	2
Sample Number:	180310003-S1-S2
Test Troffer:	Lithonia 2GT8 lensed 2x4
Test Ballast:	SYLVANIA QTP 2X32WT8/UNV ISN-SC

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:	2018-05-15
Revised Date of Test Report:	N/A
Test Report No.:	NTCR18040091
Remark (*If applicable*)	N/A

Test Specifications:	
Date of Test	2018-05-10
Test item	1. Total Luminous Flux 2. Luminous Distribution Intensity 3. Luminous Efficacy 4. Correlated Color Temperature 5. Color Rendering Index 6. Chromaticity Coordinate 7. THD and PF
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 DLC Technical Requirement V4.2

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.

3. THD and PF measurements

The sample was tested according to the ANSI C82.77-2002, the sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated from the digital power meter.

Integrating Sphere Test Results (Bare Lamp)

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.4 °C	41 %	Face Down	90 min	25 min

Electrical Data:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.1324	15.8	0.9946

Output Date:

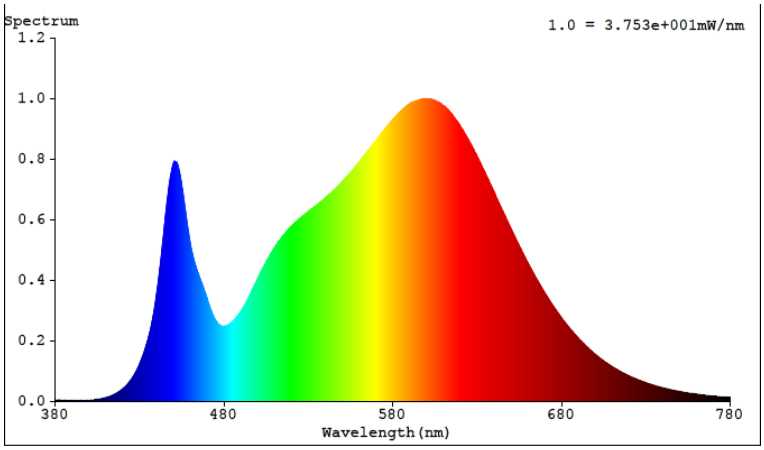
Light Output (lm)	Efficacy (lm/W)
2042.4	129.25

Color Data:

Parameter	Result
CCT (K)	3505
Color Rendering Index (CRI)	83.7
R9	12
Chromaticity, x	0.4052
Chromaticity, y	0.3910
Chromaticity u'	0.2355
Chromaticity v'	0.5114
Duv	-0.00016

Special Color Rendering			
R1	82	R9	12
R2	90	R10	77
R3	96	R11	81
R4	82	R12	67
R5	82	R13	84
R6	87	R14	98
R7	86	R15	76
R8	64	-	-

Spectrum Diagram:



Goniophotometer Test Results (Test in Troffer)

Test Condition:

Test Ambient	Test Humidity	Orientation	Stabilization Time	Test Time
25.4 °C	43 %	Face Down	90 min	25 min

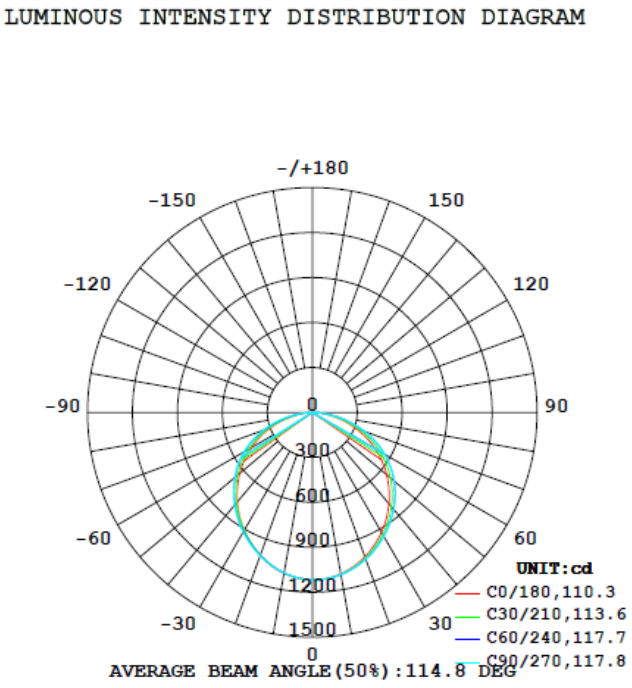
Electrical Data:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.2648	31.6	0.9943

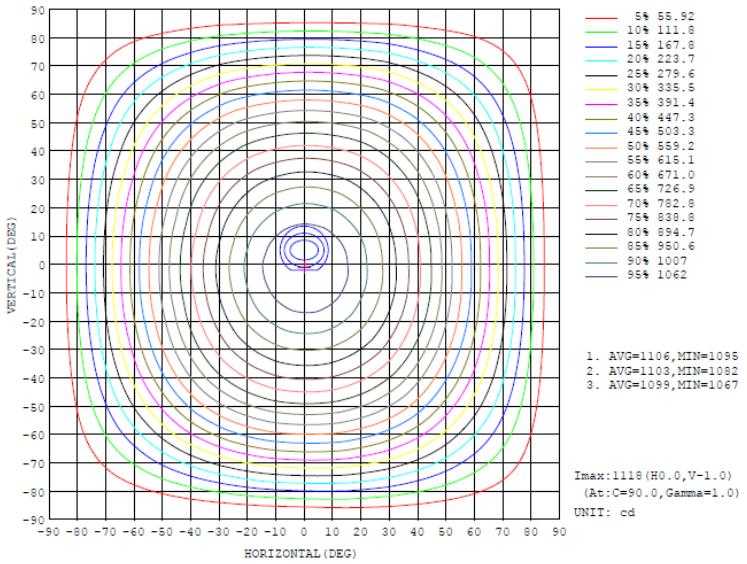
Goniophotometer Data:

Parameter	Result
Total Luminous (lm)	3263.86
Total Luminous per foot (lm/ft)	N/A
Luminous Efficacy (lm/w)	103.29
Zonal Lumens Distribution (0-60°)	77.1%
Spacing Criterion (0-180)	1.28
Spacing Criterion (90-270)	1.22
Beam Angle (°)	114.8

Luminous Intensity Distribution Diagram:



Isocandela Diagram:



Zonal Flux Diagram:

ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	Φ zone	Φ total	%lum,lamp
10	1092	1099	1099	1095	1091	1087	1088	1090	0- 10	105.5	105.5	3.23,3.23
20	1025	1040	1042	1031	1018	1013	1019	1022	10- 20	300.1	405.6	12.4,12.4
30	923.2	950.6	954.0	937.7	908.9	913.4	923.1	926.7	20- 30	452.2	857.8	26.3,26.3
40	795.3	826.8	845.2	822.8	779.2	796.7	807.0	810.4	30- 40	546.3	1404	43,43
50	647.2	702.4	714.1	688.5	632.9	663.7	675.7	678.2	40- 50	575.3	1979	60.6,60.6
60	484.4	545.1	557.3	526.9	470.8	508.9	526.3	525.8	50- 60	535.9	2515	77.1,77.1
70	305.7	357.3	371.3	334.3	292.9	325.4	349.4	342.5	60- 70	424.7	2940	90.1,90.1
80	126.1	155.9	165.3	131.2	114.2	132.9	155.3	145.9	70- 80	251.3	3191	97.8,97.8
90	4.020	4.018	5.133	0.2678	0.2163	4.055	0.7614	5.599	80- 90	66.23	3257	99.8,99.8
100	0.3680	1.210	1.104	1.341	0.5215	1.197	1.029	1.183	90-100	0.7112	3258	99.8,99.8
110	0.6118	0.8412	1.864	0.9354	0.6463	0.8329	1.447	0.8943	100-110	1.197	3259	99.9,99.9
120	0.9368	1.219	1.089	1.451	0.8299	0.9709	0.9525	1.131	110-120	0.9835	3260	99.9,99.9
130	0.9830	1.315	1.225	1.331	1.015	1.143	1.155	1.252	120-130	0.9807	3261	99.9,99.9
140	1.260	1.149	1.167	1.129	1.160	1.143	1.223	1.180	130-140	0.8461	3262	99.9,99.9
150	1.346	0.9922	1.035	1.017	1.475	1.085	1.236	1.114	140-150	0.6769	3263	100,100
160	1.457	1.171	1.048	1.228	1.624	1.215	1.157	1.223	150-160	0.5202	3263	100,100
170	1.402	1.721	1.159	1.249	1.478	1.329	1.247	1.553	160-170	0.3532	3264	100,100
180	1.950	1.870	1.874	1.778	1.949	1.871	1.878	1.779	170-180	0.1511	3264	100,100
DEG	LUMINOUS INTENSITY:cd Less than 35% Percent = 14.4 %									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	1117	1117	1117	1117	1118	1118	1118	1118	1118	1117	1117	1118	1117	1117	1117	1117	1118	1118	1118
5	1111	1113	1113	1114	1114	1115	1114	1114	1113	1112	1111	1111	1111	1109	1109	1108	1108	1108	1109
10	1093	1096	1097	1099	1099	1100	1099	1098	1096	1095	1093	1092	1091	1088	1088	1087	1087	1087	1088
15	1064	1069	1070	1073	1074	1076	1075	1073	1070	1067	1062	1061	1060	1056	1056	1054	1055	1056	1057
20	1025	1031	1034	1040	1042	1044	1042	1040	1035	1031	1024	1019	1018	1013	1014	1013	1015	1016	1019
25	978	986	991	998	1001	1003	1001	999	994	987	977	970	967	961	964	965	969	970	974
30	923	932	940	951	954	956	954	952	945	938	924	913	909	904	909	913	918	919	923
35	862	873	884	896	901	904	902	900	892	883	866	852	846	842	850	857	863	864	867
40	795	807	821	837	843	847	845	843	834	823	803	785	779	776	787	797	803	804	807
45	723	737	753	772	780	785	783	780	771	758	736	715	708	706	721	732	741	741	743
50	647	662	681	702	713	717	714	712	703	689	664	642	633	633	650	664	674	673	676
55	568	583	603	627	639	643	640	637	627	612	586	564	554	555	574	590	602	602	604
60	484	501	520	545	558	562	557	555	544	527	501	481	471	473	491	509	523	523	526
65	397	413	431	455	468	474	467	464	453	434	410	393	384	386	403	421	436	437	441
70	306	322	336	357	371	377	371	367	353	334	313	300	293	294	310	325	342	345	349
75	214	228	238	256	270	276	269	264	249	232	213	205	202	202	215	227	244	249	254
80	126	137	144	156	168	172	165	158	145	131	119	115	114	114	123	133	146	152	155
85	50.8	58.6	62.6	67.3	73.2	74.1	66.3	60.5	51.7	45.5	40.4	39.9	41.1	40.7	46.5	50.0	57.4	57.9	59.4
90	4.02	4.62	8.11	4.02	5.30	1.97	5.13	0.59	0.40	0.27	0.40	0.18	0.22	0.42	0.39	4.05	0.56	3.89	0.76
95	0.15	0.30	0.46	0.35	0.31	0.37	0.42	0.42	0.41	0.56	0.64	0.41	0.32	0.49	0.89	0.57	0.53	0.54	0.55
100	0.37	0.36	0.90	1.21	1.27	1.11	1.10	1.22	1.34	1.34	0.71	0.41	0.52	0.55	0.64	1.20	1.18	0.98	1.03
105	0.49	0.56	0.67	1.60	1.55	2.29	2.32	2.07	1.34	1.34	0.73	0.50	0.61	0.63	0.77	1.00	1.06	1.51	1.73
110	0.61	0.75	0.95	0.84	1.20	1.95	1.86	1.73	1.11	0.94	1.00	0.68	0.65	0.66	0.86	0.83	1.14	1.39	1.45
115	0.81	0.85	1.28	0.99	0.91	1.03	1.06	1.07	1.04	1.21	1.07	0.76	0.67	0.63	0.84	0.92	0.88	0.86	0.90
120	0.94	0.86	1.39	1.22	1.07	1.05	1.09	1.12	1.18	1.45	1.17	0.64	0.83	0.61	0.87	0.97	0.96	0.93	0.95
125	1.09	0.94	1.29	1.33	1.15	1.10	1.13	1.18	1.29	1.45	1.15	0.81	0.97	0.79	0.94	1.15	1.05	1.01	1.04
130	0.98	0.75	1.19	1.31	1.17	1.18	1.22	1.28	1.33	1.33	1.10	0.85	1.02	0.74	0.94	1.14	1.15	1.13	1.16
135	1.20	0.86	0.74	1.25	1.23	1.21	1.22	1.28	1.32	1.25	0.75	0.87	1.22	0.76	0.76	1.17	1.02	1.18	1.21
140	1.26	0.82	0.94	1.15	1.20	1.16	1.17	1.18	1.25	1.13	0.88	0.74	1.16	0.70	0.94	1.14	1.16	1.19	1.22
145	1.23	0.91	1.00	0.76	1.08	1.18	1.19	1.16	1.13	0.83	1.02	1.00	1.23	0.92	1.04	0.91	1.19	1.28	1.30
150	1.35	1.18	1.06	0.99	0.82	0.96	1.03	0.93	0.88	1.02	1.11	1.00	1.48	1.08	1.13	1.08	0.98	1.07	1.24
155	1.53	1.59	0.93	0.95	1.02	0.89	0.87	0.87	1.07	0.97	1.03	1.37	1.60	1.28	0.90	1.01	1.16	1.05	1.04
160	1.46	1.48	0.99	1.17	1.14	1.05	1.05	1.06	1.13	1.23	0.95	1.43	1.62	1.35	0.87	1.22	1.20	1.14	1.16
165	1.49	1.77	1.45	1.15	1.14	1.19	1.18	1.17	1.18	1.07	1.03	1.39	1.53	1.35	1.20	1.02	1.03	1.20	1.22
170	1.40	1.61	1.72	1.72	1.30	1.16	1.16	1.05	0.98	1.25	1.42	1.52	1.48	1.53	1.42	1.33	1.08	1.07	1.25
175	1.75	1.81	1.85	1.72	1.67	1.75	1.53	1.71	1.61	1.77	1.84	1.87	1.75	1.86	1.77	1.76	1.61	1.71	1.46
180	1.95	1.94	1.88	1.87	1.74	1.60	1.87	1.55	1.66	1.78	1.78	1.86	1.95	1.94	1.89	1.87	1.74	1.60	1.88

Table--2 UNIT: cd

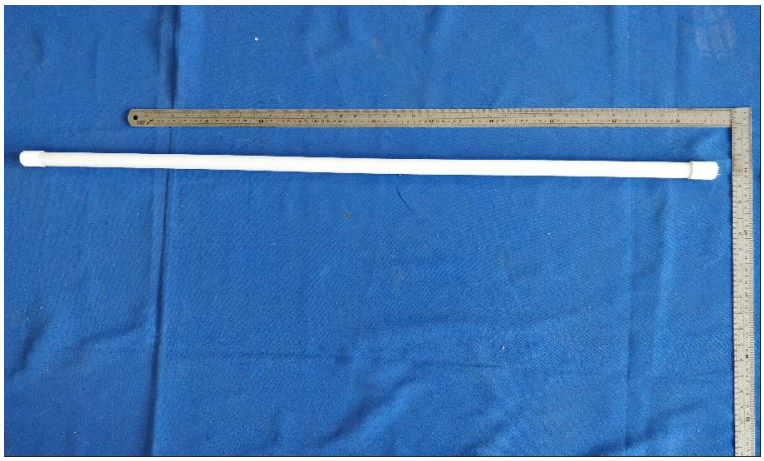
γ (DEG) \ C (DEG)	285	300	315	330	345
0	1118	1118	1117	1117	1118
5	1109	1109	1110	1111	1112
10	1088	1090	1090	1092	1093
15	1057	1060	1060	1063	1064
20	1019	1022	1022	1024	1025
25	975	978	977	978	978
30	924	928	927	926	924
35	869	873	871	868	864
40	809	813	810	805	798
45	745	750	746	738	727
50	678	684	678	667	653
55	607	612	605	591	575
60	529	534	526	510	492
65	444	448	438	423	406
70	351	354	342	330	315
75	255	256	243	234	222
80	156	156	146	139	132
85	60.5	63.3	58.9	58.4	54.9
90	2.79	0.84	5.60	1.07	4.90
95	0.52	0.50	0.51	0.50	0.36
100	1.06	1.09	1.18	1.06	0.47
105	1.72	1.52	1.57	0.76	0.64
110	1.77	1.54	0.89	0.94	0.80
115	0.90	0.91	1.01	1.15	0.89
120	0.95	1.00	1.13	1.36	0.89
125	1.02	1.07	1.25	1.39	0.95
130	1.12	1.13	1.25	1.29	0.82
135	1.18	1.25	1.27	0.80	0.97
140	1.17	1.21	1.18	0.96	0.94
145	1.27	1.26	0.88	1.07	1.02
150	1.11	1.00	1.11	1.09	1.16
155	1.05	1.18	1.07	1.07	1.57
160	1.17	1.21	1.22	1.16	1.52
165	1.21	1.27	1.27	1.32	1.58
170	1.24	1.34	1.55	1.65	1.57
175	1.69	1.61	1.72	1.74	1.76
180	1.55	1.66	1.78	1.78	1.86

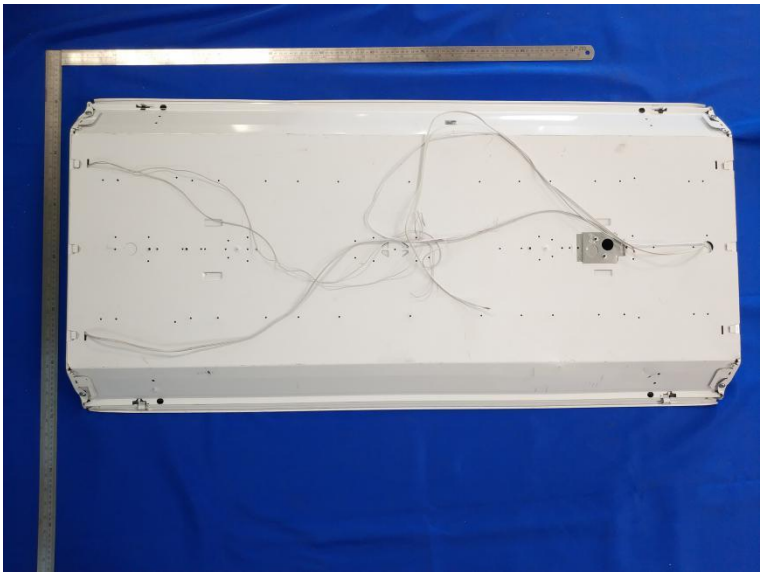
THD and PF Measurement Test Result:

Electrical Measurement:

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	iTHD
277.0	60	0.1211	31.7	0.9450	11.21

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-F01-002	Digital Power Meter	2017-11-18	2018-11-17
NTC-F01-020	Temperature & Humidity Meter	2017-11-23	2018-11-22

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

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