LCTECH

NVLAP TESTING
NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

Ref. No.: LCZP16110452
Version: 1.0
Date of Issue: Dec. 8, 2016
Total pages: 11

LCTECH (ZHONGSHAN) TESTING SERVICE CO., LTD. LABORATORY

Test report of

IES LM-79-08

Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Rendered to:

Zhejiang Starco Lighting Co.,Ltd
8-3 Geshan Road, 322110, Dongyang, Zhejiang, China

For products:

LED Tube

Models No.:

SLT836PF850

Test Date:	Nov. 29, 2016 to Nov. 30, 2016
Test Item:	Total luminous flux, Luminous Efficacy, Electrical values, Luminous Intensity Distribution, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.
Test Lab.:	**LCTECH (Zhongshan) Testing Service Co., Ltd** 2/F., Technology and Enterprise Development Center, Guangyuan Road, Xiaolan, Zhongshan, Guangdong, China Tel:+86-760-22833366 Fax:+86-760-22833399 E-mail:Service@lccert.com http://www.lccert.com
Template No.:	LC-RT-PL/LM79-08/01
Test Note:	

Complied by:		**Reviewed by:**	
Bowen Pang	Bowen Pang	**Richard Li**	
Project Engineer		**Technical Manager**	
Dec. 8, 2016		**Dec. 8, 2016**	

Table of Contents

1. General

1.1 Product Information

Brand Name	-
Product Type	LED Tube
Model Number	SLT836PF850
Rated Inputs	100-277V, 50/60Hz
Rated Power	36W
Rated Light output	N/A
Declared CCT	5000K
Power Supply	Internal LED Driver
LED Package, Array or Module	Model: 2835 White SMD LED, manufactured by ShenZhen JuFei Optoelectronics Co., Ltd.
Receipt Samples	1 unit
Date of Receipt Samples	Nov. 26, 2016
Note	-

1.2 Standards or methods

The following standards are partly or totally used or referenced for test:

No.	Name
ANSI/NEMA/ ANSLG C78.377-2011	Specifications for the Chromaticity of Solid State Lighting Products
ANSI C82.77-2002	Harmonic Emission Limits—Related Power Quality Requirements for Lighting Equipment
CIE Pub. No. 13.3-1995	Method of Measuring and Specifying Color Rendering of Light Sources
CIE Pub. No. 15:2004	Colorimetry
IES LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

1.3 Equipment list

Instrument	ID	Model name	Cal. date	Next cal. Date
AC Power supply	LC-I-923	CHP-500	2016-02-04	2017-02-03
AC Power supply	LC-I-987	APW-110N	2016-02-04	2017-02-03
Power analyzer	LC-I-928	WT210	2016-01-24	2017-01-24
Power analyzer	LC-I-954	WT210	2016-02-04	2017-02-03
Multimeter	LC-I-972	Fluke 17B	2016-08-10	2017-08-09
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-002	24V100W	2016-10-08	2017-10-07
Luminous Flux Standard Lamp	LC-PL-I-001	110V/200W	2016-09-24	2017-09-23
Goniophotometer(with mirror)	LC-I-902	GMS2000	2016-05-07	2017-05-07
Wireless temperature transmitter	LC-I-978	DWRF-B	2016-02-03	2017-02-02
Wireless temperature transmitter	LC-I-979	DWRF-B	2016-02-03	2017-02-02

2. Test conducted and method

The Tube was operated at least 2 hours to reach stabilization and temperature equilibrium before test.

2.1 Ambient Condition

The ambient temperature in which measurements are being taken was maintained at 25 °C ± 1°C; the air flow around the sample(s) being tested did not affect the performance.

2.2 Power Supply Characteristics

The AC power supply had a sinusoidal voltage wave shape at the prescribed frequency (60 Hz) such that the RMS summation of the harmonic components does not exceed 3 percent of the fundamental during operation of the test item.

The voltage of AC power supply (RMS voltage) applied to the device under test was regulated to within±0.2 percent under load.

2.3 Seasoning and Stabilization

No seasoning was performed in accordance with IESNA LM-79-08. And before the measurement, the sample was stabilized until the light output and power variations were less than 0.5% in 30 minutes intervals (3 readings, 15 minutes apart).

2.4 Electrical Instrumentation

The calibration uncertainties of the instruments for AC voltage and current were less than 0.2 percent, and the calibration uncertainty of the AC power meter was less than 0.5 percent(95 % confidence interval, k=2).

2.5 Color Measurement Method

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the color characteristics (Color rendering index, correlated color temperature, chromaticity coordinate) were calculated from these by software automatically.

2.6 Total Luminous Flux Measurement Method

Total luminous flux was measured by both sphere-spectroradiometer system and type C goniophotometer system.

Light intensity distribution was measured by a type C goniophotometer (with mirror) which can keep the sample in burn position when the tests conduct, and the total luminous flux was calculated from the intensity data by software automatically.

Spectral radiant flux was measured by a sphere (2 meter)-spectroradiometer system, and the total luminous flux was calculated from these by software automatically.

2.7 Luminous Intensity Distribution Measurement Method

Luminous intensity distribution was measured by a mirror-type goniophotometer (Type C) which can keep the sample in burn position when the tests conduct, and the kinds of graph were generated by software automatically.

2.8 Spatial Non-uniformity of Chromaticity

The customer did not require this measurement.

3. Test Result Summary

3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	120.00V~60Hz	120.04V~60Hz
Input Current(A)	0.279	0.292
Total Power(W)	33.25	34.78
Power Factor	0.993	0.993
I-THD	4.44%	-
Off-state Power(W)	-	-

3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)*	4214.02	4400.78
Luminaire Efficacy(Lm/W)*	126.74	126.53
Correlated Color Temperature (CCT)(K)	4891	-
Color Rendering Index (CRI)	83.6	-
R9	8	-
Chromaticity Coordinate (x,y)	x = 0.3494 y = 0.3646	-
Chromaticity Coordinate (u,v)	u = 0.2093 v = 0.3277	-
Chromaticity Coordinate (u',v')	u' = 0.2093 v' = 0.4915	-
Duv	0.00473	-
Zone Lumens between 0-60 °	-	48.80%

Note:

*:The Total Lumens is based on the test data of half of model SLT836PF850 multiplied by 2, the luminaire efficacy is equal to total lumens divided by total power.

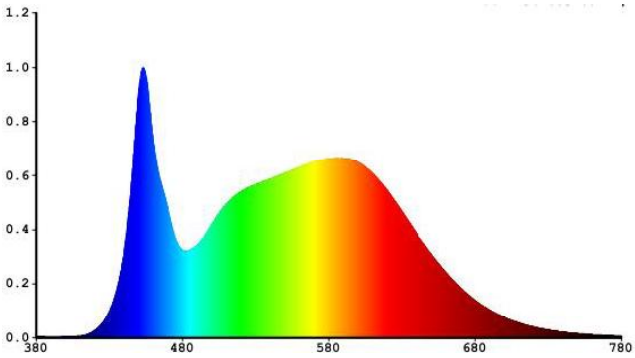
3.3 Color Rendering Details

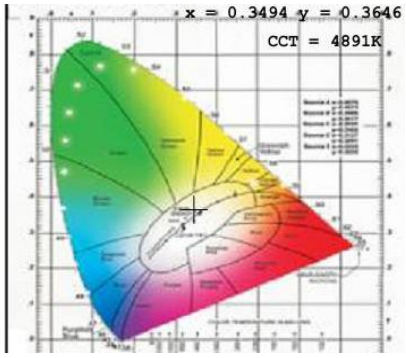
R1	R2	R3	R4	R5	R6	R7	R8
82	91	96	80	81	86	87	66
R9	R10	R11	R12	R13	R14	R15	-
8	77	79	57	84	98	75	-

Note: N.A.

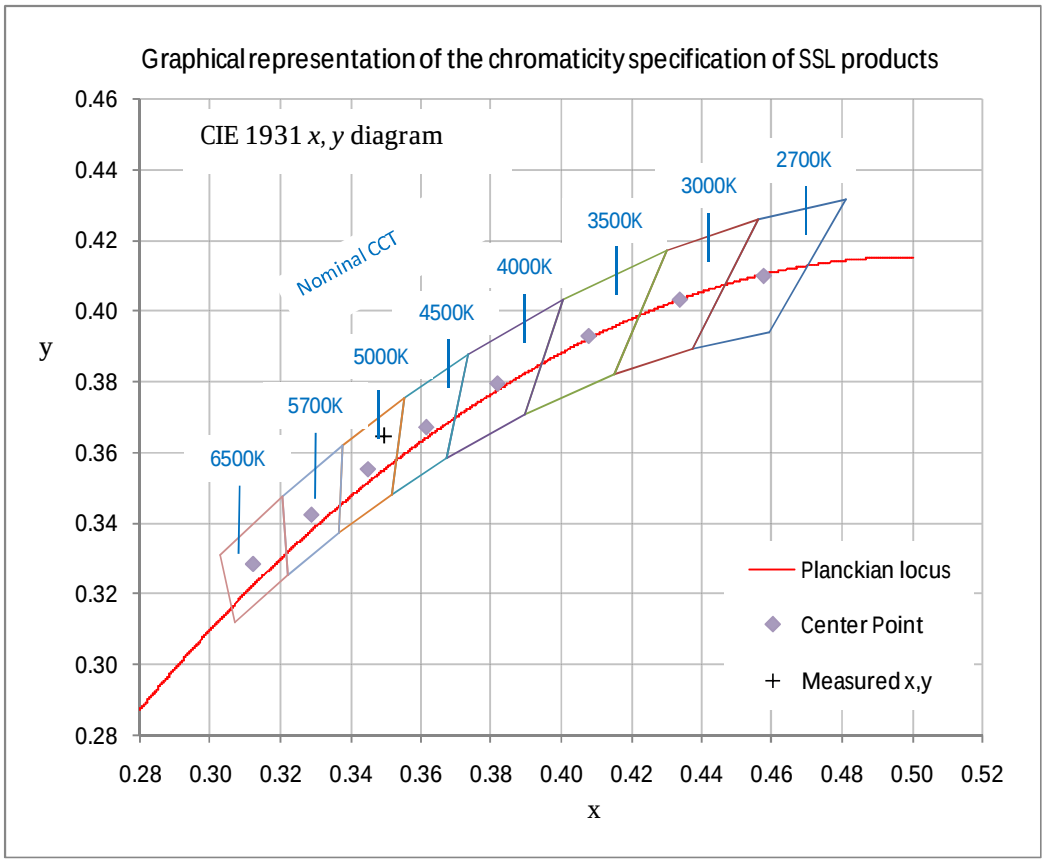
4. Test Data

4.1 Spectral Distribution





4.2 ANSI Chromaticity Quadrangles Diagram



4.3 Goniometry Test Data (half of SLT836PF850)

CIE Type	Semi-Direct	Basic Luminous Shape	Rectangular w/Sides
Spacing Criteria (0-180)	1.20	Luminous Length	1.11 m
Spacing Criteria (90-270)	1.36	Luminous Width	0.03 m
Spacing Criteria (Diagonal)	1.42	Luminous Height	0.02m
Test Distance	29.65 m		

4.4 Zonal Lumen Summary (half of SLT836PF850)

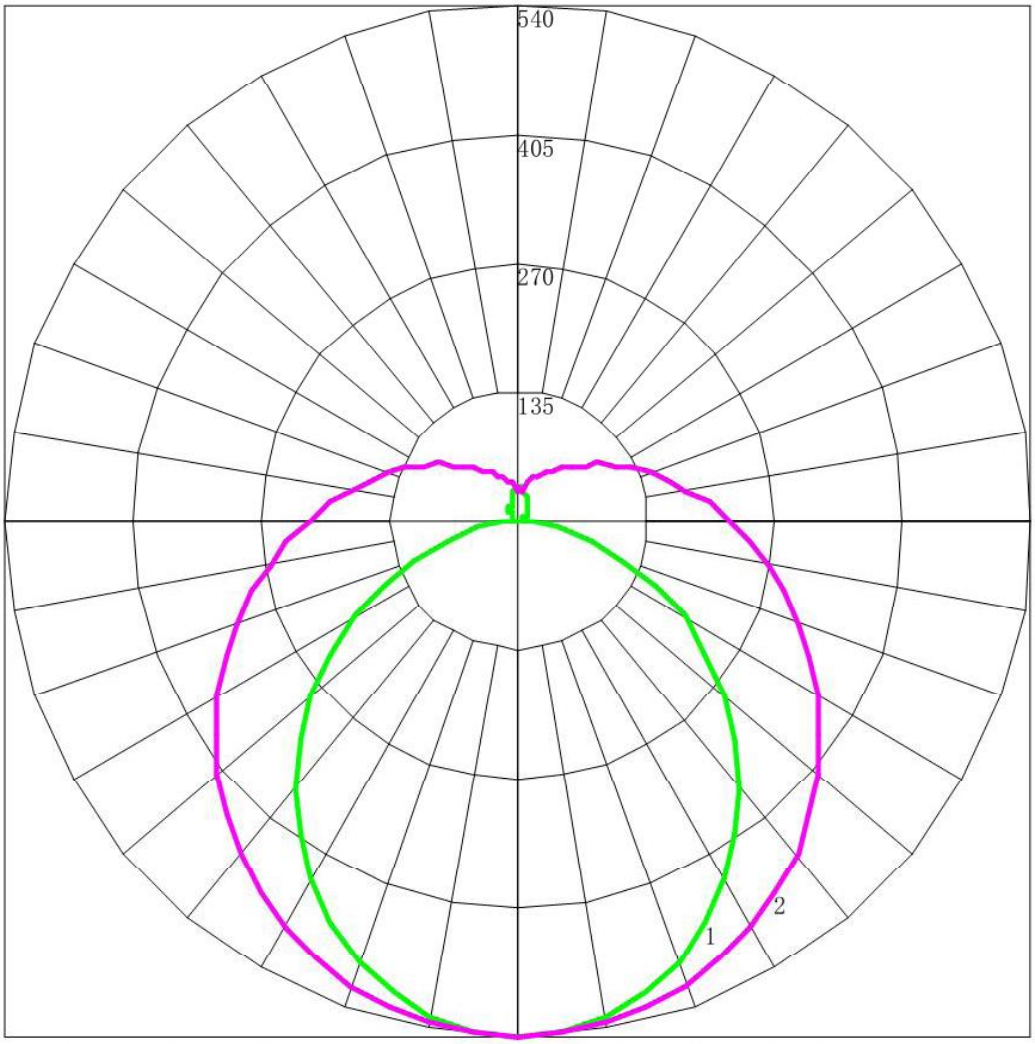
Zone	Lumens	%Lamp	%Fixt
0-20	197.81	8.30	8.30
0-30	421.61	17.70	17.70
0-40	695.81	29.30	29.30
0-60	1277.44	53.80	53.80
0-80	1747.27	73.60	73.60
0-90	1914.81	80.60	80.60
10-90	1863.70	78.50	78.50
20-40	497.99	21.00	21.00
20-50	792.67	33.40	33.40
40-70	838.36	35.50	35.50
60-80	469.83	19.80	19.80
70-80	213.10	9.00	9.00
80-90	167.54	7.10	7.10
90-110	229.86	9.70	9.70
90-120	305.32	12.90	12.90
90-130	360.95	15.20	15.20
90-150	428.95	18.10	18.10
90-180	460.58	19.40	19.40
110-180	230.72	9.70	9.70
0-180	2200.39	100.00	100.00

Total Luminaire Efficiency = 100.00%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	51.11
10-20	146.70
20-30	223.80
30-40	274.19
40-50	294.67
50-60	286.96
60-70	256.73
70-80	213.10
80-90	167.54
90-100	129.85
100-110	100.01
110-120	75.46
120-130	55.63
130-140	39.98
140-150	28.02
150-160	18.24
160-170	10.15
170-180	3.25

4.5 Polar Curves (half of SLT836PF850)



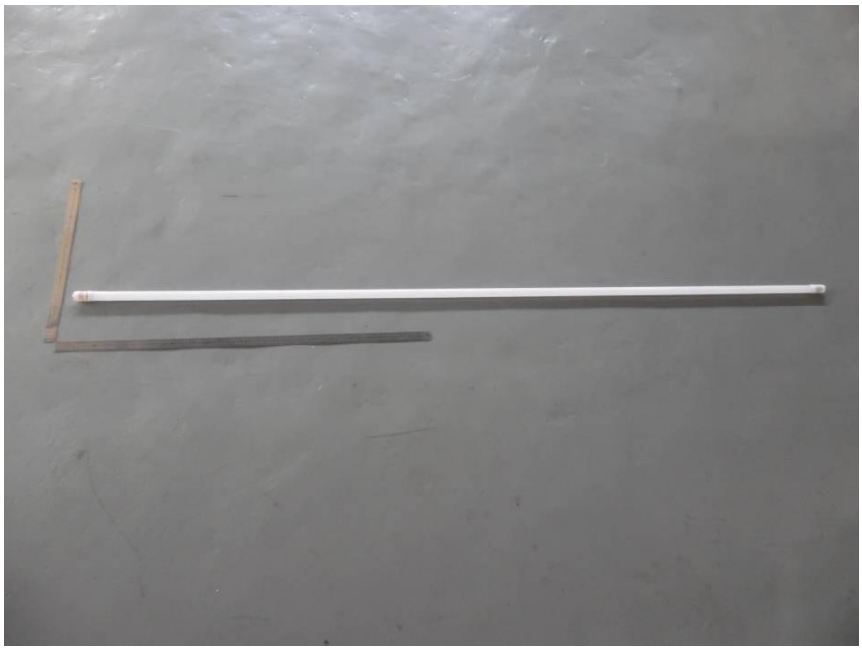
Maximum Candela = 539.738 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180)
2 - Vertical Plane Through Horizontal Angles (90 - 270)

4.6 Candela Tabulation (half of SLT836PF850)

	0	15	30	45	60	75	90
0	539.738	539.738	539.738	539.738	539.738	539.738	539.738
5	537.660	536.621	537.936	537.936	538.009	538.839	537.352
10	527.799	527.837	528.865	531.012	531.999	533.948	534.099
15	512.013	512.308	515.653	520.552	523.515	526.488	527.028
20	490.744	492.175	497.514	504.767	511.060	516.372	517.441
25	464.079	466.671	474.223	486.436	495.777	503.602	505.078
30	433.966	438.486	449.041	464.479	477.162	488.132	489.417
35	399.520	404.862	418.849	439.838	456.441	470.514	472.716
40	363.083	370.284	386.822	412.273	433.966	450.720	454.366
45	323.949	333.251	354.037	384.270	409.238	429.677	433.066
50	283.710	294.095	319.873	354.376	384.132	406.661	411.419
55	242.188	255.558	285.289	325.122	358.650	383.315	387.864
60	199.870	215.894	251.365	295.472	332.080	358.543	364.005
65	158.128	177.932	218.713	266.943	306.490	334.099	338.540
70	116.473	140.967	188.302	240.128	280.620	308.844	314.421
75	77.074	107.561	160.614	214.017	256.104	284.334	289.347
80	42.008	78.537	135.934	190.630	232.819	260.239	266.225
85	14.681	55.773	114.502	168.937	210.476	237.243	243.364
90	2.299	39.934	96.673	149.374	189.208	215.259	220.980
95	1.857	30.619	82.182	132.120	170.088	194.458	200.721
100	2.742	25.420	70.676	116.406	152.457	175.498	180.636
105	3.803	22.854	61.543	103.020	136.037	157.680	163.067
110	5.085	21.681	54.538	91.414	121.455	141.069	146.669
115	6.544	21.659	48.962	81.040	107.773	125.841	130.401
120	8.004	21.990	44.901	72.270	95.933	111.711	116.259
125	9.551	22.632	41.915	64.973	85.275	99.203	103.245
130	10.966	23.340	39.829	58.753	75.693	87.594	91.012
135	12.647	24.380	38.271	53.697	67.625	77.524	80.297
140	14.239	25.198	37.305	49.807	60.848	68.768	71.057
145	15.919	26.215	36.822	46.752	55.476	61.593	63.465
150	17.467	27.121	35.553	44.311	50.915	55.559	56.915
155	19.014	27.608	33.005	41.282	47.208	50.622	51.406
160	22.508	28.516	32.078	37.303	43.334	46.430	47.328
165	27.151	29.934	33.156	34.750	37.919	42.746	43.077
170	31.440	31.813	33.814	34.596	33.829	37.045	40.040
175	34.800	34.512	34.734	34.706	34.116	31.618	32.275
180	33.440	33.440	33.440	33.440	33.440	33.440	33.440

Appendix 1 Product Photo

Picture 1



Picture 2

****End of test report****