

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-8100-AMB

Representative (Tested) Model: LED-8100-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

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

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

1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN, LLC	
Brand Name	Light Efficient Design	
Model Number	LED-8100-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	20W	
Rated Initial Lamp Lumen	--	
Declared CCT	N/A	
LED Manufacturer	N/A	
LED Model	N/A	
Sample Number	JBE180709-I1	
Luminaire Aperture (for downlights)	--	in.
Luminaire Length	--	mm
Luminaires Width	--	mm
Number of Units (modular products)	N/A	s

Photo

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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-8100-AMB		

Electrical Measurement:

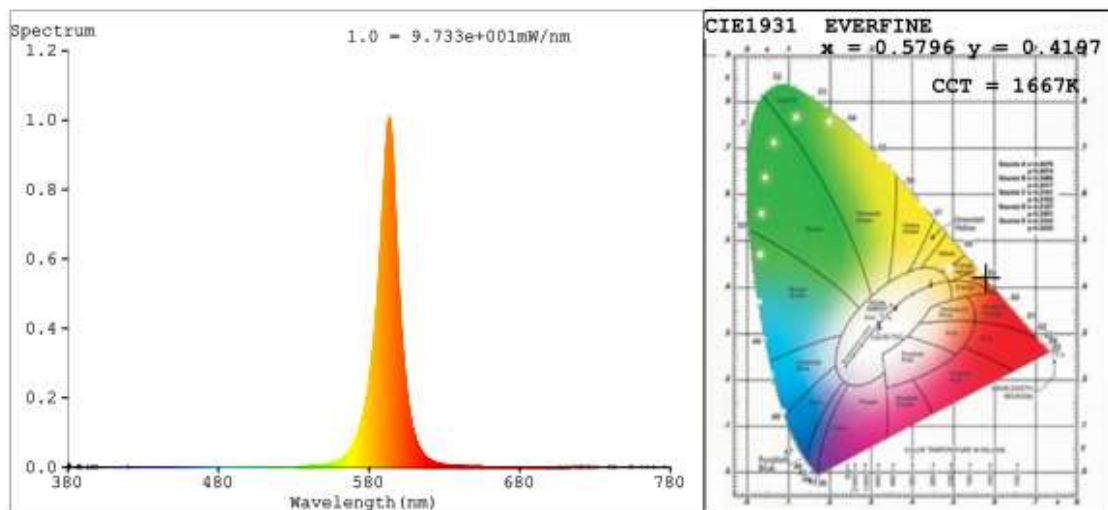
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180709-I	120.0	60	0.1843	21.94	0.9920	12.02
1	277.0	60	0.0840	21.93	0.9430	17.60

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	0	R9	0
Frequency (Hz)	60	R2	47	R10	19
CCT (K)	1667	R3	17	R11	0
Duv	0.0057	R4	0	R12	0
Chromaticity (x, y)	x=0.5796 y=0.4197	R5	0	R13	0
Chromaticity (u', v')	u'=0.3371 v'=0.5493	R6	31	R14	45
Color Rendering Index (CRI)	11.8	R7	0	R15	0
R9	0	R8	0	--	--

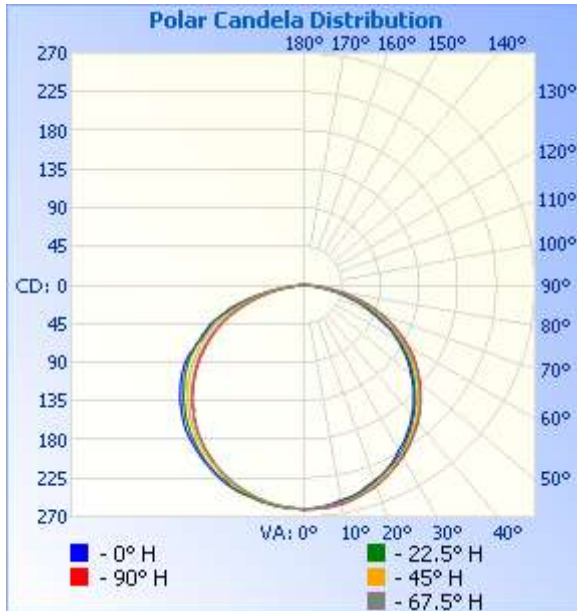
Photometric Measurement – Goniophotometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	821.64	790.24
Luminous Efficacy (lm/W)	37.45	36.03
Most Worst Luminous/Highest Watts	36.03	
Beam Angle (°)	122.0	--
Center Beam Candle Power (cd)	261	--

Spectral Power Distribution & Chromaticity Diagram

Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	205.5	25%
0-40	341.3	41.5%
0-60	626.5	76.3%
60-90	192.9	23.5%
70-100	81.5	9.9%
90-120	0.9	0.1%
0-90	819.4	99.7%
90-180	2.2	0.3%
0-180	821.6	100%

Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	24.7	3.0%	90-100	0.4	0.1%
10-20	71.2	8.7%	100-110	0.3	0%
20-30	109.6	13.3%	110-120	0.2	0%
30-40	135.8	16.5%	120-130	0.2	0%
40-50	146.2	17.8%	130-140	0.3	0%
50-60	139.0	16.9%	140-150	0.2	0%
60-70	111.8	13.6%	150-160	0.2	0%
70-80	65.6	8.0%	160-170	0.2	0%
80-90	15.5	1.9%	170-180	0.1	0%

Photometric Data


Illuminance at a Distance

Center Beam fc	Beam Width		
3.33M	2.18 fc	12.29 M	11.82 M
6.67M	0.55 fc	24.56 M	23.62 M
10.00M	0.24 fc	36.85 M	35.44 M
13.33M	0.14 fc	49.13 M	47.25 M
16.67M	0.09 fc	61.41 M	59.06 M
20.00M	0.06 fc	73.70 M	70.88 M

■ Vert. Spread: 123.0°
■ Horiz. Spread: 121.1°

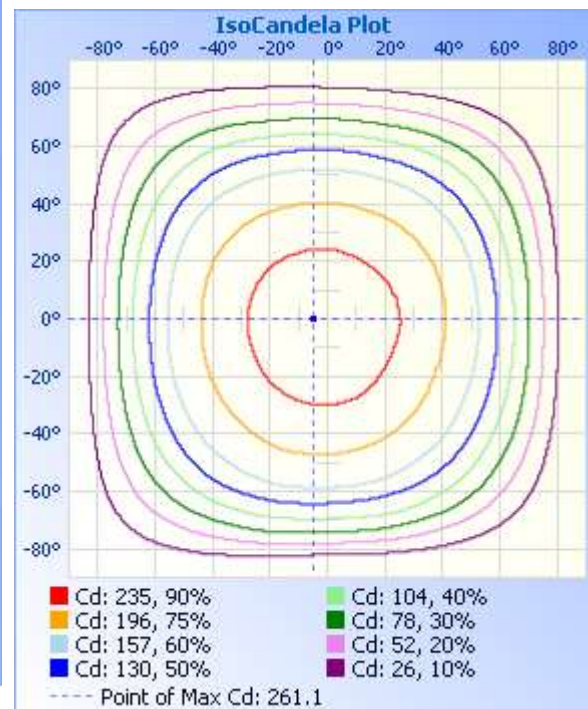
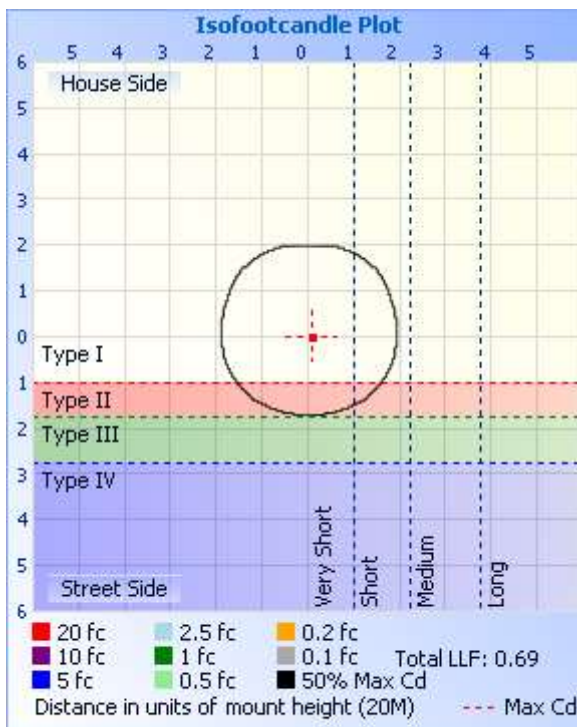


Table--1

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	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	261	
5	260	260	259	259	259	260	260	260	261	260	260	260	259	260	259	259	
10	256	256	255	254	255	257	257	258	259	259	257	257	257	257	256	255	
15	250	251	248	248	250	251	253	254	255	255	254	254	253	253	251	250	
20	244	243	241	241	242	244	246	248	249	249	248	249	249	248	245	243	
25	235	231	232	233	234	236	238	241	240	241	242	243	243	241	236	234	
30	224	224	222	223	222	226	229	230	232	232	234	235	234	232	227	224	
35	212	212	210	209	211	214	218	219	220	221	223	225	225	221	216	212	
40	198	198	196	196	197	200	205	207	208	209	211	214	214	210	204	199	
45	182	182	181	180	182	185	190	194	193	195	197	202	201	196	190	184	
50	164	165	164	163	165	168	174	176	178	180	183	187	186	181	174	166	
55	146	145	145	144	147	150	155	159	160	163	166	172	170	165	156	149	
60	125	124	124	124	127	130	136	139	141	144	148	152	147	146	137	128	
65	102	102	102	99.4	102	108	114	117	119	122	128	128	125	122	116	106	
70	77.8	77.1	75.0	75.3	78.9	81.4	90.4	93.3	95.6	98.1	102	106	99.4	98.3	89.7	81.6	
75	51.8	51.8	50.9	51.0	53.5	58.2	63.3	67.8	69.9	72.8	75.8	76.9	70.1	67.9	61.4	54.7	
80	26.2	25.8	26.4	27.5	30.3	33.6	38.0	41.8	43.5	46.0	45.9	43.7	36.0	35.3	31.8	28.2	
85	6.92	7.00	7.56	9.07	11.3	13.0	15.8	18.1	19.7	20.2	19.3	15.1	6.96	10.5	8.82	7.50	
90	0.35	0.21	0.73	2.04	1.48	2.58	2.35	2.64	3.06	2.84	1.78	0.77	0.05	1.34	0.11	0.05	
95	0.05	0.05	0.47	0.84	0.16	1.21	0.48	0.21	0.05	0.05	0.00	0.51	0.05	0.31	0.21	0.05	
100	0.05	0.00	0.37	0.45	0.18	0.63	0.32	0.05	0.05	0.10	0.00	0.26	0.07	0.34	0.27	0.16	
105	0.05	0.00	0.21	0.26	0.20	0.44	0.21	0.05	0.05	0.07	0.00	0.24	0.16	1.72	0.29	0.16	
110	0.05	0.00	0.21	0.26	0.22	0.37	0.21	0.05	0.20	0.13	0.05	0.22	0.24	0.79	0.32	0.20	
115	0.05	0.00	0.21	0.26	0.24	0.37	0.21	0.05	0.27	0.18	0.12	0.29	0.32	0.52	0.36	0.22	
120	0.16	0.00	0.21	0.26	0.26	0.37	0.21	0.05	0.34	0.26	0.17	0.30	0.37	0.42	0.39	0.24	
125	0.16	0.05	0.21	0.26	0.31	0.37	0.21	0.05	0.39	0.28	0.22	0.31	0.41	0.44	0.42	0.27	
130	0.16	0.05	0.21	0.26	0.36	0.37	0.21	0.07	0.44	0.36	0.31	0.32	0.41	0.46	0.49	0.31	
135	0.16	0.07	0.21	0.26	0.41	0.37	0.21	0.09	0.42	0.41	0.35	0.36	0.42	0.49	0.55	0.35	
140	0.26	0.10	0.21	0.36	0.42	0.37	0.32	0.12	0.44	0.42	0.36	0.40	0.47	0.53	0.60	0.38	
145	0.26	0.14	0.22	0.35	0.46	0.37	0.32	0.14	0.46	0.43	0.43	0.45	0.50	0.56	0.58	0.43	
150	0.32	0.22	0.31	0.40	0.51	0.52	0.32	0.21	0.48	0.45	0.47	0.51	0.53	0.59	0.63	0.47	
155	0.35	0.26	0.46	0.46	0.56	0.52	0.40	0.27	0.51	0.46	0.51	0.54	0.60	0.64	0.69	0.50	
160	0.39	0.26	0.53	0.50	0.61	0.69	0.49	0.29	0.63	0.57	0.57	0.59	0.65	0.68	0.78	0.53	
165	0.42	0.37	0.59	0.60	0.68	0.77	0.59	0.39	0.83	0.73	0.73	0.78	0.78	0.79	0.87	0.81	
170	0.58	0.52	0.62	0.71	0.71	0.81	0.84	0.58	0.92	0.73	0.73	0.94	0.84	0.82	0.87	0.86	
175	0.70	0.73	0.66	0.77	0.72	0.83	0.81	0.85	0.90	0.73	0.73	0.88	0.83	0.84	0.85	0.85	
180	0.74	0.73	0.78	0.83	0.73	0.84	0.79	1.07	0.95	0.73	0.73	0.78	0.83	0.79	0.85	0.80	

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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 *******