Ningbo TengLi Testing Co., Ltd

2nd floor, Block B, Ningbo Testing and Certification Base, No. 66
Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang
Tel: 86574-8783 6802
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LM-79-08 Test Report

For

Espen Technology

(Brand Name: Espen)

12257 Florence Ave, Santa Fe Springs CA 90670

Model name(s): LB48T8U6/850/13P-AB

Report Type:	Testing and Report According to IES LM-79-2008
Type of Luminaire:	Internal Driver/Line Voltage Lamp-Style Retrofit Kits (UL Type B)
Report Date:	2020-07-10
Prepared By:	Ningbo TengLi Testing Co., Ltd 2nd floor, Block B, Ningbo Testing and Certification Base, No. 66 Qingyi Road, Ningbo National Hi-Tech Zone, Ningbo, Zhejiang

Test & Report By:

Xeon Ren

Engineer: Xeon Ren

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:		
Model Number	LB48T8U6/850/13P-AB	
Remark	N/A	
Representative (Tested) Model	LB48T8U6/850/13P-AB	
Model Difference	N/A	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	Internal Driver/Line Voltage Lamp-Style Retrofit Kits (UL Type B)	
LED Manufacturer	N/A	
LED Model	N/A	
Dimming	N/A	
Integral Controls	N/A	
Sample Number	STD200728NB-A1(5000K)	
Date of Receipt	Jul.10,2020	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

1.2 Rated Values:	
Rated Voltage / Frequency	120-277Vac, 50/60 Hz
Nominal Power	13W
Rated Initial Lamp Lumen	--
Declared CCT	5000K

1.3 Test Specifications:

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

1.4 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 ℃ ±1 ℃, 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 240 or rated Volts AC, 50Hz. 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 ºC ±1 ºC. 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 240 or rated Volts AC, 50Hz. 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 ºC ±1 ºC. The sample was operated at 240 or rated Volts AC, 50Hz. 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	2020-07-10	**Test Ambient:**	25.2 ºC
Test Orientation	As intended	**Stabilization Time (min)**	45
Model Number	LB48T8U6/850/13P-AB	**Total operating time(min)**	60

Electrical Measurement:

Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
STD200728	120.0	60.01	0.1116	13.04	0.9750	19.61
NB-A1	276.9	60.01	0.0524	13.23	0.9108	19.36

Chromaticity Measurement - Sphere-Spectroradiometer Method(Self-absorption: 1.0422) (4π geometry):

Parameter	Result
Test Voltage (V)	120.0
Frequency (Hz)	60
CCT (K)	5122
Duv	0.0025
Chromaticity (x, y)	x=0.3421 y=0.3542
Chromaticity (u', v')	u'=0.2084 v'=0.4855
Color Rendering Index (CRI)	84.8
R9	12

Special Color Rendering Indices			
R1	84	R9	12
R2	93	R10	84
R3	95	R11	82
R4	82	R12	63
R5	84	R13	87
R6	89	R14	98
R7	85	R15	78
R8	66	--	--

Photometric Measurement – Goniophotometer Method(Tset Dstance: 26.00m):

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	1765.4	1800.7
Luminous Efficacy (lm/W)	135.41	136.10
Beam Angle ( )	139.0	--
Center Beam Candle Power (cd)	383	--

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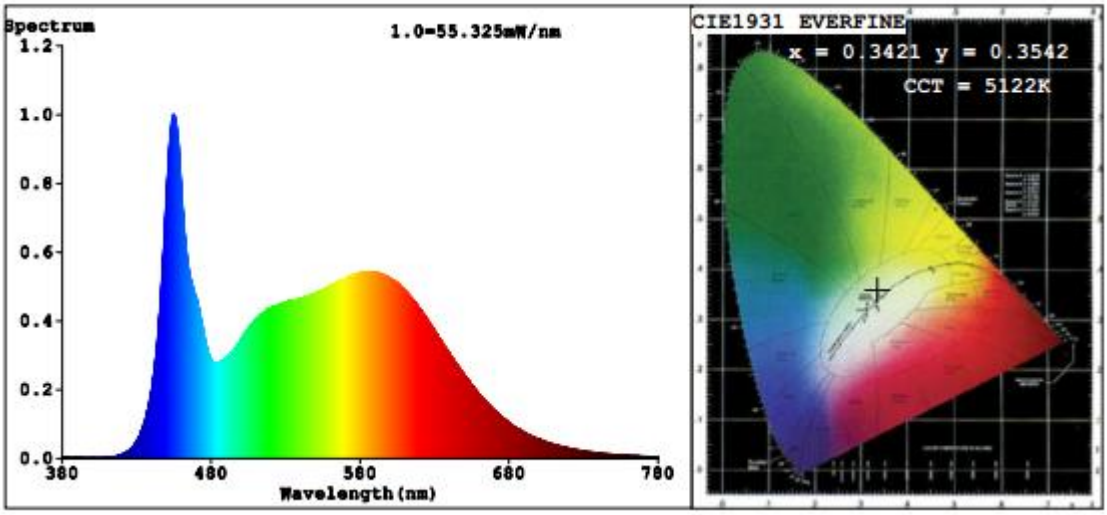
ACCREDITED
Certificate#4703.02

Spectral Power Distribution & Chromaticity Diagram



Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	302.8	17.2%
0-40	504.0	28.5%
0-60	947.6	53.7%
60-90	514.5	29.1%
70-100	341.3	19.3%
90-120	170.4	9.7%
0-90	1,462.1	82.8%
90-180	303.3	17.2%
0-180	1,765.4	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	36.3	2.1%	90-100	33.9	1.9%
10-20	104.8	5.9%	100-110	72.4	4.1%
20-30	161.6	9.2%	110-120	64.1	3.6%
30-40	201.2	11.4%	120-130	51.9	2.9%
40-50	221.3	12.5%	130-140	34.4	2%
50-60	222.3	12.6%	140-150	22.1	1.2%
60-70	207.1	11.7%	150-160	14.8	0.8%
70-80	180.0	10.2%	160-170	7.1	0.4%
80-90	127.4	7.2%	170-180	2.6	0.1%

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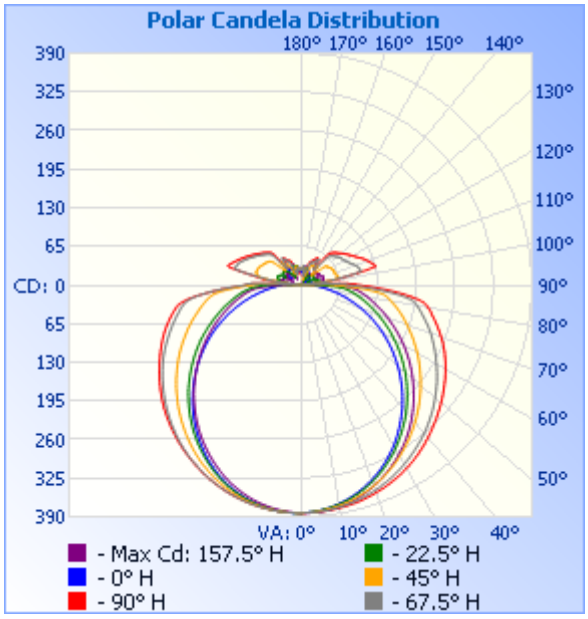
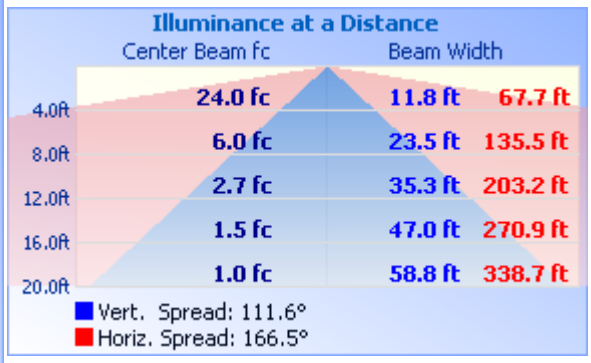
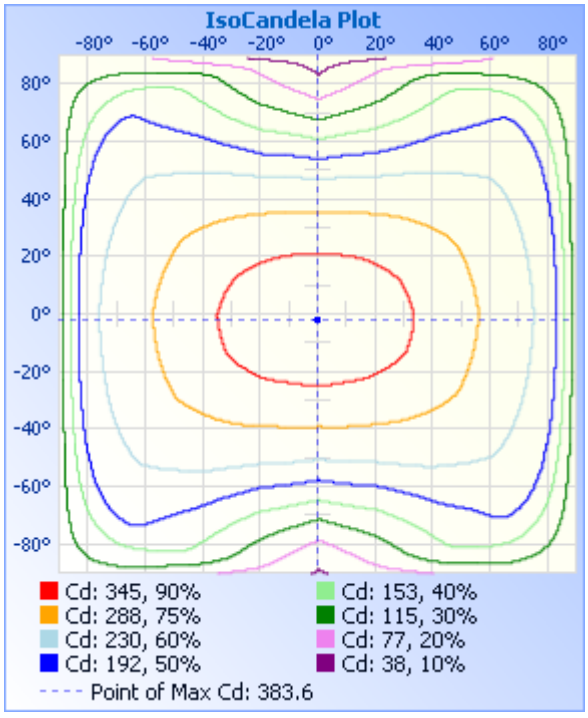
Photometric Data







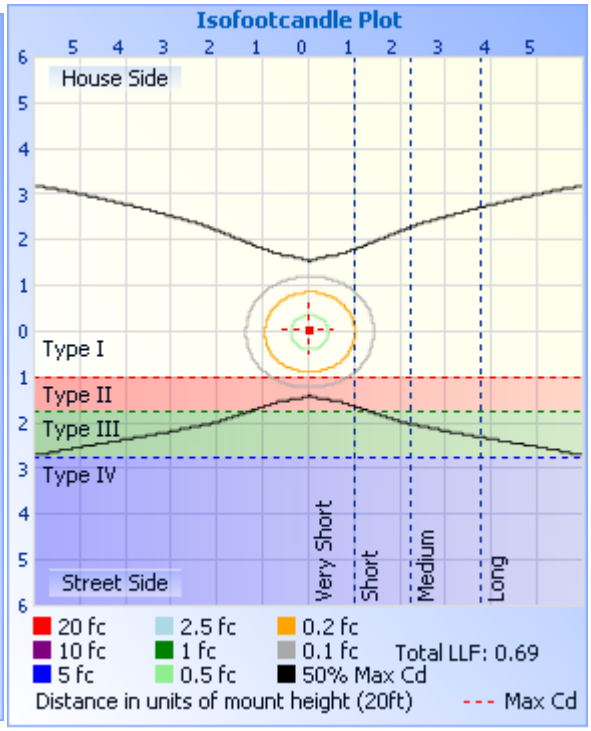


Table--1 UNIT: cd

γ (DEG) \ C (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	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383		
5	382	382	381	380	380	381	381	382	383	383	383	383	382	382	382	383		
10	379	378	376	374	373	374	377	379	381	381	380	378	378	378	379	380		
15	375	373	368	364	363	365	369	374	377	377	374	371	369	370	373	375		
20	369	365	358	352	349	352	360	367	372	371	366	360	358	359	364	369		
25	361	357	346	336	332	337	347	359	365	363	355	346	343	345	353	361		
30	351	346	332	318	313	318	333	348	356	354	343	330	325	329	340	350		
35	341	334	316	298	290	298	317	337	346	343	328	312	304	310	325	340		
40	330	321	300	277	267	277	300	324	334	331	312	291	282	289	308	327		
45	317	308	282	254	241	254	282	311	322	318	295	269	257	267	291	314		
50	304	294	264	231	215	230	264	296	309	304	278	247	231	245	273	299		
55	290	279	245	207	187	206	245	280	296	289	259	224	205	221	255	284		
60	275	263	227	184	159	182	227	264	282	274	241	200	177	198	236	268		
65	260	248	209	161	131	159	208	248	268	258	223	177	149	174	218	252		
70	246	232	192	139	104	136	190	233	252	241	204	154	121	151	199	235		
75	230	216	174	119	77.4	115	173	216	235	224	186	133	94.0	130	181	219		
80	213	199	156	99.6	53.1	95.9	155	199	219	208	169	114	68.8	110	164	202		
85	163	151	126	80.2	34.1	77.1	128	157	174	172	147	95.4	48.0	91.2	141	163		
90	92.9	80.3	59.3	32.2	10.2	29.5	59.3	82.0	99.9	102	88.7	61.9	35.4	59.0	81.9	94.3		
95	18.6	5.59	6.71	6.00	0.58	5.73	7.32	1.63	10.3	5.52	1.57	1.06	0.70	0.91	1.37	16.6		
100	70.5	62.4	64.6	31.5	18.7	28.9	61.1	64.0	70.7	60.7	65.3	34.2	31.9	33.0	57.4	56.5		
105	127	107	67.9	33.6	15.9	31.3	63.7	103	129	115	77.9	38.4	31.8	39.0	77.0	114		
110	117	101	66.1	30.0	10.4	27.9	60.7	98.0	120	111	78.9	40.3	30.6	40.5	77.3	110		
115	108	92.9	63.6	16.2	9.67	13.3	60.8	89.8	109	103	75.6	29.5	30.3	38.1	74.7	102		
120	99.3	85.9	60.2	24.1	13.8	25.8	57.9	84.2	99.7	94.4	71.7	37.6	31.0	28.8	71.3	94.0		
125	91.3	80.5	56.7	28.8	16.7	26.2	54.5	80.7	91.7	88.1	66.5	32.6	20.9	36.1	67.8	86.8		
130	84.1	75.5	39.8	30.1	20.1	26.8	26.6	75.3	83.8	80.7	40.4	32.2	28.2	34.3	58.9	80.1		
135	77.3	70.2	26.8	26.2	21.1	20.1	32.1	68.5	76.8	72.6	36.1	28.3	28.4	32.1	35.2	73.6		
140	52.8	35.6	43.1	17.2	21.8	11.9	40.9	34.7	45.2	38.5	49.0	22.2	30.8	24.1	48.4	38.6		
145	36.3	53.9	41.8	16.5	23.7	7.98	38.7	52.2	40.3	54.9	44.5	19.1	34.5	25.0	40.4	54.7		
150	50.2	47.0	41.5	11.7	25.1	21.5	37.5	45.0	50.8	49.6	41.7	6.71	29.6	20.1	34.6	48.1		
155	44.6	44.3	27.8	24.3	28.6	25.9	21.1	40.6	43.9	43.9	35.6	16.0	31.4	31.1	22.9	37.8		
160	38.0	32.1	18.3	23.5	27.6	30.9	9.72	23.4	34.3	31.7	21.2	26.5	35.3	35.0	25.3	22.3		
165	24.8	24.4	19.5	24.2	23.8	26.7	22.8	17.2	15.7	15.4	19.1	28.7	33.8	33.7	29.4	20.5		
170	25.4	23.7	23.7	23.5	20.9	27.9	28.1	32.4	25.3	25.5	30.1	31.4	32.1	31.4	30.4	27.1		
175	23.4	20.4	25.5	24.9	23.8	28.9	30.1	26.5	23.0	23.3	25.9	27.9	30.2	28.6	28.0	24.9		
180	28.6	26.3	25.8	24.9	27.9	27.2	26.3	29.9	29.6	30.9	26.7	25.7	25.6	27.6	27.7	28.0		

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-702	2 meter Integrating Sphere	Verified by D204 standard lamp	
ST-R-701	Spectral analysis system HAAS-1200	Verified by D204 standard lamp	
ST-R-703	Standard Lamp D204	2020-02-22	2021-02-21
ST-R-704	Power Meter for Integrating Sphere	2020-01-05	2021-01-04
ST-R-714	Goniophotometer system	Verified by D908S standard lamp	
ST-R-710	Standard Lamp D908S	2020-02-22	2021-02-21
ST-R-711	Power Meter for Goniophotometer	2020-01-05	2021-01-04
Uncertainty(K=2): Photometric Measurement (Sphere):3.94% Chromaticity Measurement(Sphere):48.2K Photometric Measurement(Goniophotometer):3.96%			

4. Product Photo

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