

**Verification Services**

Project No. 4787070113-7
 Report No. 4787070113-7a
 Report Issued Date: 2016-04-26

Test Report

Customer Company & Address:			
SORAA Inc ADD: 6500 Kaiser Dr, Fremont, CA 94555			
Contact Person:	Steve Yang		
Phone Number:	510-4567183	Email Address:	SYang@soraa.com

Relevant Standards:	IES LM-79-2008		
Product Description:	Integral LED Lamp, PAR16 GU10		
Brand Name:	SORAA		
Tested Model Number:	SM16GA-07-10D-940-03		
Product Family:	N/A		
Allowable Variations:	N/A		
Electrical Specification:	120 V AC, 60 Hz, 7.5 W		

Test Laboratory & Address:			
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			
Telephone:	+86 20 28667188	Fax:	+86 20 83486605

Sample Reception Date:	2015-10-13	Test Date:	2015-10-15
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Tested By	Approved By
<i>Derek</i> / Derek Zhang	<i>Candy Zhang</i> / Candy Zhang
Signatory & Test Personnel Name	Signatory & Approval Name

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



NVLAP Lab Code: 200952-0



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Statement of Results

Test Flow	Test Item	Sample ID (Lab)	Pass/Fail/NA
1	Integrating Sphere Test	2225378-S001	Evaluate by customer
2	Goniophotometer Test	2225378-S001	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 Flow 1: Integrating Sphere Test

Environmental Conditions

Temperature: 25.1°C

Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
GVS-LE-PE002	Integrating Sphere	Before Use	Before Use
GVS-LE-FS019	Measurement Standard Lamp	2015-08-21	2016-08-19

Test Sample

2225378-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 Factor	Power (W)
Input	120.08	60	0.065	0.964	7.5

Test Type	CCT (K)	CRI	Lumen Output (lm)	Luminous Efficacy (lm/W)
Output	3940	95	467	62.4



Test Report



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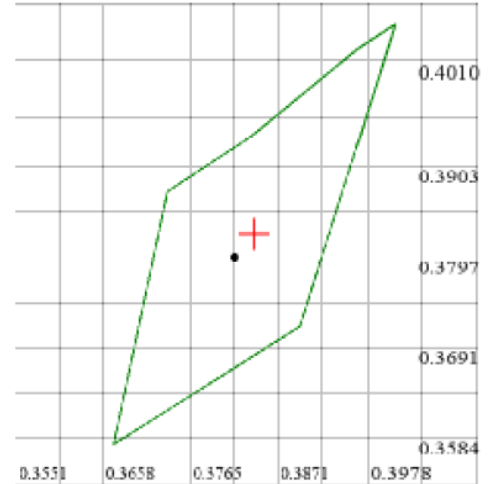
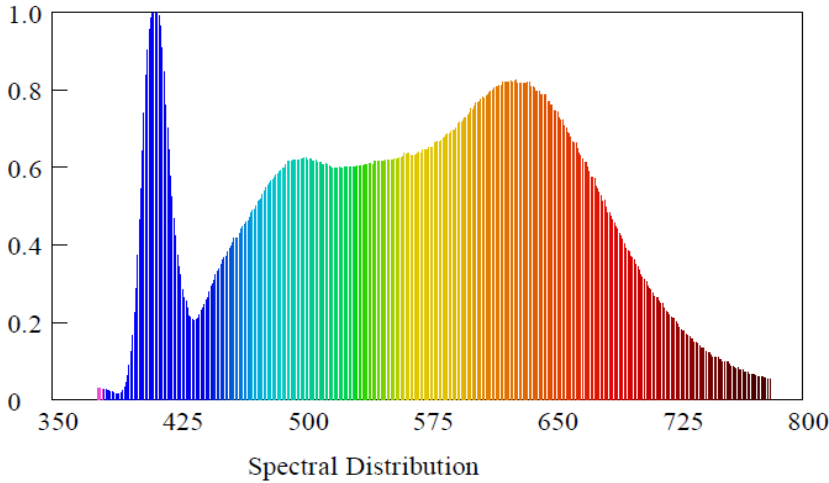
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Test Condition

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

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

Spectroradiometric Parameters



Nominal CCT:LED_4000K
x0=0.3842 y0=0.3824

Chromaticity Coordinates: $x=0.3842$ $y=0.3824$ $u'=0.2254$ $v'=0.5046$

Correlated Color Temperature: 3940 K

Dominant Wavelength: 577.0 nm(E)

Luminous Flux: 467.218 lm

Purity: 0.3009

Chromaticity Difference: +0.00153Duv

Peak Wavelength: 413.1 nm

Color Ratio: $K_r=37.8\%$ $K_g=49.2\%$ $K_b=13.0\%$

Bandwidth: 16.3nm

Radiant Flux: 1.821 W

Rendering Index: Ra=95.4

R1=95 R2=96 R3=96 R4=94 R5=94 R6=92 R7=97 R8=97
R9=95 R10=90 R11=92 R12=83 R13=95 R14=98 R15=97



Test Report

Test Flow 2: Goniophotometer Test

Environmental Conditions

Temperature: 25.1°C

Test Equipment

Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
GVS-LE-GS001	Goniophotometer	Before Use	Before Use
GVS-LE-FS019	Measurement Standard Lamp	2015-08-21	2016-08-19

Test Sample

2225378-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 Factor	Power (W)
Input	120.10	60	0.064	0.963	7.4

Test Type	Lumen Output (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	454	7109	19.5	19.5	11.4	11.4	61.0



Test Report



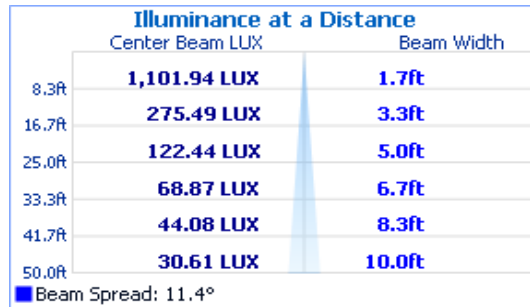
NVLAP Lab Code: 200952-0



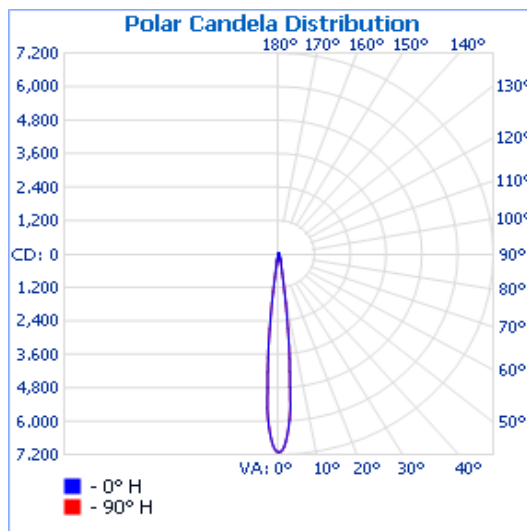
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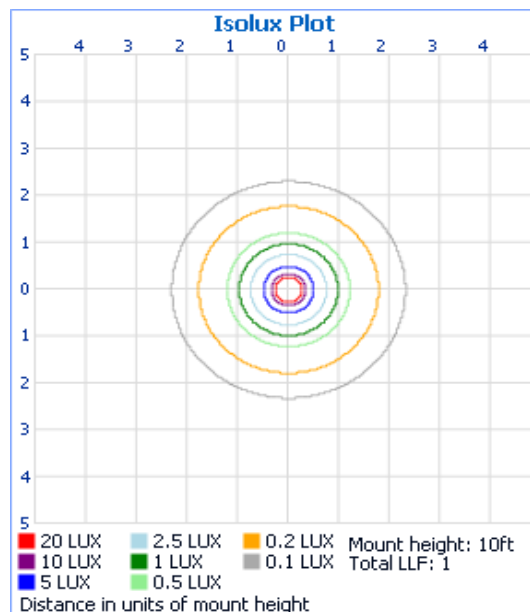
Illuminance at a Distance



Polar Candela Distribution



Isolux Plot





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Test Report

Zonal Lumen Tabulation

Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	359.9	79.2%
0-40	390.0	85.8%
0-60	424.7	93.5%
60-90	28.9	6.4%
70-100	14.1	3.1%
90-120	0.2	0%
0-90	453.6	99.8%
90-180	0.8	0.2%
0-180	454.3	100%

Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	138.6	30.5%	90-95	0.0	0%
5-10	129.2	28.4%	95-100	0.0	0%
10-15	37.1	8.2%	100-105	0.0	0%
15-20	22.0	4.9%	105-110	0.0	0%
20-25	17.1	3.8%	110-115	0.0	0%
25-30	15.9	3.5%	115-120	0.0	0%
30-35	15.6	3.4%	120-125	0.0	0%
35-40	14.5	3.2%	125-130	0.1	0%
40-45	11.3	2.5%	130-135	0.1	0%
45-50	8.2	1.8%	135-140	0.1	0%
50-55	7.6	1.7%	140-145	0.1	0%
55-60	7.6	1.7%	145-150	0.1	0%
60-65	7.5	1.7%	150-155	0.1	0%
65-70	7.3	1.6%	155-160	0.1	0%
70-75	6.4	1.4%	160-165	0.1	0%
75-80	4.6	1.0%	165-170	0.1	0%
80-85	2.4	0.5%	170-175	0.0	0%
85-90	0.6	0.1%	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	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109	7109
0.5	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101	7101
1	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037	7037
2	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739	6739
3	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243	6243
4	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545	5545
5	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254	4254
6	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322	3322
7	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198	2198
8	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366	1366
9	862	862	862	862	862	862	862	862	862	862	862	862	862	862	862	862	862
10	583	583	583	583	583	583	583	583	583	583	583	583	583	583	583	583	583
11	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
12	317	317	317	317	317	317	317	317	317	317	317	317	317	317	317	317	317
13	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265	265
14	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223
15	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189	189
16	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163
17	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141
18	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124
19	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
20	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
25	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
30	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
35	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
40	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
50	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
55	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
60	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
65	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
70	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
75	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
80	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
85	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
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

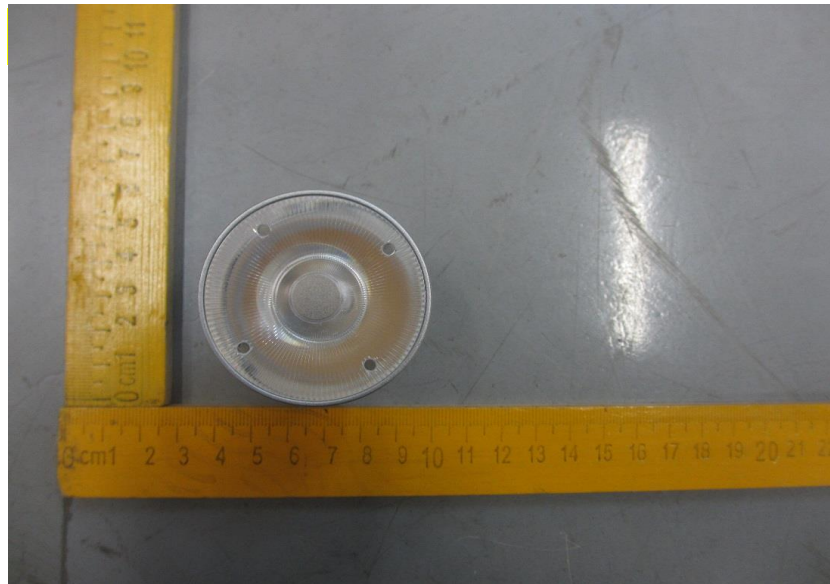


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Photos of sample



End of Test Report