

LM-79-08 Test Report

For

Espen Technology, Inc. (Brand Name: ESPEN)

12257 FLORENCE AVE SANTA FE SPRINGS, CA 90670 USA

Replacement Lamps ("Plug and Play") (UL Type A)

Model name(s): L48T8/835/10P-EB

Representative (Tested) Model: L48T8/835/10P-EB

Model Difference: N/A

Test & Report By:

Johnson Sun

Engineer: Johnson Sun

Date: Jul.03,2017

Review By:

Tommy Liang

Manager: Tommy Liang

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

Laboratory: Standard-Tech Co. Ltd Testing Center
NVLAP CODE: 201011-0

Report Format Number STD/QR4909-A/2

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<http://www.standard-tech.com>

1.1 Product Information:

Organization Name	Espen Technology, Inc.	
Brand Name	ESPEN	
Model Number	L48T8/835/10P-EB	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Replacement Lamps ("Plug and Play") (UL Type A)	
Rated Voltage / Frequency	120/277 Vac, 50/60 Hz	
Nominal Power	10W	
Rated Initial Lamp Lumen	--	
Declared CCT	3500K	
LED Manufacturer	EVERLIGHT ELECTRONICS CO., LTD	
LED Model	67-21S Series	
Test Ballast	ESPEN VE232MVHIPE	
Sample Number	STD170701NB-B1,B2(3500K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo


1.2 Test Specifications:

Date of Receipt	Jun.28, 2017
Date of Test	Jun.30, 2017
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. Electrical Parameters
Reference Standard	1. IES LM-79-2008 Electrical and Photometric Measurements of Solid-State Lighting Products 2. ANSI C78.377-2008 Specifications for the Chromaticity of Solid State Lighting Products 3. CIE 13.3-1995 Method of Measuring and Specifying Colour Rendering Properties of Light Sources 4. CIE 15-2004 Technical Report Colorimetry 5. IESNA LM-16-93 Practical Guide to Colorimetry of Light Source 6. IESNA TM-16-05 Technical Memorandum on Light Emitting Diode (LED) Sources and Systems
Reference Work Instruction	QD25

1.3 Test Methods

1) Photometric and Light Distribution Measurement – Goniophotometer 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 120 or rated 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° horizontal intervals.

2) Chromaticity Measurement – Sphere-Spectroradiometer Method:

Chromaticity 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 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral power distribution taken at 5 nm intervals over the range of 380 to 780 nm.

3) Electrical Measurements:

Electrical parameters were measured using power meters incorporated in goniophotometer or sphere-spectroradiometer system. The ambient temperature surrounding the sample was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample was operated at 120 or rated Volts AC, 60Hz. It was stabilized before measurement was made. Voltage, frequency, current, power, power factor and total harmonic distortion were measured by and read from the power meter.

2.1 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2017-06-30	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	L48T8/835/10P-EB, with ballast ESPEN VE232MVHIPE		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD170701 NB-B1	120.0	60	0.1159	13.85	0.9961	6.41
	277.0	60	0.0525	13.87	0.9532	14.86
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

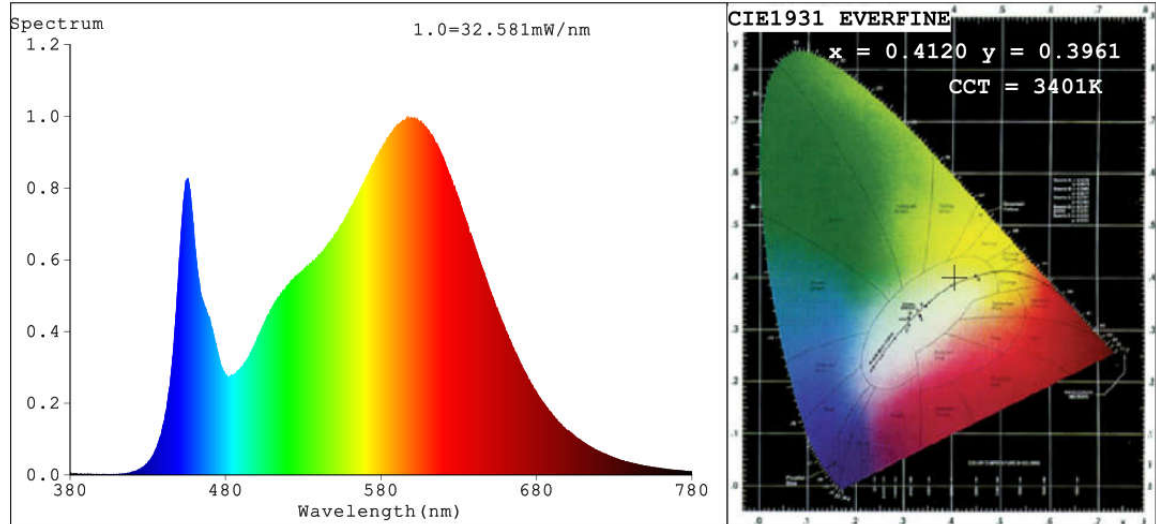
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	3401	R3	95	R11	78
Duv	0.0009	R4	79	R12	65
Chromaticity (x, y)	x=0.4120 y=0.3961	R5	81	R13	85
Chromaticity (u', v')	u'=0.2379 v'=0.5145	R6	90	R14	98
Color Rendering Index (CRI)	82.6	R7	82	R15	74
R9	5	R8	59	--	--

Photometric Measurement for Bare-lamp –Sphere-Spectroradiometer Method:

Parameter	Result		DLC V4.2 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	1691	1690	Bare Lamp: >=1600(-10%)
Luminous Efficacy (lm/W)	122.09	121.85	Bare lamp: >= 110(-3%)
Most Worst Luminous/Highest Watts	121.85		

Spectral Power Distribution & Chromaticity Diagram



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2.2 Electrical, Photometric and Chromaticity Measurements
(Refer to Work Instruction QD25)

Test date	2017-06-30	Test Ambient:	25.2 ° C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	L48T8/835/10P-EB, with ballast ESPEN VE232MVHIPE		

Electrical Measurement for 2-lamp in Lithonia 2GT8 lensed 2x4:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD170701	120.0	60	0.2316	27.69	0.9964	6.49
NB-B1,B2	277.0	60	0.1050	27.74	0.9535	14.90
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

Chromaticity Measurement for 2-lamp in Lithonia 2GT8 lensed 2x4 -
Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	81	R9	5
Frequency (Hz)	60	R2	92	R10	82
CCT (K)	3401	R3	95	R11	78
Duv	0.0009	R4	79	R12	65
Chromaticity (x, y)	x=0.4120 y=0.3960	R5	81	R13	85
Chromaticity (u', v')	u'=0.2378 v'=0.5144	R6	90	R14	98
Color Rendering Index (CRI)	82.5	R7	82	R15	74
R9	5	R8	59	--	--

Photometric Measurement 2-lamp in Lithonia 2GT8 lensed 2x4 -
Goniophotometer Method:

Parameter	Result		DLC V4.2 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2758.7	2756.6	In luminaire (2 lamps): >=3000(-10%)
Luminous Efficacy (lm/W)	99.63	99.37	In luminaire: >= 100(-3%)
Most Worst Luminous/Highest Watts	99.37		
Zonal lumens in the 0-60° zone (%)	84.7	--	>= 75(-3)
SC: 0-180° (if applicable)	1.31	--	1.0-2.0(±0.1)
SC: 90-270° (if applicable)	1.20	--	1.0-2.0(±0.1)
Beam Angle (°)	100.9	--	--
Center Beam Candle Power (cd)	1105	--	--

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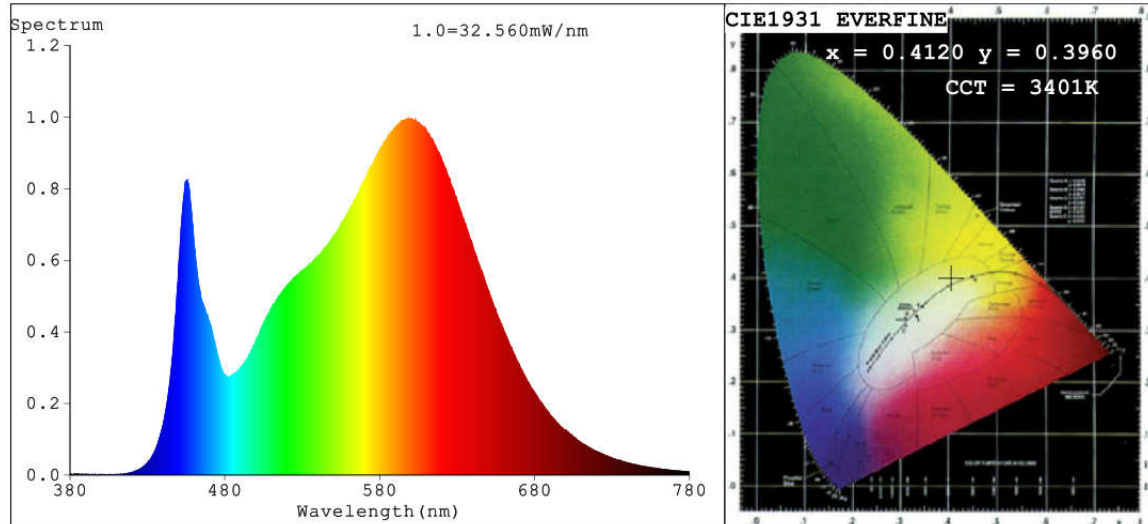
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Spectral Power Distribution & Chromaticity Diagram

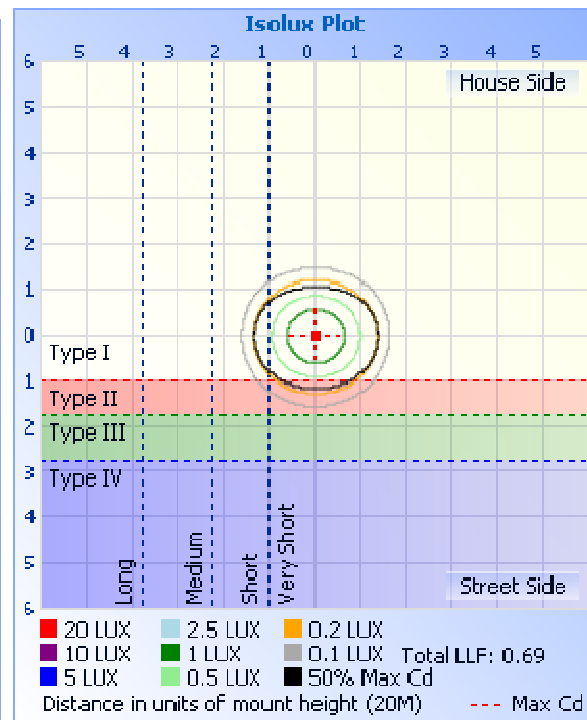
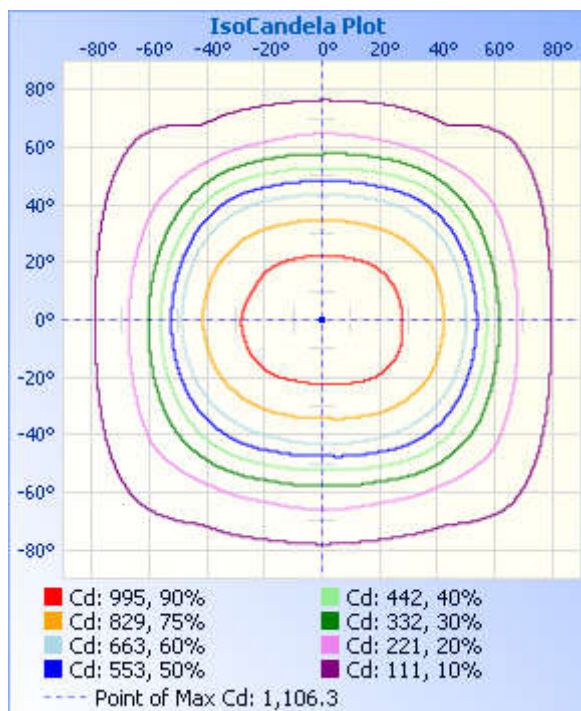
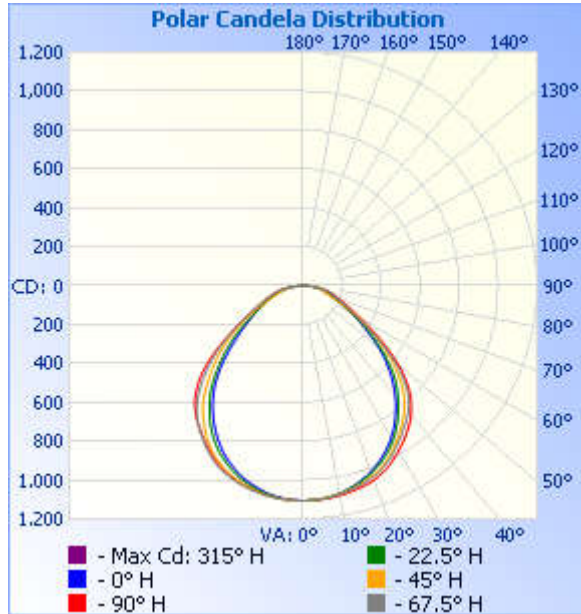


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	865.3	31.3%
0-40	1,410.8	51.1%
0-60	2,341.0	84.7%
60-90	419.8	15.2%
70-100	184.9	6.7%
90-120	0.7	0%
0-90	2,760.9	99.9%
90-180	1.7	0.1%
0-180	2,762.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	104.7	3.8%	90-100	0.2	0%
10-20	301.5	10.9%	100-110	0.2	0%
20-30	459.0	16.6%	110-120	0.3	0%
30-40	545.5	19.7%	120-130	0.2	0%
40-50	533.7	19.3%	130-140	0.2	0%
50-60	396.5	14.4%	140-150	0.2	0%
60-70	235.1	8.5%	150-160	0.2	0%
70-80	137.8	5.0%	160-170	0.1	0%
80-90	46.9	1.7%	170-180	0.0	0%

Photometric Data



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Table--1

UNIT: cd

C (DEG) γ (DEG)	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	
0	1105	1105	1105	1105	1105	1105	1105	1105	1105	1105	1105	1105	1105	1105	1105	1105	
5	1101	1102	1103	1101	1101	1100	1099	1100	1103	1102	1101	1099	1100	1102	1103	1104	
10	1091	1093	1091	1088	1084	1085	1087	1089	1095	1092	1088	1083	1082	1086	1093	1096	
15	1075	1076	1071	1062	1056	1059	1067	1071	1082	1076	1067	1056	1051	1062	1074	1081	
20	1053	1054	1041	1026	1017	1024	1039	1047	1064	1054	1037	1018	1010	1024	1046	1059	
25	1019	1019	1003	979	966	979	1001	1010	1029	1021	997	969	956	976	1009	1028	
30	970	967	947	919	903	920	945	957	980	969	941	906	888	914	955	978	
35	916	909	880	843	826	844	880	899	926	909	869	825	806	835	884	919	
40	858	851	807	756	734	758	808	840	862	832	782	732	713	743	800	849	
45	778	774	715	661	632	661	713	753	773	728	668	618	601	631	688	749	
50	659	644	594	542	518	539	590	620	643	604	552	502	475	515	575	627	
55	501	485	469	421	395	413	454	460	487	467	431	384	370	396	453	488	
60	358	345	333	308	298	296	318	326	350	347	320	287	289	292	335	361	
65	260	248	218	216	225	207	208	236	255	259	225	216	229	219	234	269	
70	196	188	145	159	170	152	138	184	194	200	155	165	178	166	162	205	
75	152	144	106	120	123	117	106	143	151	146	116	126	131	124	117	152	
80	106	103	83.5	86.5	90.3	83.1	83.9	102	105	96.9	86.2	84.5	91.0	86.1	87.6	104	
85	43.9	48.2	44.7	47.0	47.3	45.1	43.9	45.2	42.5	40.0	36.6	39.9	41.4	42.3	37.9	45.9	
90	0.06	0.06	0.22	0.43	0.47	0.31	0.12	0.33	0.00	0.00	0.05	5.64	0.13	0.13	0.00	0.00	
95	0.00	0.00	0.05	0.35	0.16	0.25	0.00	0.06	0.00	0.00	0.03	0.16	0.30	0.16	0.00	0.00	
100	0.00	0.00	0.00	0.37	0.24	0.32	0.00	0.00	0.00	0.06	0.11	0.35	0.45	0.35	0.14	0.00	
105	0.00	0.00	0.03	0.36	0.24	0.32	0.00	0.00	0.12	0.17	0.25	0.50	0.62	0.36	0.28	0.09	
110	0.00	0.00	0.33	0.36	0.24	0.38	0.22	0.00	0.26	0.31	0.38	0.50	0.63	0.37	0.50	0.23	
115	0.00	0.00	0.29	0.35	0.24	0.32	0.39	0.00	0.38	0.41	0.41	0.40	0.48	0.38	0.64	0.46	
120	0.00	0.00	0.28	0.03	0.19	0.08	0.33	0.03	0.43	0.42	0.41	0.19	0.35	0.24	0.63	0.46	
125	0.00	0.03	0.27	0.03	0.18	0.08	0.36	0.03	0.49	0.50	0.41	0.19	0.27	0.14	0.62	0.46	
130	0.09	0.26	0.26	0.03	0.17	0.08	0.39	0.20	0.56	0.54	0.41	0.20	0.28	0.14	0.61	0.46	
135	0.29	0.37	0.25	0.03	0.16	0.08	0.33	0.28	0.59	0.56	0.41	0.20	0.29	0.14	0.42	0.46	
140	0.38	0.35	0.21	0.03	0.23	0.08	0.26	0.31	0.61	0.57	0.41	0.21	0.32	0.14	0.37	0.46	
145	0.39	0.33	0.20	0.03	0.34	0.08	0.23	0.31	0.62	0.58	0.44	0.22	0.41	0.16	0.34	0.46	
150	0.41	0.31	0.23	0.03	0.35	0.08	0.29	0.31	0.63	0.59	0.44	0.22	0.46	0.24	0.28	0.46	
155	0.42	0.29	0.25	0.03	0.36	0.11	0.36	0.32	0.64	0.60	0.45	0.33	0.47	0.46	0.24	0.46	
160	0.45	0.26	0.28	0.40	0.36	0.32	0.27	0.35	0.65	0.61	0.45	0.37	0.49	0.48	0.31	0.46	
165	0.47	0.30	0.31	0.45	0.37	0.35	0.31	0.40	0.66	0.62	0.46	0.39	0.50	0.49	0.36	0.46	
170	0.50	0.34	0.34	0.44	0.45	0.46	0.33	0.48	0.67	0.66	0.46	0.38	0.48	0.51	0.41	0.46	
175	0.52	0.35	0.37	0.43	0.46	0.45	0.35	0.57	0.69	0.67	0.46	0.38	0.46	0.46	0.45	0.46	
180	0.64	0.34	0.38	0.43	0.45	0.46	0.36	0.68	0.67	0.63	0.33	0.38	0.42	0.46	0.47	0.37	

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-336	2 meter Integrating Sphere	2016-07-01	2017-06-30
ST-R-331	Spectral analysis system HAAS-2000	2016-07-01	2017-06-30
D204	Standard Lamp	2016-07-01	2017-06-30
PF2010	Power Meter for Integrating Sphere	2016-07-01	2017-06-30
EE-09	Goniophotometer system	2016-07-01	2017-06-30
D908S	Standard Lamp	2016-07-01	2017-06-30
PF210	Power Meter for Goniophotometer	2016-07-01	2017-06-30
ST-R-181A	Temperature Tester	2016-07-01	2017-06-30
Uncertainty: Photometric Measurement (Sphere):1.74% Chromaticity Measurement(Sphere):14.3K Photometric Measurement(Goniophotometer):1.62%			

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