



NVLAP Lab Code: 200952-0

### Verification Services

Project No.: 4786480425-15  
Report No.: 4786480425-15a  
Report Issued Date: 2015-04-02


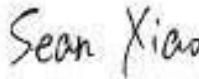
# Test Report

<b>Customer Company &amp; Address:</b>			
SORAA Inc ADD: 6500 Kaiser Dr, Fremont, CA 94555			
<b>Contact Person:</b>	Steve Yang		
<b>Telephone:</b>	510-4567183	<b>Fax/Email Address:</b>	SYang@soraa.com

<b>Manufacturer:</b>	SORAA Inc.
<b>Country of Origin:</b>	USA
<b>Country of Export:</b>	USA
<b>Product Description:</b>	Lamp Type: MR16 GU5.3 LED Lamp Total Amount Of Light Source: 1 pc
<b>Model Number:</b>	SM16-07-25D-940-03
<b>Electrical Specification:</b>	12 V AC, 60 Hz

<b>Test Laboratory &amp; Address:</b>			
UL Verification Services (Guangzhou) Co., Ltd.  ADD: Building A1, 1F & 2F, Nansha Science and Technology Innovation Center, No. 25, South Huanshi Avenue, Nansha District, Guangzhou 511458, China			
<b>Telephone:</b>	+86 20 28667188	<b>Fax:</b>	+86 20 83486605

<b>Receipt of Test Samples :</b>	2015-03-10	<b>Test Period:</b>	2015-03-10 ~ 2015-3-31
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Tested By	Approved By
 / Jackson Zeng	 / Sean Xiao
<b>Test Personnel Name &amp; Signatory</b>	<b>Approval Name &amp; Signatory</b>

The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.



# Test Report

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## Statement of Results

Test Flow	Test Method	Sample ID (Lab)	Sample Serial No.	Pass/Fail/NA
1.	Integrating Sphere Test	2077599-S001	N/A	Evaluate by customer
2.	Goniophotometer Test	2077599-S001	N/A	Evaluate by customer

## Deviation from Test Method (if any)

N/A

## Remark (if any)

This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.



# Test Report

## Test No. 1 : Integrating Sphere Test

### Environmental Conditions

Temperature: 25.1° C

### Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
GVS-LE-PE003	Integrating Sphere	Before Use	Before Use
GVS-LE-FS019	Measurement Standard Lamp	08/22/2014	08/21/2015

### Test Sample

2077599-S001

### Test Method

The sample was tested according to the IES LM-79-2008. Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25° C ± 1° 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 rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

### Test Results

Test Type	Voltage (V AC)	Frequency (Hz)	Current (A)	Power (W)	THD (%)	Power Factor	Orientation	Operate time (Min.)	Stabilization time (Min.)
Input	12.03	60	0.745	7.82	38.56	0.917	Base up	58	50

Test Type	CCT (K)	Luminous Flux (lm)	Color Rendering Index Ra	Luminous Efficacy (lm/W)
Output	3970	467.1	95.0	59.7



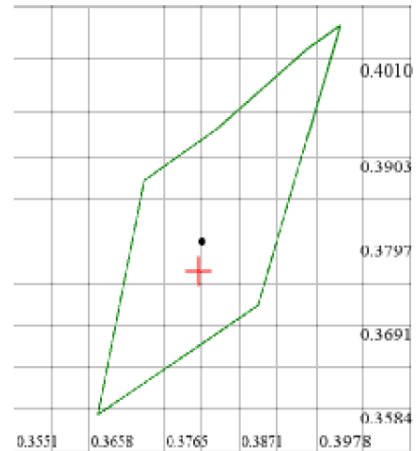
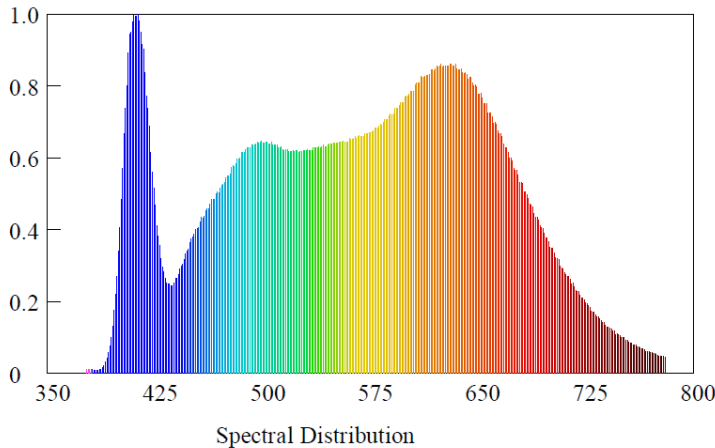
# Test Report

## Test Condition

Temperature: 25.1°C  
 Spectrum Range: 380-780 nm

RH: ----%  
 Scan Step: 1 nm

## Spectroradiometric Parameters



Nominal CCT:LED\_4000K  
 $x_0=0.3813$   $y_0=0.3759$

Chromaticity Coordinates:  $x=0.3813$   $y=0.3759$   $u'=0.226$   $v'=0.5013$

Correlated Color Temperature: 3970 K

Dominant Wavelength: 578.0 nm(E)

Luminous Flux: 467.050 lm

Purity: 0.2728

Chromaticity Difference: -0.00067Duv

Peak Wavelength: 413.1 nm

Color Ratio:  $K_r=38.0\%$   $K_g=49.1\%$   $K_b=13.0\%$

Bandwidth: 19.6nm

Radiant Flux: 1.774 W

Rendering Index:  $R_a=95.0$

$R_1=94$   $R_2=95$   $R_3=97$   $R_4=94$   $R_5=93$   $R_6=92$   $R_7=98$   $R_8=97$

$R_9=92$   $R_{10}=89$   $R_{11}=91$   $R_{12}=81$   $R_{13}=94$   $R_{14}=99$   $R_{15}=96$



# Test Report

**Test No.2: Goniophotometer Test**

**Environmental Conditions**

Temperature: 25.1 °C

**Test Equipment**

Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
GVS-LE-GS002	Goniophotometer	Before Use	Before Use
GVS-LE-FS019	Measurement Standard Lamp	08/19/2014	08/18/2015
GVS-LE-CA008	Digital Calliper	09/18/2014	09/17/2015

**Test Sample**

2077599-S001

**Test Method**

The sample was tested according to the IES LM-79-2008. Photometric parameters were measured using a type C goniophotometer and software. The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 22.5° horizontal intervals.

**Test Results**

Test Type	Voltage (V AC)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation	Operate time (Min.)	Stabilization time (Min.)
Input	12.02	60	0.710	7.77	0.910	Base up	70	30

Test Type	Flux (lm)	Center Beam Candle Power (cd)	Field angle (10%)		Beam angle (50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
Output	468.1	2421	42.4	42.4	21.7	21.7	60.2



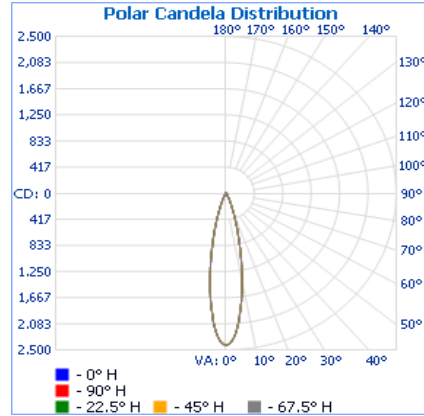
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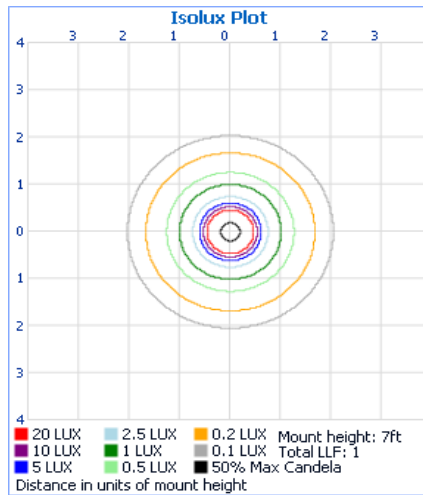
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# Test Report

## Light Distribution Curve



## Isolux Plot





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# Test Report

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## Zonal Lumen Tabulation

### Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	424.2	90.6%
0-40	441.0	94.2%
0-60	458.7	98%
60-90	8.2	1.8%
70-100	3.3	0.7%
90-120	0.4	0.1%
0-90	466.9	99.7%
90-180	1.2	0.3%
0-180	468.1	100%

### Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	53.7	11.5%	90-95	0.1	0%
5-10	119.9	25.6%	95-100	0.1	0%
10-15	115.9	24.8%	100-105	0.1	0%
15-20	76.6	16.4%	105-110	0.1	0%
20-25	39.4	8.4%	110-115	0.1	0%
25-30	18.7	4.0%	115-120	0.1	0%
30-35	9.8	2.1%	120-125	0.1	0%
35-40	7.0	1.5%	125-130	0.1	0%
40-45	5.6	1.2%	130-135	0.1	0%
45-50	4.7	1.0%	135-140	0.1	0%
50-55	4.0	0.9%	140-145	0.1	0%
55-60	3.4	0.7%	145-150	0.1	0%
60-65	2.8	0.6%	150-155	0.1	0%
65-70	2.2	0.5%	155-160	0.1	0%
70-75	1.6	0.3%	160-165	0.1	0%
75-80	1.0	0.2%	165-170	0.0	0%
80-85	0.5	0.1%	170-175	0.0	0%
85-90	0.2	0.0%	175-180	0.0	0%



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## Intensity Data(cd)

Candela Table - Type C																	
	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421
1	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406	2406
2	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364	2364
3	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295	2295
4	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198
5	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
6	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937	1937
7	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798	1798
8	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648	1648
9	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490	1490
10	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333	1333
11	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199
12	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060	1060
13	919	919	919	919	919	919	919	919	919	919	919	919	919	919	919	919	919
14	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804
15	693	693	693	693	693	693	693	693	693	693	693	693	693	693	693	693	693
16	597	597	597	597	597	597	597	597	597	597	597	597	597	597	597	597	597
17	502	502	502	502	502	502	502	502	502	502	502	502	502	502	502	502	502
18	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422
19	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356
20	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296	296
25	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115	115
30	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
35	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
40	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
45	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
50	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
55	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
60	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
65	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
70	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
75	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
85	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0





# Test Report

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## Photos of sample



\*\*\*\*\***END OF TEST REPORT**\*\*\*\*\*