NVLAP LAB CODE 500080-0

IESNA SUSTAINING MEMBER

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Test Report of

IES LM-79-08

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

Applicant:

P.Q.L., Inc.

2285 Ward Avenue / Simi Valley, CA 93065

For Products:

Retrofit Cans

Models:

91014

Test Date: From Jun. 24, 2016 to Jun. 24, 2016

Test Item: Total luminous flux, Luminous Efficacy, Electrical values, Chromaticity coordinates, CCT and CRI, Spectral Power Distribution.

Test Lab.: **LCTECH (Zhongshan) Testing Service Co., Ltd**

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Template No.: LC-RT-PL/LM79-08/02

Lab. Note: /

Complied by:	Fish Tan Project Engineer Jul. 21, 2016	**Reviewed by:**	Richard Li Technical Manager Jul. 21, 2016

1. General

1.1 Product Information

Brand Name	Superior Life®
Product Type	Retrofit Cans
Model Number	91014
Rated Inputs	120VAC, 60Hz
Rated Power	15W
Rated Light output	1150lm
Declared CCT	4000K
Power Supply	LED Driver
LED Package, Array or Module	HL-AT-2835FVW-S1-08-PCT-HR3
Sample Code:	S1
Date of Receipt Samples	2016/6/21
Note	All the tests are tested in a Can. Auxiliary test can mode: H71CAT

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	2016/2/4	2017/2/3
AC Power supply	LC-I-987	APW-110N	2016/2/4	2017/2/3
Power analyzer	LC-I-928	WT210	2016/1/24	2017/1/24
Power analyzer	LC-I-954	WT210	2016/2/4	2017/2/3
Multimeter	LC-I-972	Fluke 17B	2015/8/17	2016/8/16
Photometric colorimetric electric system(2 meter sphere)	LC-I-900	SPR3000	Before use	Before use
Standard lamp	LC-I-917	24V100W	2015/10/9	2016/10/8
Luminous Flux Standard Lamp	LC-I-946	110V/200W	2015/10/17	2016/10/16
Goniophotometer(with mirror)	LC-I-902	GMS2000	2015/5/7	2016/5/7
Wireless temperature transmitter	LC-I-978	DWRF-B	2016/2/3	2017/2/2
Wireless temperature transmitter	LC-I-979	DWRF-B	2016/2/3	2017/2/2

2. Test Conduct and Method

The lamp/luminaire was operated at least 2 hours to reach stabilization and temperature equilibrium before test.
All the tests are tested in a Can which model H71CAT.

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.
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

The customer did not require this measurement.

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 (V)	120.03	-
Input Frequency (Hz)	60	-
Input Current (A)	0.127	-
Total Power (W)	14.92	-
Power Factor	0.982	-

3.2 Photometric data

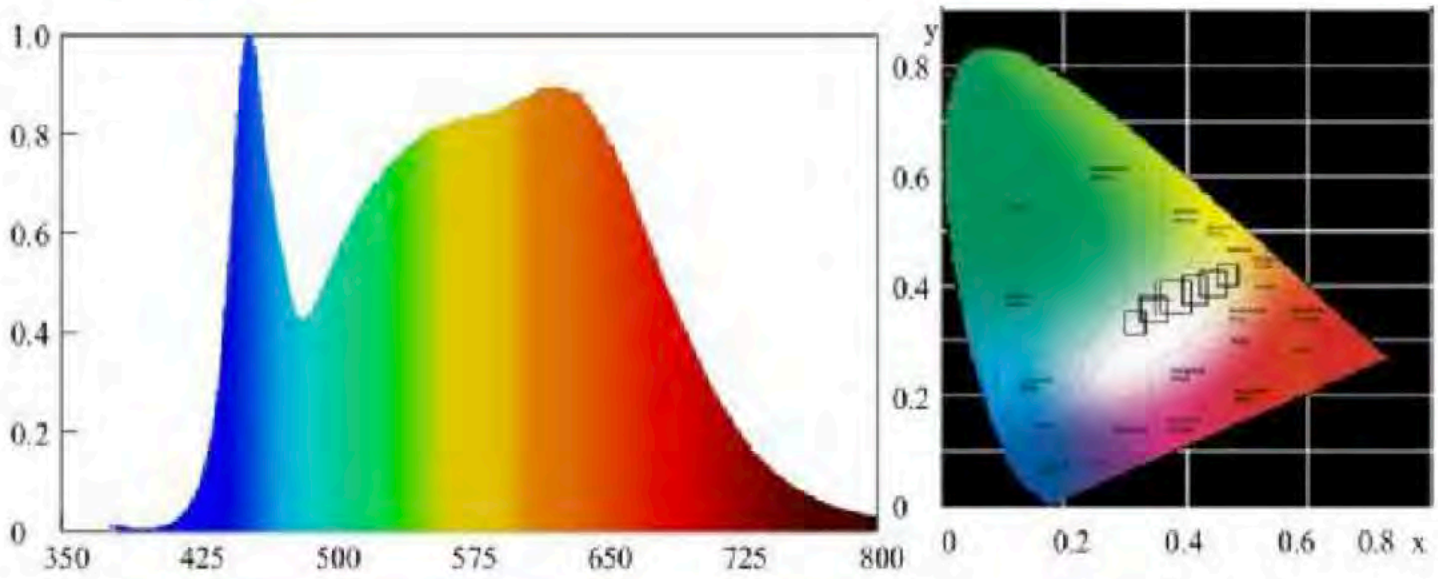
Criteria Item	Result (Sphere)	Result (Goniophotometer)
Total Lumens (Lm)	1182.17	-
Luminous Efficacy (Lm/W)	79.23	-
Correlated Color Temperature(CCT) (K)	4030	-
Color Rendering Index(Ra)	94	-
R9	79	-
Chromaticity Coordinate (x,y)	x=0.379, y=0.3754	-
Chromaticity Coordinate (u,v)	u=0.2247, v=0.3339	-
Chromaticity Coordinate (u',v')	u'=0.2247, v'=0.5008	-
Duv	-0.0002	-
Zone Lumens between 0-60°	-	-

3.3 Color Rendering Details

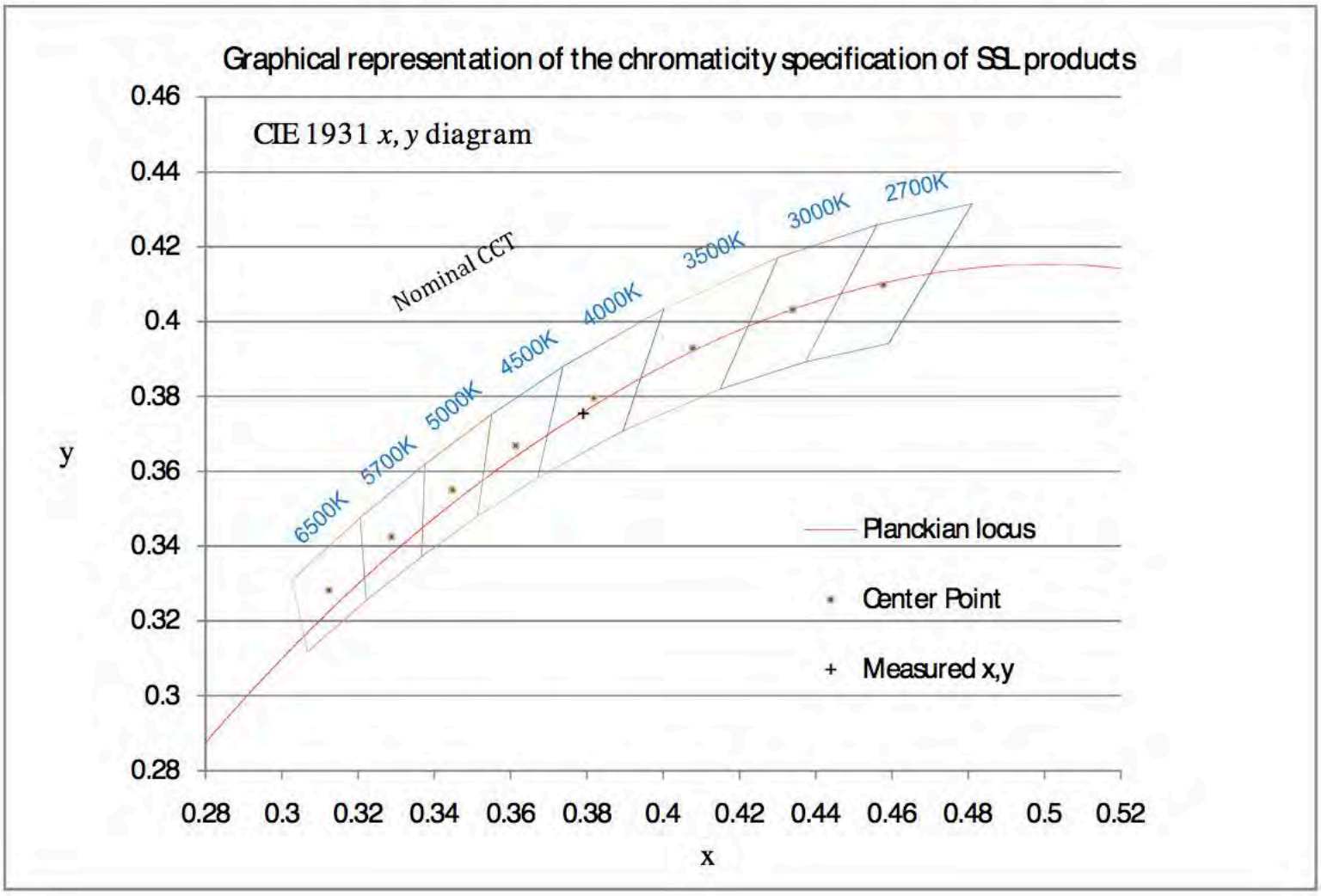
R1	R2	R3	R4	R5	R6	R7	R8
95	98	97	93	93	94	95	91
R9	R10	R11	R12	R13	R14	R15	-
79	92	92	71	96	98	94	-

4. Test Data

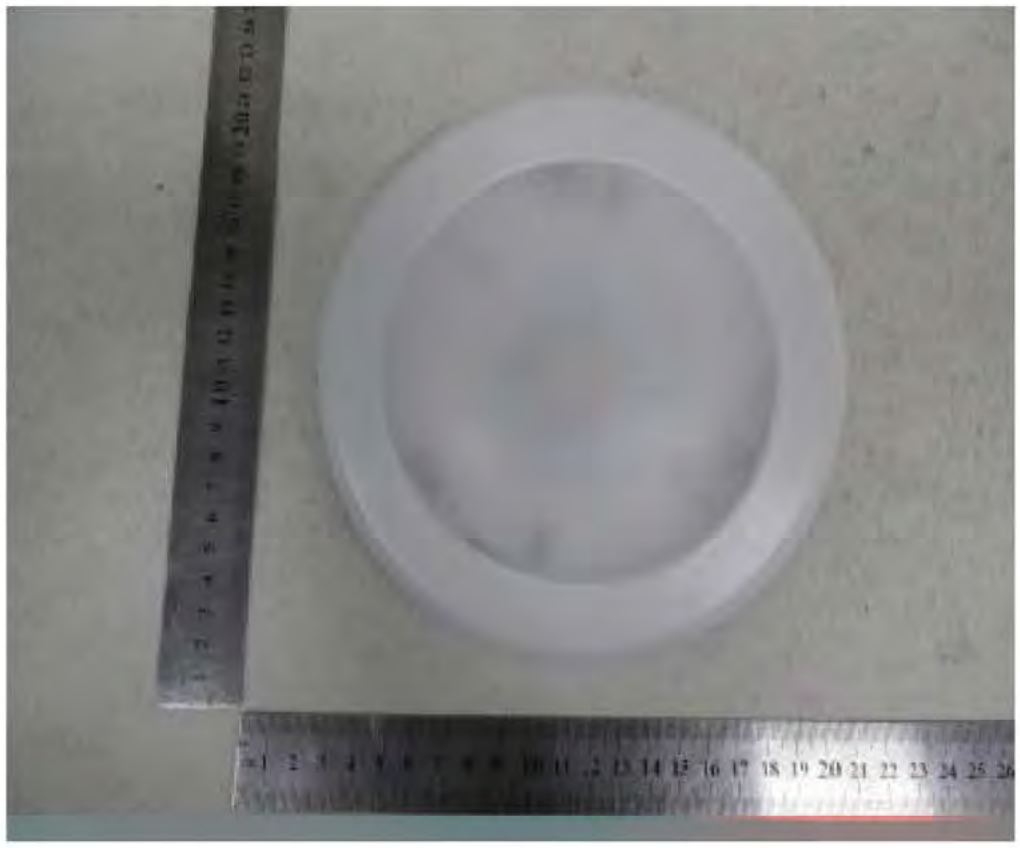
4.1 Spectral Distribution



4.2 ANSI Chromaticity Quadrangles Diagram



Appendix 1 Product Photo



picture 1

Picture 2