

LM-79-08 Test Report

For

Espen Technology Inc. (Brand Name: ESPEN)

12257 Florence Ave, Santa Fe Springs CA 90670

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

Model name(s): L48T8/8XX/14G-EB

Remark: Where "XX" stand for CCT, 30=3000K, 35=3500K, 40=4000K, 50=5000K
This is multiple listed report, the Project Number of the original report is
JBE190314-H-R

Representative (Tested) Model: L48T8/830/14G-EB
L48T8/850/14G-EB

Model Difference: All construction and rating are the same, except CCT

Test & Report By:

Garman Mo

Engineer: Garman Mo

Date: Mar.24,2020

Review By:

Johnson Sun

Manager: Johnson Sun

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

2.This report does not imply product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

1.1 Product Information:

Organization Name	Eспен Technology Inc.	
Brand Name	ESPEN	
Model Number	L48T8/8XX/14G-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 Lamp Power	14W	
Rated Initial Lamp Lumen	--	
Declared CCT	3000K,3500K,4000K, 5000K	
LED Manufacturer	Everlight Electronics Co., LTD	
LED Model	67-21S Series	
Test Ballast	OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC	
Sample Number	JBE190314-H1,H2(3000K),H3(5000K)	
Lamp Length	1200	mm
Lamp Width	--	mm
Number of Units (modular products)	N/A	s

Photo




1.2 Test Specifications:

Date of Receipt	Apr.30, 2019
Date of Test	May.07, 2019
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 Color 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

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

Test date	2019-05-07	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	L48T8/830/14G-EB with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE190314-	120.0	60	0.1369	15.53	0.9451	5.81
H1	277.0	60	0.0586	15.62	0.9625	8.55
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

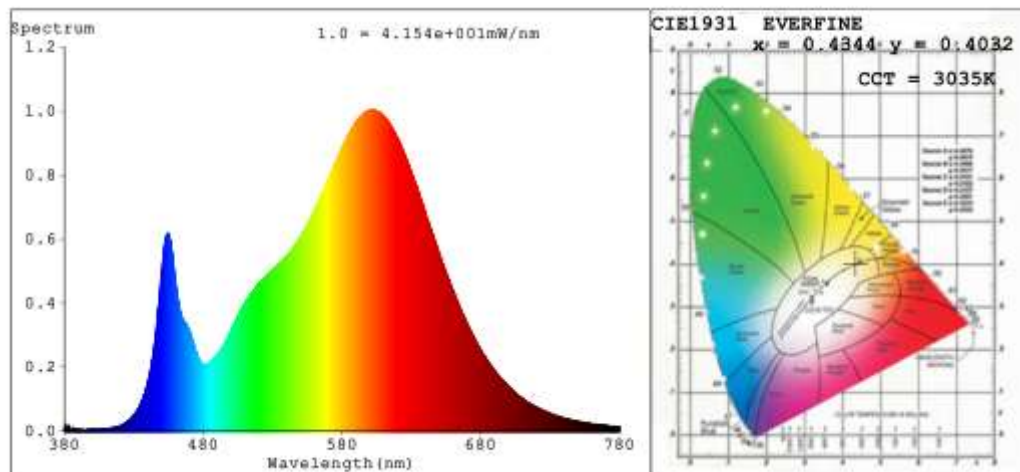
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	3
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	3035	R3	95	R11	77
Duv	-0.0000	R4	78	R12	69
Chromaticity (x, y)	x=0.4344 y=0.4032	R5	80	R13	83
Chromaticity (u', v')	u'=0.2494 v'=0.5206	R6	90	R14	98
Color Rendering Index (CRI)	81.6	R7	81	R15	72
R9	3	R8	57	--	--

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

Parameter	Result		DLC V4.4 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2098	2095	Bare Lamp: >= 1600(-10%)
System Efficacy (lm/W)	135.09	134.12	Bare lamp: >= 110(-3%)
Bare Lamp Efficacy (lm/W)	149.86	149.64	--

Spectral Power Distribution & Chromaticity Diagram



Laboratory: Standard-Tech Co., Ltd Testing Center

Report Format Number STD-QP019-409-B/0

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2.2 Electrical, Photometric and Chromaticity Measurements

Test date	2019-05-07	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	L48T8/830/14G-EB, with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

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

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE190314-H	120.0	60	0.2861	32.53	0.9476	5.70
1,H2	277.0	60	0.1224	32.71	0.9650	8.40
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

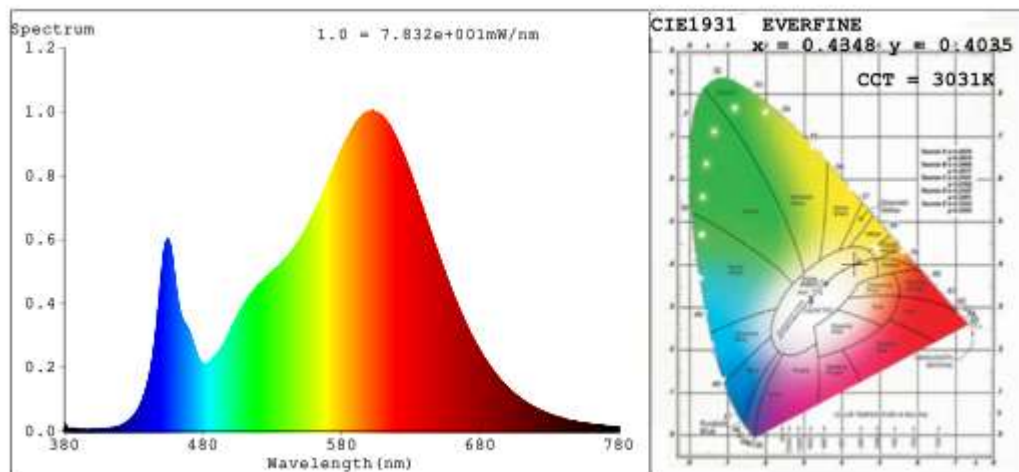
Chromaticity Measurement for 2-lamp in Lithonia 2GT8 lensed 2x4 - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	80	R9	2
Frequency (Hz)	60	R2	92	R10	81
CCT (K)	3031	R3	95	R11	77
Duv	0.0001	R4	78	R12	69
Chromaticity (x, y)	x=0.4348 y=0.4035	R5	80	R13	83
Chromaticity (u', v')	u'=0.2495 v'=0.5208	R6	90	R14	98
Color Rendering Index (CRI)	81.6	R7	81	R15	72
R9	2	R8	56	--	--

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

Parameter	Result		DLC V4.4 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	3482.7	3478.1	In luminaire (2 lamps): >= 3000(-10%)
Luminous Efficacy (lm/W)	107.06	106.33	In luminaire: >= 100(-3%)
Zonal lumens in the 0-60 °zone (%)	84.8	--	>= 75(-3)
SC: 0-180 °(if applicable)	1.33	--	1.0-2.0(±0.1)
SC: 90-270 °(if applicable)	1.22	--	1.0-2.0(±0.1)
Beam Angle (°)	101.4	--	--
Center Beam Candle Power (cd)	1381	--	--

Spectral Power Distribution & Chromaticity Diagram

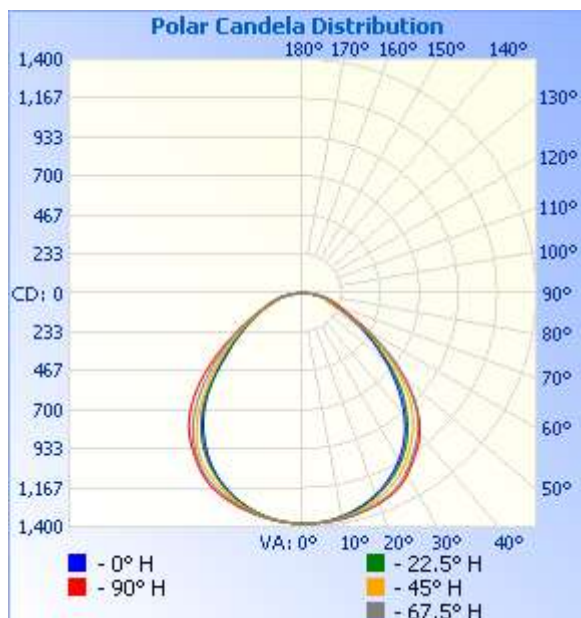


Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	1,087.7	31.2%
0-40	1,780.5	51.1%
0-60	2,951.0	84.7%
60-90	524.7	15.1%
70-100	227.6	6.5%
90-120	2.9	0.1%
0-90	3,475.8	99.8%
90-180	6.4	0.2%
0-180	3,482.2	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	130.9	3.8%	90-100	1.0	0%
10-20	377.5	10.8%	100-110	0.9	0%
20-30	579.3	16.6%	110-120	1.0	0%
30-40	692.8	19.9%	120-130	0.9	0%
40-50	667.3	19.2%	130-140	0.8	0%
50-60	503.2	14.5%	140-150	0.7	0%
60-70	298.2	8.6%	150-160	0.6	0%
70-80	169.4	4.9%	160-170	0.4	0%
80-90	57.2	1.6%	170-180	0.1	0%

Photometric Data



Illuminance at a Distance

	Center Beam fc	Beam Width	
3.3ft	127 fc	7.5 ft	8.7 ft
6.7ft	30.8 fc	15.1 ft	17.7 ft
10.0ft	13.8 fc	22.6 ft	26.5 ft
13.3ft	7.81 fc	30.1 ft	35.2 ft
16.7ft	4.95 fc	37.8 ft	44.2 ft
20.0ft	3.45 fc	45.2 ft	53.0 ft

■ Vert. Spread: 97.0°
 ■ Horiz. Spread: 105.9°

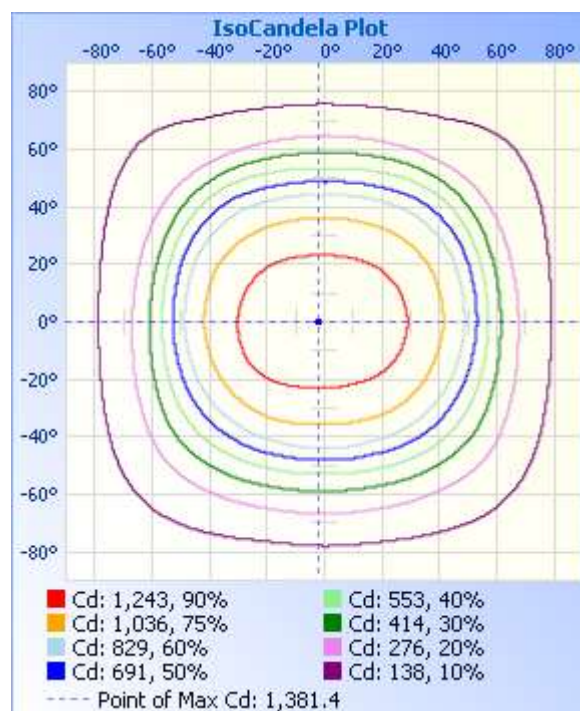
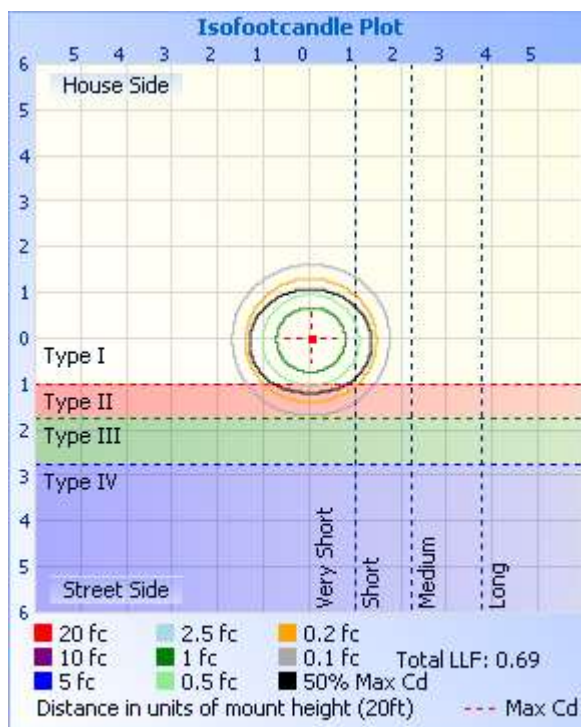


Table--1

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	1381	1381	1381	1381	1381	1381	1381	1381	1381	1381	1381	1381	1381	1381	1381	1381			
5	1375	1375	1375	1375	1376	1377	1378	1380	1380	1378	1376	1375	1373	1373	1373	1374			
10	1362	1363	1361	1358	1357	1361	1366	1372	1373	1368	1361	1357	1352	1353	1356	1359			
15	1343	1343	1335	1328	1326	1333	1344	1356	1360	1351	1337	1327	1318	1320	1329	1335			
20	1318	1315	1300	1287	1283	1293	1313	1334	1340	1328	1304	1284	1271	1275	1291	1306			
25	1284	1277	1255	1233	1226	1240	1270	1300	1312	1297	1262	1230	1210	1218	1245	1269			
30	1225	1214	1191	1165	1154	1173	1207	1240	1255	1246	1210	1161	1131	1146	1188	1212			
35	1147	1134	1108	1078	1065	1088	1125	1161	1179	1163	1126	1072	1034	1055	1103	1130			
40	1061	1050	1013	967	949	975	1031	1076	1094	1057	1001	951	920	937	980	1021			
45	939	935	893	839	812	845	910	959	965	912	840	790	780	781	823	880			
50	783	783	745	691	665	693	755	801	805	749	685	639	618	632	675	723			
55	608	612	593	546	520	544	597	625	624	596	544	504	491	496	532	574			
60	443	436	425	406	391	400	424	440	454	459	417	390	382	382	403	441			
65	317	288	267	270	278	268	266	288	321	338	308	295	296	291	295	327			
70	238	212	177	186	200	187	177	213	240	239	220	215	223	214	212	233			
75	180	169	144	143	148	144	144	172	185	168	161	157	164	157	154	164			
80	123	121	112	105	106	103	113	126	128	117	108	105	111	105	105	110			
85	48.0	53.7	52.2	54.3	55.8	54.3	54.8	55.7	52.1	54.7	48.3	51.3	52.7	53.0	45.7	50.8			
90	1.35	1.35	1.41	1.60	1.77	1.98	1.69	1.53	1.18	1.18	0.95	1.17	1.22	1.22	1.62	1.28			
95	0.79	0.79	0.79	0.84	1.11	1.17	0.84	0.73	0.72	0.78	0.67	0.91	1.06	1.02	1.10	0.78			
100	0.55	0.66	0.73	0.81	1.01	0.93	0.84	0.70	0.72	0.67	0.83	0.86	0.94	0.96	0.97	0.67			
105	0.51	0.70	0.67	0.80	1.01	0.90	0.86	0.67	0.85	0.82	1.01	0.80	0.94	0.92	1.06	0.86			
110	0.73	0.79	0.82	0.82	1.00	1.00	1.48	0.95	1.04	1.01	1.02	0.75	0.94	0.93	1.06	1.01			
115	0.90	0.99	0.87	0.60	1.00	0.95	2.25	0.96	1.19	1.17	1.04	0.56	0.89	0.89	1.06	1.06			
120	1.02	1.23	0.97	0.50	0.82	0.67	3.01	1.00	1.25	1.23	1.05	0.31	0.69	0.84	1.06	1.06			
125	1.06	1.29	1.06	0.50	0.77	0.68	1.51	1.09	1.24	1.29	1.06	0.14	0.75	0.79	1.06	1.06			
130	1.10	1.29	1.03	0.50	0.72	0.70	1.20	1.13	1.31	1.34	1.11	0.70	0.89	0.78	1.06	1.06			
135	1.18	1.29	1.00	0.50	0.83	0.71	1.06	1.17	1.36	1.34	1.09	0.84	1.02	0.83	1.06	1.06			
140	1.32	1.29	0.97	0.50	0.90	0.89	1.02	1.21	1.39	1.34	1.08	1.02	1.19	1.05	1.06	1.06			
145	1.46	1.29	0.94	0.95	0.94	1.00	0.95	1.20	1.41	1.33	1.11	1.02	1.39	1.18	1.06	1.06			
150	1.62	1.29	0.91	0.95	0.98	1.04	0.96	1.17	1.42	1.32	1.14	1.04	1.46	1.33	1.12	1.06			
155	1.52	1.29	0.96	0.95	1.14	1.08	0.98	1.14	1.44	1.32	1.14	1.07	1.50	1.45	1.26	1.06			
160	1.40	1.13	1.01	1.06	1.44	1.12	1.06	1.11	1.50	1.31	1.15	1.10	1.55	1.72	1.37	1.32			
165	1.71	1.14	1.07	1.06	1.67	1.16	1.08	1.09	1.63	1.30	1.16	1.17	1.73	1.83	1.62	1.43			
170	1.52	1.16	1.17	1.45	1.74	1.66	1.11	1.06	1.46	1.34	1.17	1.28	1.79	1.83	1.79	1.49			
175	1.40	1.17	1.40	1.59	1.77	1.81	1.39	1.17	1.57	1.57	1.17	1.67	1.69	1.72	1.75	1.55			
180	1.51	1.18	1.34	1.62	1.78	1.83	1.45	1.17	1.57	1.52	1.18	1.34	1.61	1.78	1.73	1.45			

2.3 Electrical, Photometric and Chromaticity Measurements

Test date	2019-05-07	Test Ambient:	25.2 °C
Test Orientation	Horizontal	Stabilization Time (min)	90
Model Number	L48T8/850/14G-EB, with ballast OSRAM SYLVANIA QTP 2x32T8/UNV ISN-SC		

Electrical Measurement for Bare-lamp:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE190314-H3	120.0	60	0.1367	15.50	0.9450	5.80
	277.0	60	0.0585	15.59	0.9624	8.59
DLC Pass Criteria					>= 0.9(-3%)	<= 20(+5)

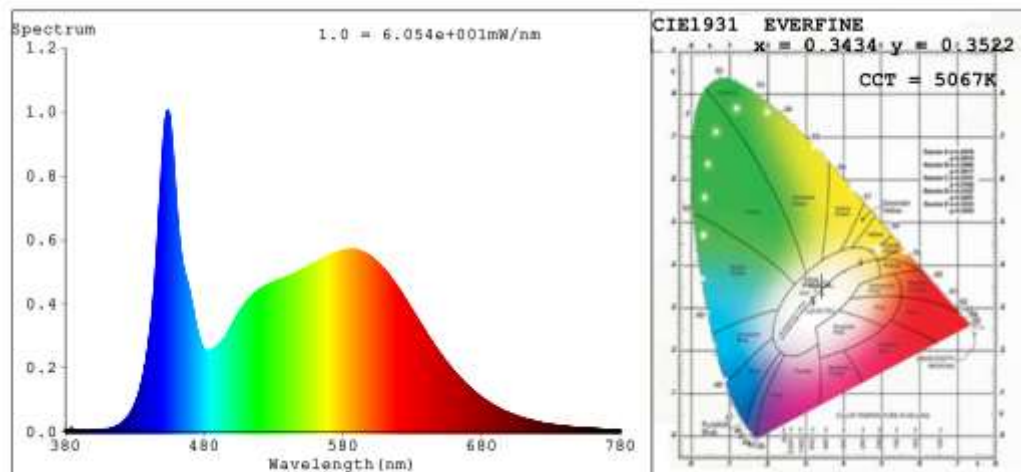
Chromaticity Measurement for Bare-lamp - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	82	R9	6
Frequency (Hz)	60	R2	91	R10	78
CCT (K)	5067	R3	95	R11	81
Duv	0.0010	R4	82	R12	62
Chromaticity (x, y)	x=0.3434 y=0.3522	R5	83	R13	85
Chromaticity (u', v')	u'=0.2100 v'=0.4847	R6	86	R14	98
Color Rendering Index (CRI)	83.6	R7	85	R15	77
R9	6	R8	65	--	--

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

Parameter	Result		DLC V4.4 Pass Criteria
Test Voltage (V)	120.0	277.0	--
Frequency (Hz)	60	60	
Total Luminous (lm)	2191	2188	Bare Lamp: >= 1600(-10%)
System Efficacy (lm/W)	141.35	140.35	Bare lamp: >= 110(-3%)
Bare Lamp Efficacy (lm/W)	156.50	156.29	--

Spectral Power Distribution & Chromaticity Diagram



Laboratory: Standard-Tech Co., Ltd Testing Center

Report Format Number STD-QP019-409-B/0

Address: Standard-Tech Building, No.6 Guanhong Road, Guangzhou Science City, Guangzhou 510663, China

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2.4 Performance Assessment:

Model name	CCT(K)	Total Luminous (lm)	Power (W)	Luminous Efficacy (lm/W)
L48T8/830/14G-EB	3000K	2098	15.53	135.09
L48T8/835/14G-EB	3500K	2121 ^{*1}	15.52 ^{*2}	136.66 ^{*3}
L48T8/840/14G-EB	4000K	2145 ^{*1}	15.52 ^{*2}	138.21 ^{*3}
L48T8/850/14G-EB	5000K	2191	15.50	141.35

*1: This value is calculated and the calculation formula is as below:

$$2121 = (2191 - 2098) / 4 * 1 + 2098$$

$$2145 = (2191 - 2098) / 4 * 2 + 2098$$

*2: This value is calculated and the calculation formula is as below:

$$15.52 = (15.50 + 15.53) / 2$$

*3: This value is calculated and the calculation formula is as below:

$$136.66 = 2112 / 15.52$$

$$138.21 = 2145 / 15.52$$

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-327	Spectral analysis system HAAS-2000	Verified by D204 standard lamp	
ST-R-332	Standard Lamp	2018-07-04	2019-07-03
ST-R-333	Power Meter for Integrating Sphere	2018-06-28	2019-06-27
ST-R-355	Goniophotometer system	Verified by D908S standard lamp	
ST-R-359	Standard Lamp	2018-07-04	2019-07-03
ST-R-358	Power Meter for Goniophotometer	2018-06-28	2019-06-27
Expand Uncertainty: Photometric Measurement (Sphere):2.66%, k=2 Chromaticity Measurement(Sphere):28.6K, k=2 Photometric Measurement(Goniophotometer):2.76%, k=2			

******* END OF REPORT *******