

# IES LM-79-08

## MEASUREMENT AND TEST REPORT For

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

**Test Model: SLT828P450**

|                       |  |
|-----------------------|--|
| <b>Report Type:</b>   | Electrical and Photometric tests including: Input Current, Power, Power Factor, Luminous Flux, Luminous Efficacy, CRI, CCT, Chromaticity Coordinate, Spectral Power Distribution   |
| <b>Test Engineer:</b> | Daniel Duan <i>Daniel Duan</i>   |
| <b>Report Number:</b> | RSZ151228505-10A2  |
| <b>Test Date:</b>     | 2016-01-07   |
| <b>Report Date:</b>   | 2016-01-12   |
| <b>Reviewed By:</b>   | Jeanne Han/Safety Manager <i>Jeanne Han</i>  |
| <b>Prepared By:</b>   | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>6/F, the 3rd Phase of WanLi Industrial Building,<br>ShiHua Road, FuTian Free Trade Zone<br>Shenzhen, Guangdong, China<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008 |
| <b>Test Facility:</b> | Test facility was located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.   |
| <b>Accreditation:</b> | The NVLAP Lab Code is 200707-0.  |

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## 1. Product Description

### General Information:

One sample was received on 2015-12-28 and used for testing. Sample No.: RSZ151228505-S01 Model: SLT828P450

Model Tested: SLT828P450  
 Manufacturer: Zhejiang Starco Lighting Co.,Ltd  
 Brand Name: Starco Lighting  
 Product Designation: Four-Foot Linear Replacement Lamps  
 UL type of tube Type B  
 Dimmable: Non-Dimmable  
 Burning Time Before Test: 0 hour(For New Products)

### Rated Values:

Rated Voltage/Frequency: 100-277V AC 50/60Hz  
 Rated Power: 28 W  
 Nominal Light Output: 3650 lm  
 Nominal CCT: 5000K  
 Nominal CRI: 80

## 2. Standards Used

- IESNA LM-79-08: Approved Method: Electrical & Photometric Measurement of Solid-state Lighting Products
- ANSI C82.77-2002: Harmonic Emission Limits – Related Power Quality Requirements for Lighting

## 3. Description of Test Equipment

| Device                | Manufacture | Model No | Serial No                    | Test Range                | Calibration date | Calibration due date |
|-----------------------|-------------|----------|------------------------------|---------------------------|------------------|----------------------|
| Integrating Sphere    | SENSING     | SPR-600  | S09008                       | 25~50℃                    | 2015-03-25       | 2016-03-24           |
| Spectral photometer   | SENSING     | SPR3000  | 90902027                     | 350nm~800nm               | 2015-03-25       | 2016-03-24           |
| Power Meter           | YOKOGAWA    | WT-210   | 91j926132                    | 15/30/60/150/300/600<br>V | 2015-03-05       | 2016-03-04           |
| AC Power Supply       | ALL Power   | APW-105N | 970663                       | 220V±10% 50HZ             | 2015-03-05       | 2016-03-04           |
| Standard Light Source | EVERFINE    | D204     | 01331191                     | 24V/100W                  | 2015-08-27       | 2016-08-26           |
| Thermal Meter         | SENSING     | N/A      | N/A                          | 25、50℃                    | 2015-03-05       | 2016-03-04           |
| DC Power Supply       | ITECH       | IT6154   | 0061 0417<br>6471 0010<br>19 | 0~32V                     | 2015-03-05       | 2016-03-04           |

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

## 4. Test Method

Product was tested with no seasoning. All stabilization and measurements were made in compliance with IES LM-79-08. The product was operated at rated voltage or at voltage required by manufacturer. The ambient temperature of the sample was maintained at  $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$  during measurement. And relative humidity is less than 65%.

### **Integrating Sphere System**

The system includes AC power source, digital power meter, DC power supply, spectrophotometer, and integrating sphere. The integrating sphere system is calibrated by standard light source before measurement. The system and standard light source has been calibrated regularly and traceable to the National Primary Standards.

$4\pi$  geometry was used during measurement. The product was operated in its intended orientation in application and was recorded in this report.

The uncertainty of the light output (luminous flux) measurements is  $U=2.1\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=32\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the CRI is  $U=2.1$  ( $K=2$ ), at the 95% confidence level.

The uncertainty of power meter AC current  $U=0.19\%$  of rdg, AC Voltage  $U=0.15\%$  of rdg, Power  $U=0.20\%$  ( $K=2$ ), at the 95% confidence level.

## 5. Test Result

### [Integrating Sphere System]

Total operating time for integrating sphere test: **1 hours**

Test orientation: **Downward**

#### Electrical Measurement

| Voltage (V) | Frequency (Hz) | Current (A) | Power (W) | Power Factor |
|-------------|----------------|-------------|-----------|--------------|
| 120.05      | 60             | 0.238       | 28.39     | 0.994        |

#### Photometric Measurement

| Luminous Flux (lm) | Radiant Flux (W) | Efficacy (lm/W) | CCT (K) | Duv    |
|--------------------|------------------|-----------------|---------|--------|
| 3731.343           | 11.321           | 131.432         | 4823    | 0.0072 |

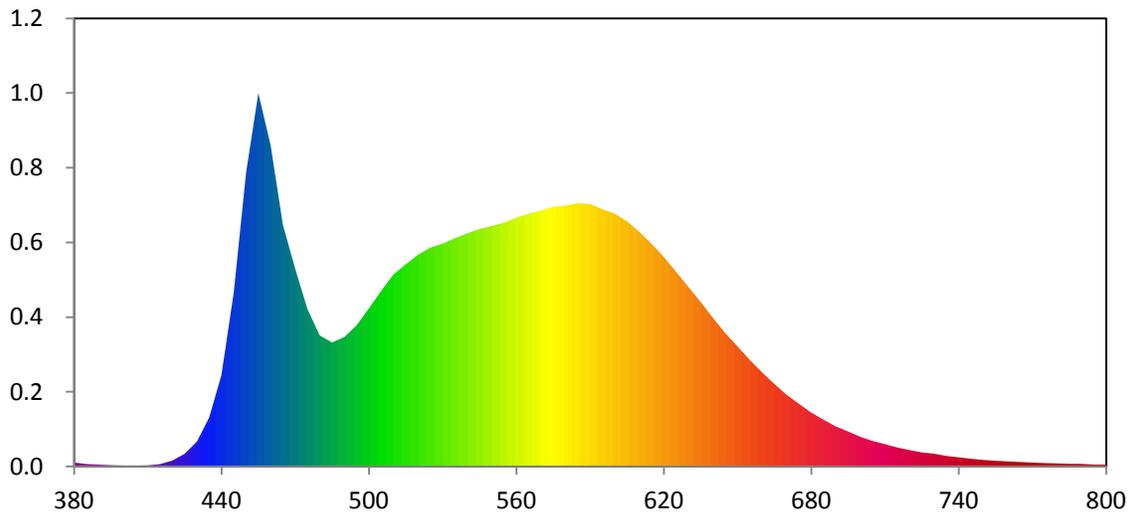
#### Chromaticity Coordinate

| x      | y      | u      | v      | u'     | v'     |
|--------|--------|--------|--------|--------|--------|
| 0.3522 | 0.3720 | 0.2084 | 0.3302 | 0.2084 | 0.4953 |

#### Color Rendering Index

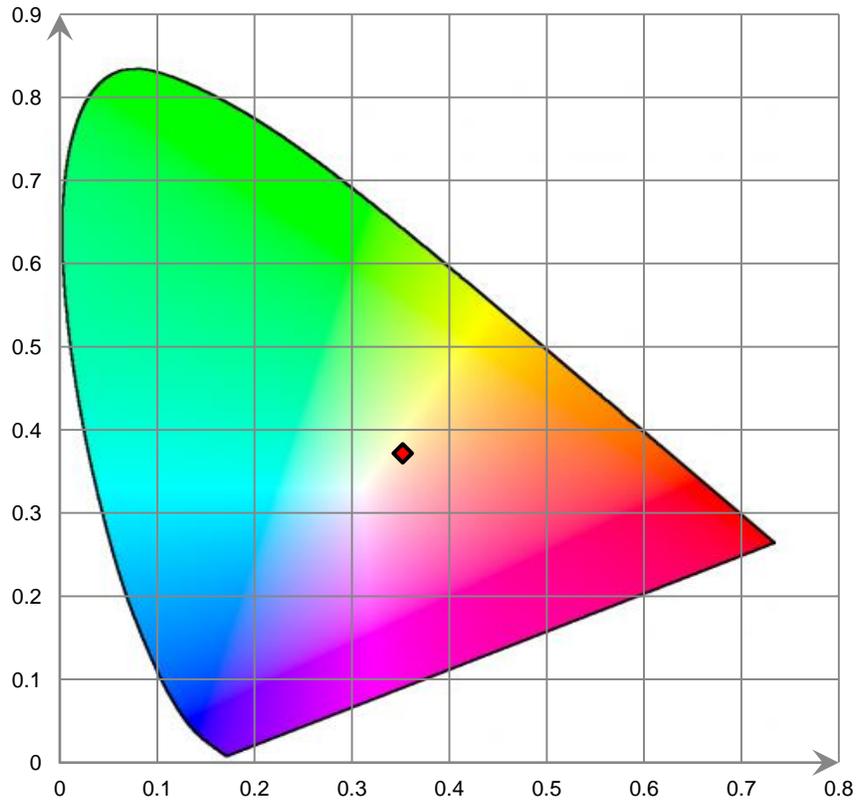
|           |           |           |           |
|-----------|-----------|-----------|-----------|
| <b>Ra</b> |           |           |           |
| 82.2      |           |           |           |
| R1<br>80  | R2<br>90  | R3<br>96  | R4<br>77  |
| R5<br>79  | R6<br>86  | R7<br>86  | R8<br>64  |
| R9<br>2   | R10<br>76 | R11<br>76 | R12<br>54 |
| R13<br>84 | R14<br>98 | R15<br>73 |           |

### Relative Spectral Power Distribution

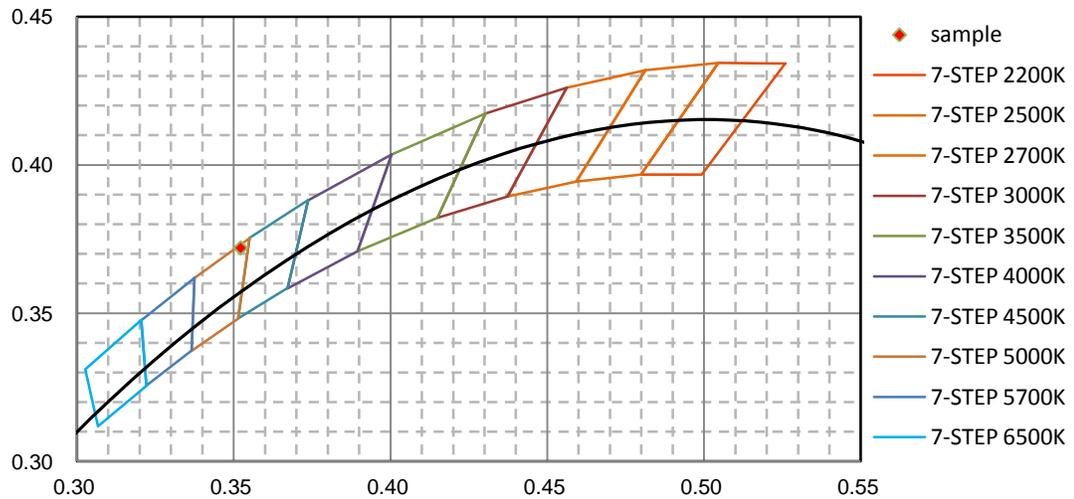


| nm  | mW        |
|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|
| 380 | 4.007E-03 | 465 | 2.354E-01 | 550 | 2.342E-01 | 635 | 1.602E-01 | 720 | 1.611E-02 |
| 385 | 2.493E-03 | 470 | 1.926E-01 | 555 | 2.374E-01 | 640 | 1.447E-01 | 725 | 1.384E-02 |
| 390 | 1.936E-03 | 475 | 1.534E-01 | 560 | 2.423E-01 | 645 | 1.300E-01 | 730 | 1.259E-02 |
| 395 | 1.342E-03 | 480 | 1.277E-01 | 565 | 2.462E-01 | 650 | 1.170E-01 | 735 | 1.038E-02 |
| 400 | 9.949E-04 | 485 | 1.208E-01 | 570 | 2.493E-01 | 655 | 1.038E-01 | 740 | 9.042E-03 |
| 405 | 9.614E-04 | 490 | 1.261E-01 | 575 | 2.527E-01 | 660 | 9.169E-02 | 745 | 7.630E-03 |
| 410 | 1.149E-03 | 495 | 1.376E-01 | 580 | 2.541E-01 | 665 | 8.047E-02 | 750 | 6.503E-03 |
| 415 | 2.416E-03 | 500 | 1.540E-01 | 585 | 2.563E-01 | 670 | 6.985E-02 | 755 | 5.669E-03 |
| 420 | 5.864E-03 | 505 | 1.710E-01 | 590 | 2.556E-01 | 675 | 6.110E-02 | 760 | 5.066E-03 |
| 425 | 1.240E-02 | 510 | 1.871E-01 | 595 | 2.506E-01 | 680 | 5.262E-02 | 765 | 4.500E-03 |
| 430 | 2.430E-02 | 515 | 1.969E-01 | 600 | 2.462E-01 | 685 | 4.568E-02 | 770 | 3.924E-03 |
| 435 | 4.768E-02 | 520 | 2.062E-01 | 605 | 2.388E-01 | 690 | 3.907E-02 | 775 | 3.452E-03 |
| 440 | 8.909E-02 | 525 | 2.132E-01 | 610 | 2.286E-01 | 695 | 3.416E-02 | 780 | 3.128E-03 |
| 445 | 1.693E-01 | 530 | 2.170E-01 | 615 | 2.170E-01 | 700 | 2.898E-02 |     |           |
| 450 | 2.858E-01 | 535 | 2.223E-01 | 620 | 2.041E-01 | 705 | 2.491E-02 |     |           |
| 455 | 3.634E-01 | 540 | 2.270E-01 | 625 | 1.897E-01 | 710 | 2.186E-02 |     |           |
| 460 | 3.129E-01 | 545 | 2.313E-01 | 630 | 1.749E-01 | 715 | 1.864E-02 |     |           |

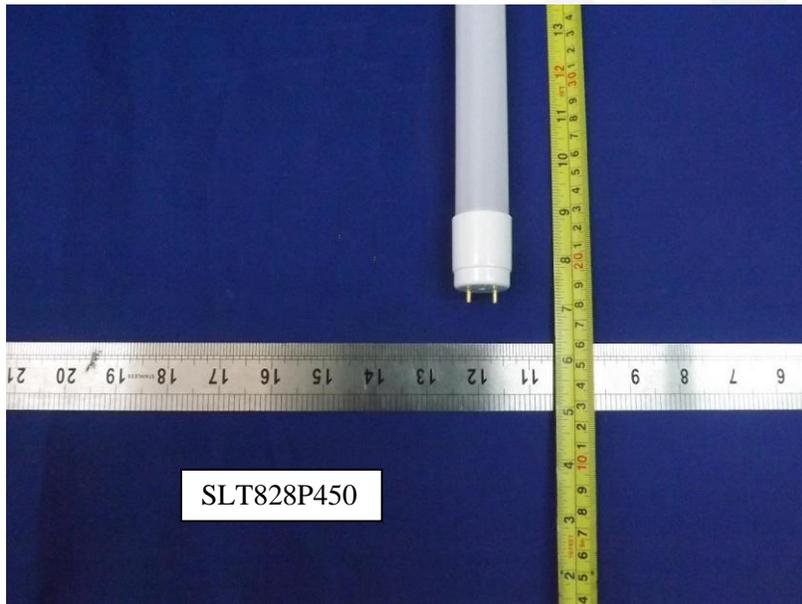
**CIE 1931 x y Chromaticity Diagram**



**7-Step & 4-Step Chromaticity Quadrangles**



6. Product Photo



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