



NVLAP<sup>®</sup>  
TESTING

NVLAP LAB CODE 500080-0

Ref. No.: LCZF17100136

Version: 1.0

Date of issue: Oct. 12, 2017

Total pages: 12



Test report of

## IES LM-79-08

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

Rendered to:

ETI Solid State Lighting (Zhuhai) Ltd

No.1, Zhongzhu Road South, Science & Technology Innovation Coast, High Tech District, Zhuhai City, Guangdong Prov., China

For products:

Inseparable SSL Luminaire

Models No.:

546563##(##=41-50)

(where "##" denotes color temperature, 41~50 identifies 4000K)

**Test Date:** Oct. 11, 2017

**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:** N/A

---

**Complied by:**

**Fish Tan**

**Project Engineer**

**Oct. 12, 2017**

*Fish Tan*

**Reviewed by:**

**Richard Li**

**Technical Manager**

**Oct. 12, 2017**

*Richard Li*

---

The duplication of this report or parts of it and its use for advertising purposes is only allowed with permission of the testing laboratory. This report contains the result of the examination of the product sample submitted by the applicant. A general statement concerning the quality of the products from the series manufacture cannot be derived therefore. This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.



## Table of Contents

<b>1. General</b>	3
1.1 Product Information	3
1.2 Standards or methods	4
1.3 Equipment list	4
<b>2. Test conducted and method</b>	5
2.1 Ambient Condition	5
2.2 Power Supply Characteristics	5
2.3 Seasoning and Stabilization	5
2.4 Electrical Instrumentation	5
2.5 Color Measurement Method	5
2.6 Total Luminous Flux Measurement Method	5
2.7 Luminous Intensity Distribution Measurement Method	5
2.8 Spatial Non-uniformity of Chromaticity	5
<b>3. Test Result Summary</b>	6
3.1 Electrical data	6
3.2 Photometric data	6
3.3 Color Rendering Details	6
<b>4. Test Data</b>	7
4.1 Spectral Distribution	7
4.2 ANSI Chromaticity Quadrangles Diagram	7
4.3 Goniometry Test Data	8
4.4 Zonal Lumen Summary	8
4.5 Polar Curves	9
4.6 Candela Tabulation	10
<b>Appendix 1 Product Photo</b>	11
<b>Appendix 2 U.S. Department of Energy Lighting Facts CM Uniform LM-79 Reporting Template</b>	12



LCTECH



## 1. General

### 1.1 Product Information

Brand Name	ETI
Product Type	Inseparable SSL Luminaire
Model Number	546563##(##=41-50)
Rated Inputs	120-277VAC, 50/60Hz
Rated Power	40 W (The power of light source is 34W, the power of emergency power supply is 6W)
Rated Light output	3600 lm
Declared CCT	4000 K
Power Supply	LED Driver
LED Package, Array or Module	Model: LM281B, Samsung Electronics Co., LTD
Receipt Samples	1 unit
Sample Code of lab.	170930108001
Date of Receipt Samples	Sep. 30, 2017
Note	-



LCTECH



**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	2017-02-04	2018-02-03
AC Power supply	LC-I-987	APW-110N	2017-02-04	2018-02-03
Power analyzer	LC-I-928	WT210	2017-01-19	2018-01-19
Power analyzer	LC-I-954	WT210	2017-02-04	2018-02-03
Multimeter	LC-I-972	Fluke 17B	2017-08-10	2018-08-09
Photometric colorimetric electric system (2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-PL-I-002	24V100W	2017-09-24	2018-09-23
Luminous Flux Standard Lamp	LC-PL-I-001	110V/200W	2017-09-24	2018-09-23
Goniophotometer(with mirror)	LC-I-902	GMS2000	2017-05-07	2018-05-06
Wireless temperature transmitter	LC-I-978	DWRF-B	2017-02-10	2018-02-10
Wireless temperature transmitter	LC-I-979	DWRF-B	2017-02-10	2018-02-10

## 2. Test conducted and method

The luminaire 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  $25\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ ; 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  $\pm 0.2$  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.



LCTECH



### 3. Test Result Summary

#### 3.1 Electrical data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Input Voltage & Frequency	119.90 V~60Hz	120.08 V~60Hz
Input Current(A)	0.3394	0.3390
Total Power(W)	39.41	39.41
Power Factor	0.968	0.968
I-THD	21.42%	-
Off-state Power(W)	-	-

#### 3.2 Photometric data

Criteria Item	Result(Sphere)	Result(Goniophotometer)
Total Lumens(lm)	-	3719.35
Luminaire Efficacy(Lm/W)	-	94.38
Correlated Color Temperature (CCT)(K)	3976	-
Color Rendering Index (CRI)	84.2	-
R9	16	-
Chromaticity Coordinate (x,y)	x = 0.3823 y = 0.3802	-
Chromaticity Coordinate (u,v)	U = 0.2249 v = 0.3356	-
Chromaticity Coordinate (u',v')	u' = 0.2249 v' = 0.5034	-
Duv	0.0011	-
Zone Lumens between 0-60 °	-	64.48%

#### 3.3 Color Rendering Details

R1	R2	R3	R4	R5	R6	R7	R8
83	89	94	84	83	85	88	68
R9	R10	R11	R12	R13	R14	R15	-
16	74	83	65	84	97	77	-

Note: N.A.

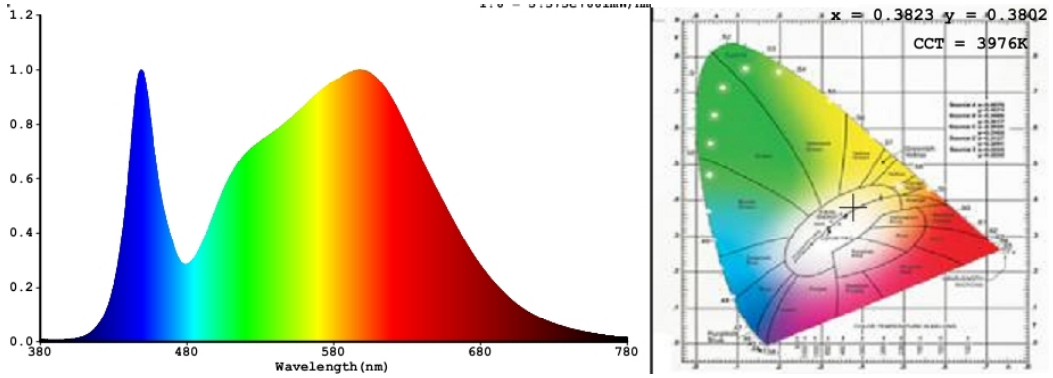


LCTECH

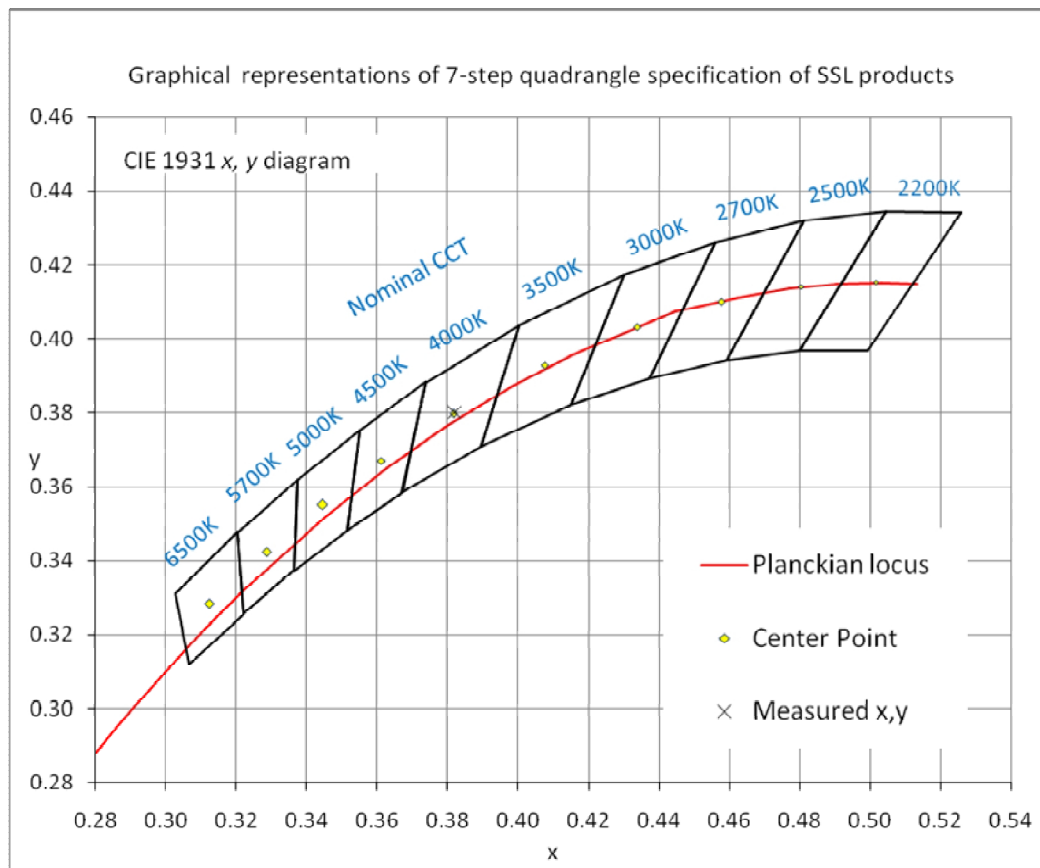


### 4. Test Data

#### 4.1 Spectral Distribution



#### 4.2 ANSI Chromaticity Quadrangles Diagram





LCTECH



**4.3 Goniometry Test Data**

CIE Type	Semi-Direct	Basic Luminous Shape	Circular w/ Sides
Spacing Criteria (0-180)	1.24	Luminous Length	1.20 m
Spacing Criteria (90-270)	1.30	Luminous Width	0.10 m
Spacing Criteria (Diagonal)	1.40	Luminous Height	0.03 m
Test Distance	29.79 m		

**4.4 Zonal Lumen Summary**

Zone	Lumens	%Lamp	%Fixt
0-20	380.74	10.20	10.20
0-30	807.65	21.70	21.70
0-40	1325.45	35.60	35.60
0-60	2398.08	64.50	64.50
0-80	3170.96	85.30	85.30
0-90	3381.46	90.90	90.90
10-90	3282.78	88.30	88.30
20-40	944.71	25.40	25.40
20-50	1494.41	40.20	40.20
40-70	1516.69	40.80	40.80
60-80	772.88	20.80	20.80
70-80	328.81	8.80	8.80
80-90	210.51	5.70	5.70
90-110	236.50	6.40	6.40
90-120	293.80	7.90	7.90
90-130	321.80	8.70	8.70
90-150	334.14	9.00	9.00
90-180	337.88	9.10	9.10
110-180	101.38	2.70	2.70
0-180	3719.34	100.00	100.00

Total Luminaire Efficiency = 100.00%

**ZONAL LUMEN SUMMARY**

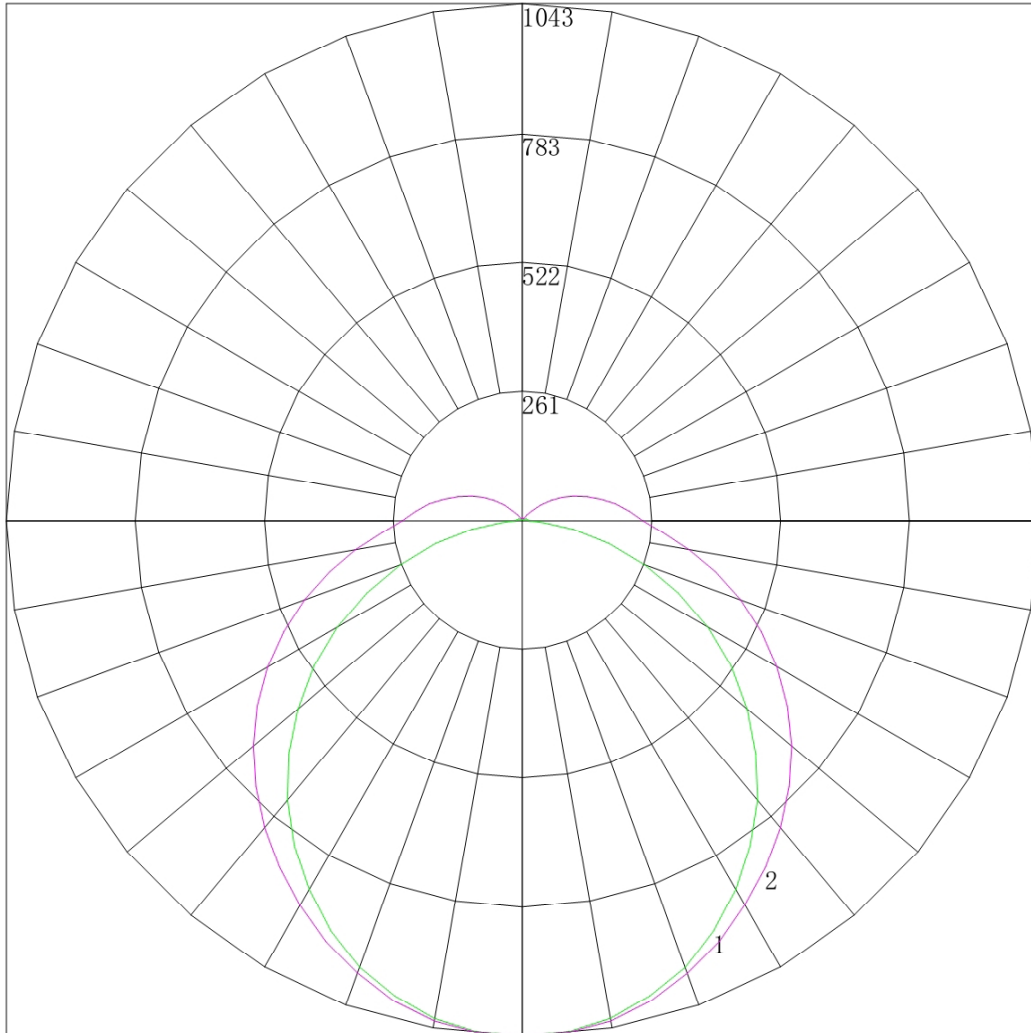
Zone	Lumens
0-10	98.69
10-20	282.05
20-30	426.91
30-40	517.80
40-50	549.70
50-60	522.93
60-70	444.06
70-80	328.81
80-90	210.51
90-100	140.80
100-110	95.70
110-120	57.29
120-130	28.01
130-140	9.49
140-150	2.85
150-160	1.96
160-170	1.31
170-180	0.47





LCTECH

4.5 Polar Curves



Maximum Candela = 1043.494 Located At Horizontal Angle = 0, Vertical Angle = 0  
# 1 - Vertical Plane Through Horizontal Angles (0 - 180)  
# 2 - Vertical Plane Through Horizontal Angles (90 - 270)



LCTECH



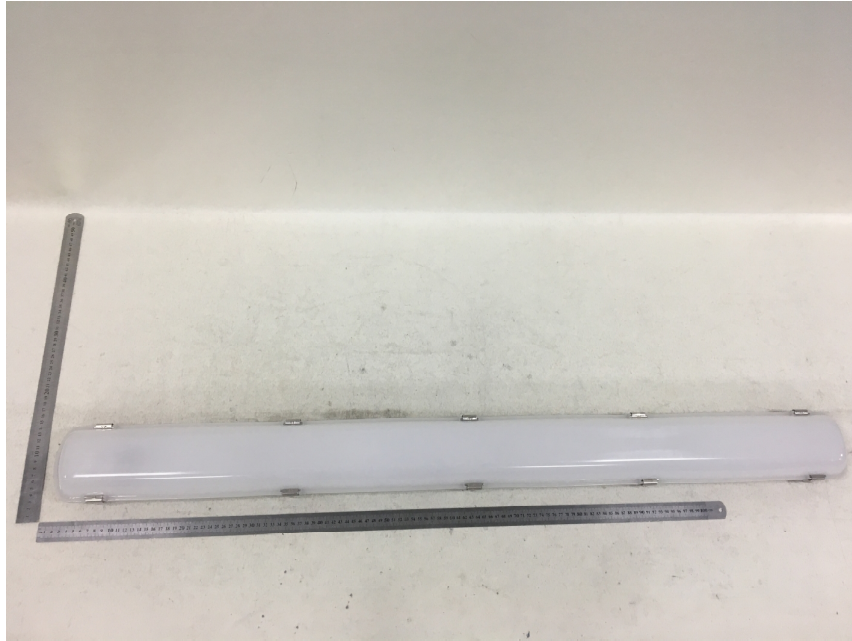
4.6 Candela Tabulation

	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>
<b>0</b>	1043.494	1043.494	1043.494	1043.494	1043.494	1043.494	1043.494
<b>5</b>	1040.362	1038.343	1038.428	1037.927	1039.021	1038.957	1041.579
<b>10</b>	1023.670	1021.790	1021.832	1023.110	1024.845	1025.721	1028.716
<b>15</b>	996.014	995.090	996.644	999.507	1001.540	1002.593	1006.009
<b>20</b>	961.914	960.604	961.912	966.402	970.221	972.247	974.873
<b>25</b>	915.955	916.213	918.026	926.235	931.487	936.106	940.048
<b>30</b>	862.836	863.771	868.221	878.069	887.107	894.983	899.118
<b>35</b>	803.273	804.035	811.562	825.689	838.695	850.676	856.694
<b>40</b>	738.653	740.618	748.848	769.180	789.284	805.154	811.460
<b>45</b>	667.455	671.268	683.961	710.367	736.010	755.440	762.890
<b>50</b>	592.453	596.719	614.639	649.110	679.887	703.079	709.839
<b>55</b>	514.319	521.814	545.221	587.923	622.015	646.021	654.245
<b>60</b>	433.275	442.828	476.037	523.656	561.001	586.575	594.473
<b>65</b>	347.667	363.351	405.231	457.742	497.830	524.362	533.036
<b>70</b>	263.268	286.727	336.203	390.014	432.557	460.905	467.997
<b>75</b>	181.419	212.312	268.850	324.324	368.153	395.439	404.007
<b>80</b>	105.119	144.122	206.104	261.452	305.383	332.628	341.995
<b>85</b>	43.319	88.289	148.811	205.230	248.440	274.905	284.601
<b>90</b>	14.947	52.487	110.817	165.425	207.696	234.626	243.280
<b>95</b>	12.530	35.690	89.528	141.429	182.328	208.487	217.016
<b>100</b>	11.411	23.221	69.368	118.167	157.267	182.594	190.622
<b>105</b>	10.337	14.165	51.910	96.652	133.143	156.588	164.182
<b>110</b>	8.771	9.302	36.333	76.381	109.902	131.511	139.321
<b>115</b>	7.294	7.651	22.753	56.622	87.235	107.632	114.417
<b>120</b>	6.041	6.558	12.495	39.522	66.470	84.858	91.534
<b>125</b>	5.102	5.487	6.425	24.307	46.886	63.276	69.045
<b>130</b>	3.983	4.394	4.852	12.198	28.960	42.738	48.355
<b>135</b>	3.267	3.591	3.988	4.946	14.644	24.412	28.547
<b>140</b>	2.864	3.145	3.611	4.147	5.628	11.266	13.700
<b>145</b>	2.640	3.056	3.523	4.103	4.498	4.803	5.225
<b>150</b>	3.088	3.279	3.722	4.147	4.520	4.714	4.831
<b>155</b>	3.356	3.614	3.899	4.347	4.609	4.758	4.742
<b>160</b>	3.893	3.993	4.188	4.480	4.764	4.891	4.918
<b>165</b>	4.296	4.305	4.453	4.635	4.808	4.936	4.917
<b>170</b>	4.699	4.729	4.741	4.813	4.852	5.002	4.962
<b>175</b>	4.967	4.997	4.963	4.990	4.986	5.002	5.050
<b>180</b>	5.127	5.127	5.127	5.127	5.127	5.127	5.127

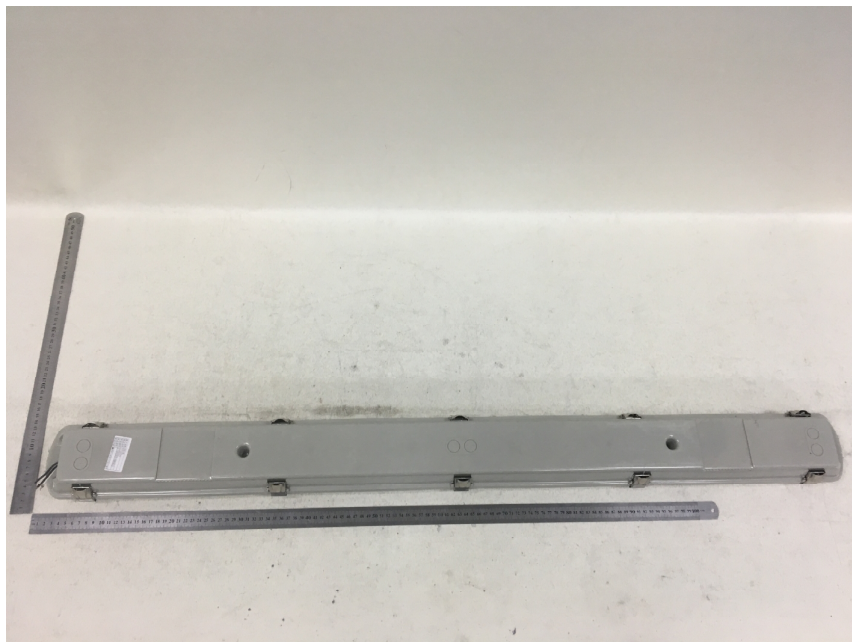


LCTECH

**Appendix 1 Product Photo**



Picture 1



Picture 2



LCTECH



## Appendix 2 U.S. Department of Energy Lighting Facts CM Uniform LM-79 Reporting Template

### Laboratory Information

Name of test lab	LCTECH (Zhongshan) Testing Service Co., Ltd
Date of test report	Oct. 12, 2017
Test report number	LCZP17100136
Laboratory contact name	Richard Li

### Product Information

Applicant	ETI Solid State Lighting (Zhuhai) Ltd	
Brand name	ETI	
Model number	546563##(##=41-50)	
SKU(if available)	N/A	
Type of luminaire (for integral lamps, list base type and lamp type)	Inseparable SSL Luminaire	
Luminaire aperture	-	in.
Luminaire height	1.18	in.
Luminaire length	47.24	in.
Luminaire width	3.94	in.
Number of units(modular products)	N/A	

Electrical Measurements	Integrating sphere output	Goniophotometer Output	
Input wattage	39.41	39.41	W
Input current	0.3394	0.3390	A
Input voltage(AC)	119.90	120.08	V
Power factor	0.968	0.968	
Off-state power	0.0	0.0	W

Photometric Characteristics			
Total initial lumen output	-	3719.35	lm
Initial luminaire efficacy	-	94.38	lm/W
Correlated color temperature / CCT	3976	K	
Color rendering index/CRI	84.2		
Rgvalue	16		
Duv	0.0011		

Luminous Intensity Distribution		Goniophotometer Output	
Center beam candle power(if applicable)	--	1043.494	cd
Beam angle(if applicable)		-	°
Zonallumensinthe0°-60°zone		64.48	%
Zonal lumens in the60°-90° zone		33.29	%
Zonallumensinthe90°-120°zone		10.39	%
Zonallumensinthe120°-180°zone		1.2	%

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