

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-8104-22K

Representative (Tested) Model: LED-8104-22K

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

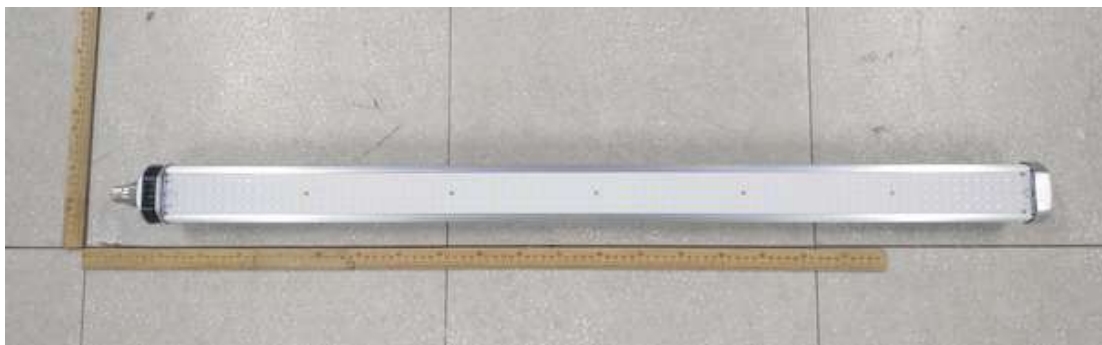
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<http://www.standard-tech.com>

1.1 Product Information:

Organization Name	LIGHT EFFICIENT DESIGN, LLC	
Brand Name	Light Efficient Design	
Model Number	LED-8104-22K	
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	2200K	
LED Manufacturer	N/A	
LED Model	N/A	
Sample Number	JBE180709-D1(2200K)	
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-8104-22K		

Electrical Measurement:

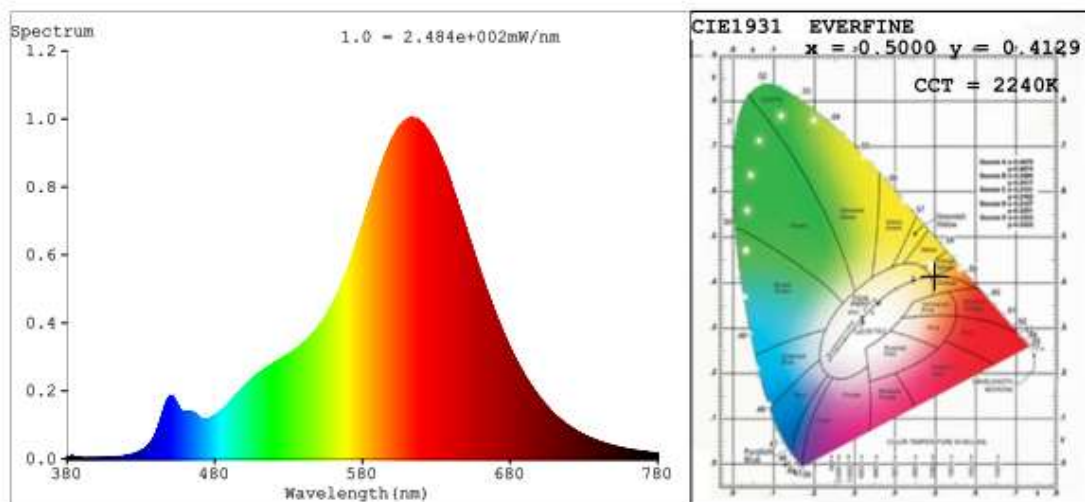
Sample No.	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD %
JBE180709-	120.0	60	0.8914	106.4	0.9947	8.21
D1	277.0	60	0.4122	105.2	0.9214	9.92

Chromaticity Measurement - Sphere-Spectroradiometer Method:

Parameter	Result	Special Color Rendering Indices			
Test Voltage (V)	120.0	R1	84	R9	12
Frequency (Hz)	60	R2	96	R10	92
CCT (K)	2240	R3	90	R11	85
Duv	-0.0007	R4	82	R12	91
Chromaticity (x, y)	x=0.5000 y=0.4129	R5	85	R13	87
Chromaticity (u', v')	u'=0.2876 v'=0.5343	R6	97	R14	95
Color Rendering Index (CRI)	83.4	R7	78	R15	74
R9	12	R8	55	--	--

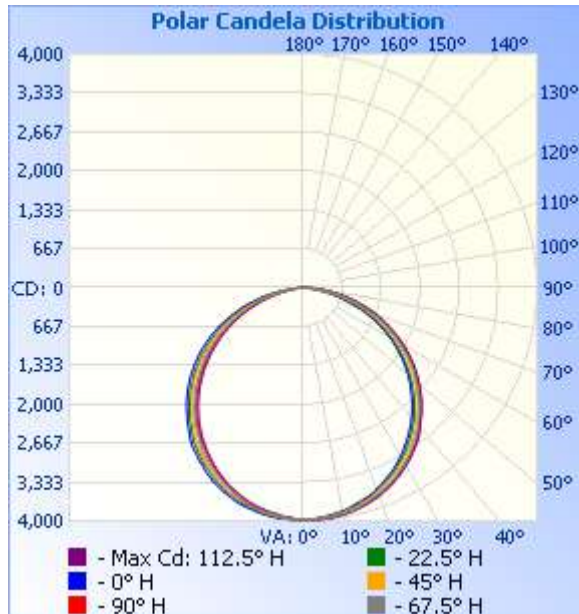
Photometric Measurement – Goniophotometer Method:

Parameter	Result	
Test Voltage (V)	120.0	277.0
Frequency (Hz)	60	60
Total Luminous (lm)	11576	11534
Luminous Efficacy (lm/W)	108.80	109.64
Most Worst Luminous/Highest Watts	108.40	
Beam Angle (°)	114.7	--
Center Beam Candle Power (cd)	3974	--

Spectral Power Distribution & Chromaticity Diagram

Zonal Lumen Tabulation

Zonal Lumen Summary		
Zone	Lumens	% Luminaire
0-30	3,104.6	26.8%
0-40	5,106.0	44.1%
0-60	9,094.8	78.6%
60-90	2,436.3	21%
70-100	997.4	8.6%
90-120	16.5	0.1%
0-90	11,531.1	99.6%
90-180	43.3	0.4%
0-180	11,574.5	100%

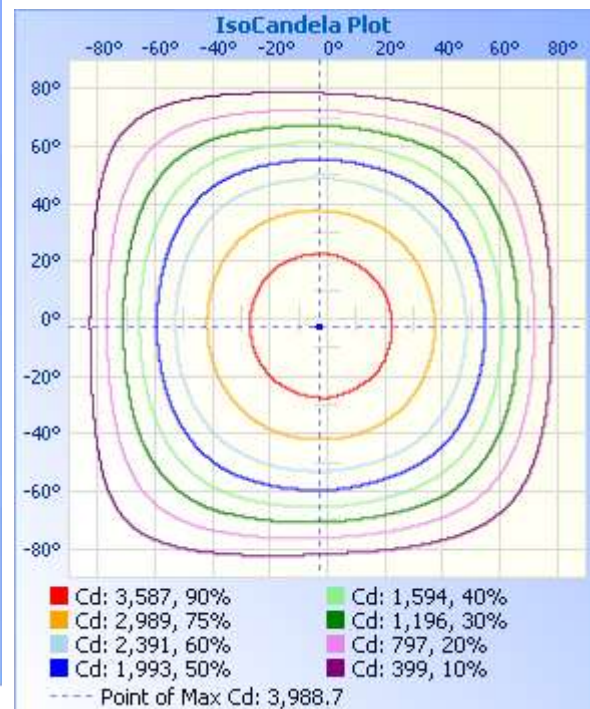
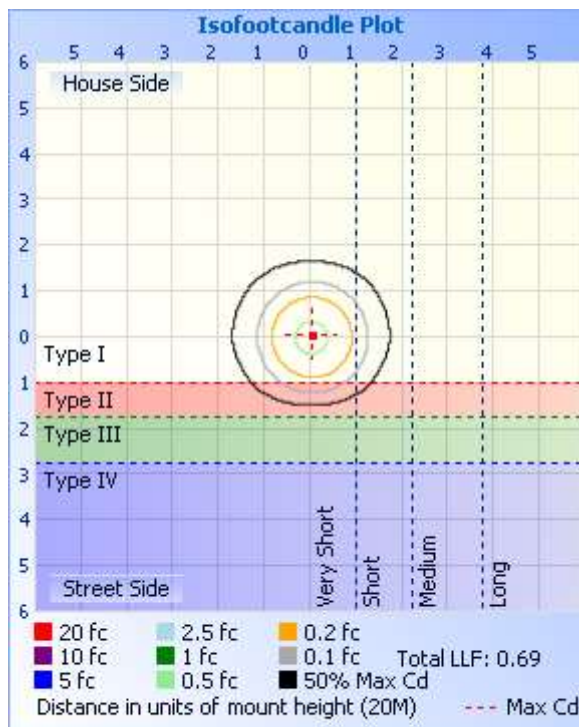
Lumens Per Zone					
Zone	Lumens	% Total	Zone	Lumens	% Total
0-10	376.2	3.3%	90-100	6.7	0.1%
10-20	1,080.8	9.3%	100-110	4.2	0%
20-30	1,647.6	14.2%	110-120	5.6	0%
30-40	2,001.4	17.3%	120-130	6.2	0.1%
40-50	2,089.2	18.0%	130-140	6.0	0.1%
50-60	1,899.6	16.4%	140-150	5.5	0%
60-70	1,445.7	12.5%	150-160	4.5	0%
70-80	797.8	6.9%	160-170	3.3	0%
80-90	192.9	1.7%	170-180	1.3	0%

Photometric Data


Illuminance at a Distance

Center Beam fc	Beam Width	Beam Width	Beam Width
3.33M	33.2 fc	10.48 M	10.35 M
6.67M	8.31 fc	20.95 M	20.68 M
10.00M	3.69 fc	31.42 M	31.03 M
13.33M	2.08 fc	41.89 M	41.36 M
16.67M	1.33 fc	52.37 M	51.71 M
20.00M	0.92 fc	62.85 M	62.05 M

Vert. Spread: 115.0°
Horiz. Spread: 114.4°



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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	3974	3974	3974	3974	3974	3974	3974	3974	3974	3974	3974	3974	3974	3974	3974	3974	
5	3941	3932	3930	3936	3946	3953	3960	3965	3978	3984	3985	3977	3972	3962	3959	3946	
10	3872	3862	3863	3863	3890	3894	3917	3935	3944	3951	3949	3948	3940	3918	3908	3888	
15	3779	3763	3765	3764	3795	3816	3835	3862	3878	3886	3889	3883	3875	3840	3816	3802	
20	3645	3632	3629	3629	3676	3696	3730	3761	3786	3796	3803	3779	3776	3737	3716	3673	
25	3483	3459	3460	3473	3520	3552	3601	3632	3660	3674	3674	3661	3659	3601	3568	3524	
30	3293	3260	3267	3291	3335	3376	3425	3477	3506	3519	3516	3508	3484	3433	3392	3347	
35	3079	3040	3047	3069	3120	3176	3230	3285	3323	3334	3329	3323	3307	3245	3191	3116	
40	2841	2788	2804	2827	2887	2948	3007	3063	3096	3111	3105	3098	3060	3003	2942	2882	
45	2564	2517	2525	2564	2629	2684	2763	2811	2856	2862	2864	2855	2814	2746	2685	2619	
50	2267	2219	2231	2276	2352	2396	2487	2537	2590	2593	2596	2583	2547	2462	2410	2326	
55	1961	1896	1919	1968	2045	2091	2192	2246	2298	2304	2309	2290	2253	2160	2102	2012	
60	1624	1562	1591	1633	1719	1767	1868	1917	1987	1989	2007	1975	1936	1834	1773	1685	
65	1272	1224	1246	1287	1372	1428	1530	1586	1656	1652	1680	1639	1594	1496	1424	1339	
70	914	874	890	928	1009	1076	1180	1233	1310	1314	1334	1281	1224	1131	1069	974	
75	567	534	538	577	654	721	817	883	952	967	970	924	852	771	702	628	
80	260	235	235	266	325	390	466	537	600	621	615	568	488	431	368	301	
85	57.1	45.5	42.1	50.4	79.2	121	180	237	286	305	295	253	174	149	112	79.4	
90	3.51	3.50	4.04	6.13	5.42	7.78	22.7	45.4	68.8	78.7	68.3	42.1	7.39	5.84	4.24	3.49	
95	2.34	2.64	3.35	4.99	4.56	4.78	3.78	3.25	2.91	3.95	2.88	2.75	4.72	3.20	2.39	2.12	
100	2.44	2.59	3.35	5.14	5.29	4.41	3.19	2.49	1.97	2.12	2.15	2.70	5.77	3.73	2.61	2.34	
105	2.87	3.33	4.14	6.54	6.60	5.04	3.46	2.60	2.18	2.17	2.51	3.02	7.34	4.73	3.25	2.92	
110	3.66	4.02	5.13	7.89	8.07	6.14	4.20	3.24	2.61	2.80	3.04	3.60	8.50	5.78	4.21	3.61	
115	4.30	5.02	6.23	9.14	9.12	7.19	5.00	4.03	3.24	3.33	3.62	4.78	9.81	6.88	5.06	4.09	
120	5.05	5.55	6.86	10.1	9.70	8.40	5.96	4.88	3.88	4.13	4.35	5.67	10.4	7.93	5.86	4.88	
125	5.47	6.19	7.60	10.7	10.1	9.13	6.65	5.41	4.09	4.45	4.88	6.45	9.54	8.72	6.49	5.30	
130	5.84	6.61	8.28	11.0	10.0	9.50	7.08	5.89	4.52	5.02	5.50	7.23	10.4	9.30	6.98	5.78	
135	5.84	6.72	8.54	11.0	9.85	9.98	7.61	6.15	5.10	5.45	5.98	7.74	10.8	10.0	7.61	6.31	
140	6.22	7.14	9.06	11.2	10.4	10.4	8.09	6.74	5.48	6.03	6.45	8.00	11.4	10.3	8.25	6.79	
145	6.54	7.56	9.48	11.3	11.2	10.7	8.57	7.21	6.22	6.56	7.07	8.31	12.2	10.8	8.94	7.59	
150	6.91	8.19	9.90	11.5	11.5	10.8	9.15	7.64	6.75	7.40	7.55	8.63	12.8	11.7	10.00	8.44	
155	7.54	8.67	10.2	11.9	11.8	10.9	9.63	8.33	7.33	8.09	8.07	8.94	12.8	12.1	10.9	9.29	
160	7.76	8.83	10.5	11.9	11.9	11.1	10.00	8.65	7.71	8.51	8.44	9.26	12.2	12.9	11.7	9.71	
165	8.82	10.1	11.7	13.0	14.2	13.6	11.7	10.1	9.25	9.63	10.1	11.3	13.8	15.2	14.4	11.9	
170	9.93	11.0	12.6	14.0	16.1	14.9	12.8	11.1	10.4	10.5	11.2	13.1	14.8	16.6	15.8	13.3	
175	11.0	11.8	13.3	14.8	17.0	15.5	13.8	12.0	11.0	11.1	11.4	12.8	14.9	17.3	16.0	13.7	
180	11.1	11.7	13.1	14.6	17.3	15.6	13.8	12.0	11.1	11.1	11.5	12.8	14.6	17.3	15.7	13.7	

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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 *******