

LM-79-08 Test Report

For

LIGHT EFFICIENT DESIGN, LLC**(Brand Name: Light Efficient Design)**

188 S.Northwest Highway, Cary, IL60013, USA

LED SOX Lamp Retrofit

Model name(s): LED-8104-AMB

Representative (Tested) Model: LED-8104-AMB

Model Different: N/A.

Test & Report By:

Only Zhang

Engineer: Only Zhang

Date: Aug.03,2018

Review By:

John Li

Manager: John Li

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

2. 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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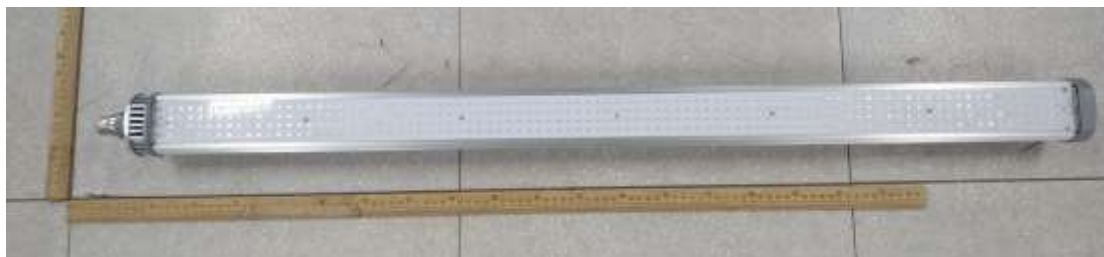
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1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN, LLC	
Brand Name	Light Efficient Design	
Model Number	LED-8104-AMB	
SKU (if available)	N/A	
Type of Luminaire (for integral lamps, list base type and lamp type)	LED SOX Lamp Retrofit	
Rated Voltage / Frequency	100-277Vac, 50/60Hz	
Nominal Power	100W	
Rated Initial Lamp Lumen	--	
Declared CCT	N/A	
LED Manufacturer	N/A	
LED Model	N/A	
Sample Number	JBE180709-L1	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo

1.2 Test Specifications:

Date of Receipt	Aug.01,2018
Date of Test	Aug.03,2018
Test item	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	2018-08-03	Test Ambient:	25.2 °C
Test Orientation	As intended	Stabilization Time (min)	90
Model Number	LED-8104-AMB		

Electrical Measurement:

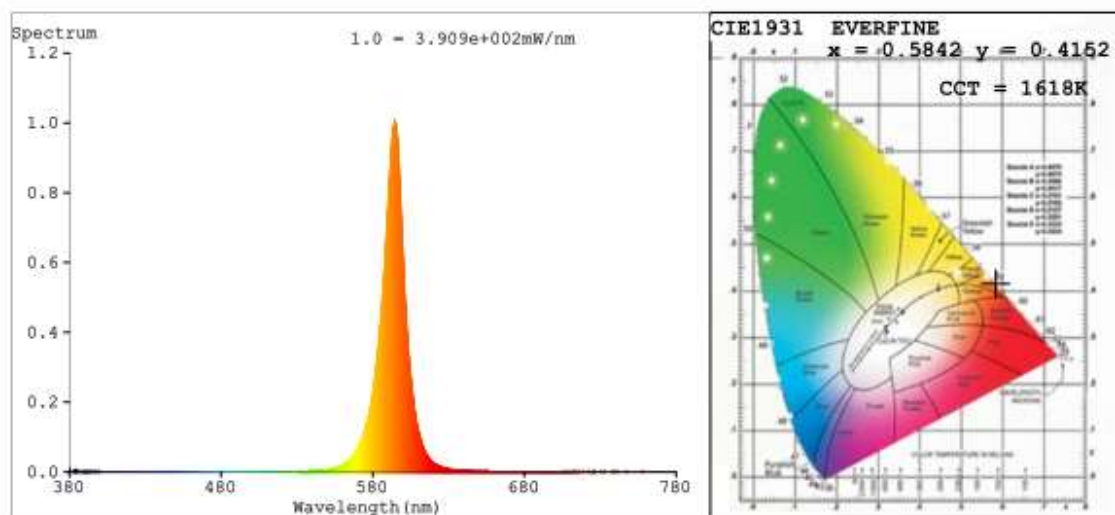
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180709-	120.0	60	0.8960	106.7	0.9924	6.65
L1	277.0	60	0.4100	104.0	0.9157	14.64

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	0	R9	0
Frequency (Hz)	60	R2	49	R10	23
CCT (K)	1618	R3	16	R11	0
Duv	-0.0051	R4	0	R12	0
Chromaticity (x, y)	x=0.5842 y=0.4152	R5	0	R13	0
Chromaticity (u', v')	u'=0.3429 v'=0.548	R6	34	R14	45
Color Rendering Index (CRI)	12.4	R7	0	R15	0
R9	0	R8	0	--	--

Photometric Measurement – Goniophotometer Method:

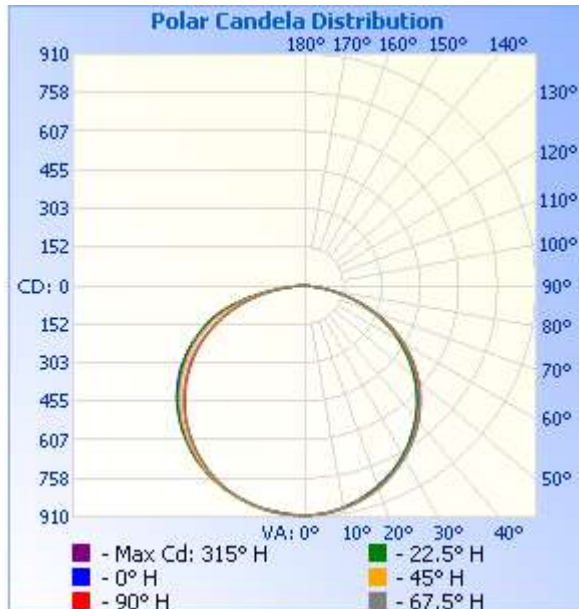
Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	2873.3	2694.2
Luminous Efficacy (lm/W)	26.93	25.91
Most Worst Luminous/Highest Watts	25.25	
Beam Angle (°)	123.2	--
Center Beam Candle Power (cd)	903	--

Spectral Power Distribution & Chromaticity Diagram

Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	713.1	24.8%
0-40	1,184.7	41.2%
0-60	2,175.8	75.7%
60-90	688.4	24%
70-100	296.4	10.3%
90-120	3.5	0.1%
0-90	2,864.2	99.7%
90-180	9.1	0.3%
0-180	2,873.3	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	85.6	3.0%	90-100	1.3	0%
10-20	246.9	8.6%	100-110	1.0	0%
20-30	380.7	13.2%	110-120	1.2	0%
30-40	471.6	16.4%	120-130	1.3	0%
40-50	507.9	17.7%	130-140	1.3	0%
50-60	483.1	16.8%	140-150	1.1	0%
60-70	393.3	13.7%	150-160	0.9	0%
70-80	237.5	8.3%	160-170	0.7	0%
80-90	57.7	2.0%	170-180	0.3	0%

Photometric Data



Illuminance at a Distance

Center Beam fc	Beam Width	Beam Width	Beam Width
3.33M	7.54 fc	12.75 M	11.92 M
6.67M	1.89 fc	25.50 M	23.84 M
10.00M	0.84 fc	38.25 M	35.76 M
13.33M	0.47 fc	50.99 M	47.67 M
16.67M	0.30 fc	63.75 M	59.60 M
20.00M	0.21 fc	76.50 M	71.52 M

Vert. Spread: 124.8°
Horiz. Spread: 121.6°

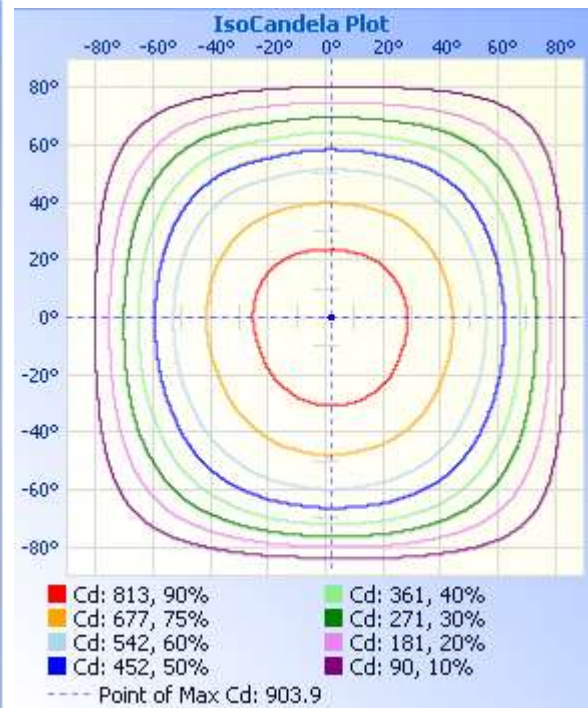
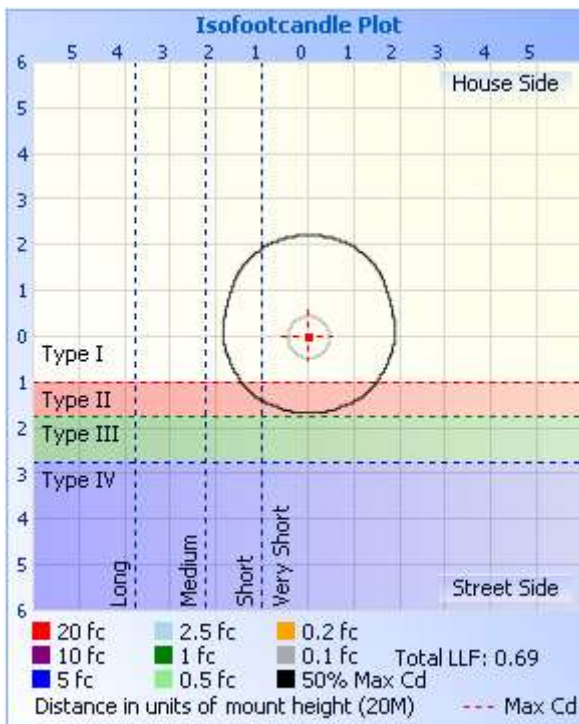


Table--1

UNIT: cd

C (DEG) y (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	903	903	903	903	903	903	903	903	903	903	903	903	903	903	903	903	
5	902	902	902	899	899	898	899	900	899	898	899	898	899	900	902	902	
10	895	894	892	886	885	885	888	888	889	886	887	889	893	893	893	894	
15	881	880	874	867	864	866	869	871	871	869	871	876	880	880	882	880	
20	861	858	851	842	839	840	846	849	848	845	852	856	864	865	864	861	
25	834	829	821	811	808	810	816	819	817	816	826	836	842	843	842	834	
30	801	796	787	777	773	773	781	783	782	780	794	807	815	817	812	802	
35	762	755	746	734	727	731	739	740	742	740	755	773	783	782	777	766	
40	717	708	701	684	679	681	691	695	697	696	714	734	748	745	735	720	
45	666	655	648	630	626	625	638	641	644	643	665	689	703	700	691	672	
50	610	597	588	572	568	563	579	581	586	587	610	639	656	648	638	617	
55	548	534	524	508	505	496	513	516	520	525	552	584	601	592	581	558	
60	480	463	456	439	436	424	441	443	449	453	490	520	537	531	517	490	
65	403	388	381	363	358	348	362	363	371	376	417	446	464	466	447	414	
70	322	309	299	279	274	266	278	278	284	296	333	373	396	391	368	336	
75	233	223	211	193	188	180	187	185	192	205	239	273	295	295	274	245	
80	142	134	123	109	101	96.9	97.6	98.6	103	112	132	155	170	177	166	152	
85	59.9	55.1	46.7	37.6	31.7	28.9	29.2	29.4	31.2	35.8	43.0	52.2	57.2	67.2	67.3	64.6	
90	7.81	6.78	4.14	2.33	1.98	1.48	1.56	1.78	0.87	1.22	0.97	0.87	3.17	3.46	6.44	8.38	
95	0.62	0.81	0.82	1.30	1.33	1.10	0.85	0.64	0.55	0.87	0.57	0.70	1.30	2.39	0.65	0.70	
100	0.42	0.68	0.85	1.31	1.42	1.10	0.76	0.63	0.41	0.64	0.54	0.73	1.45	1.32	0.62	0.43	
105	0.45	0.68	0.87	1.33	1.76	1.10	0.81	0.60	0.63	0.64	0.66	0.82	1.97	1.00	0.64	0.59	
110	0.53	0.67	0.92	1.59	1.84	1.47	0.80	0.85	0.74	0.72	0.77	1.01	2.03	1.26	0.85	0.74	
115	0.67	0.73	1.07	1.89	2.23	1.64	1.04	0.90	0.77	0.79	0.98	1.18	2.25	1.41	1.07	0.86	
120	0.82	0.82	1.26	2.20	2.44	1.78	1.23	1.01	0.92	0.98	1.10	1.38	2.30	1.78	1.16	0.97	
125	0.92	0.92	1.54	2.30	2.49	2.04	1.44	1.11	0.98	1.08	1.23	1.54	2.32	1.83	1.28	1.07	
130	0.92	1.07	1.60	2.35	2.44	2.20	1.52	1.20	1.07	1.16	1.29	1.69	2.35	1.83	1.41	1.22	
135	0.92	1.08	1.93	2.39	2.27	2.20	1.61	1.28	1.13	1.26	1.33	1.74	2.44	1.83	1.48	1.28	
140	0.92	1.08	2.01	2.43	2.18	2.24	1.71	1.30	1.18	1.35	1.45	1.80	2.59	1.79	1.76	1.46	
145	1.08	1.18	1.94	2.47	2.38	2.35	1.76	1.39	1.35	1.44	1.54	1.89	2.79	1.93	1.82	1.60	
150	1.23	1.45	1.91	2.49	2.47	2.35	1.89	1.55	1.51	1.69	1.66	1.93	2.83	2.57	2.08	1.82	
155	1.38	1.59	2.02	2.43	2.57	2.36	1.92	1.69	1.64	1.79	1.74	2.03	2.84	2.66	2.25	1.93	
160	1.54	1.67	2.16	2.44	2.69	2.36	2.00	1.81	1.74	1.80	1.92	2.13	2.85	2.93	2.57	2.02	
165	1.71	1.86	2.25	2.57	2.80	2.67	2.29	1.98	2.00	2.15	2.25	2.61	3.05	3.35	3.05	2.52	
170	1.79	2.15	2.51	2.71	3.27	2.88	2.60	2.09	2.30	2.31	2.37	2.61	3.13	3.61	3.42	2.73	
175	2.30	2.31	2.52	3.12	3.53	3.19	2.67	2.57	2.38	2.51	2.40	2.61	3.19	3.58	3.33	2.73	
180	2.35	2.36	2.56	3.12	3.53	3.25	2.72	2.62	2.30	2.36	2.41	2.56	3.22	3.56	3.31	2.73	

3. Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Next Calibration Date
ST-R-331	2 meter Integrating Sphere	2018-07-02	2019-07-01
ST-R-327	Spectral analysis system HAAS-2000	2018-07-02	2019-07-01
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	2018-07-01	2019-06-30
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):2.04%, k=2 Chromaticity Measurement(Sphere):28.8K, k=2 Photometric Measurement(Goniophotometer):2.36%, k=2			

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