NVLAP Lab Code: 200952-0

Verification Services

Project No.: 4786480425-9
Report No.: 4786480425-9a
Report Issued Date: 2015-2-2

Test Report

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

Manufacturer:	SORAA Inc.
Country of Origin:	USA
Country of Export:	USA
Product Description:	Lamp Type: MR16 GU5.3 LED Lamp Total Amount Of Light Source: 1 pc
Model Number:	SM16-07-36D-940-03
Electrical Specification:	12 V AC, 60 Hz

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

Receipt of Test Samples :	2015-1-13	**Test Period:**	2015-1-13 ~ 2015-1-30

Tested By	**Approved By**
Jackson Zeng / Jackson Zeng	Sean Xiao / Sean Xiao
Test Personnel Name & Signatory	**Approval Name & Signatory**

Test Report

Statement of Results

Test Flow	Test Method	Sample ID (Lab)	Sample Serial No.	Pass/Fail/NA
1.	Integrating Sphere Test	2033562-S1	N/A	Evaluate by customer
2.	Goniophotometer Test	2033562-S1	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:	25.1º 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	08/22/2013	08/21/2015

Test Sample

2033562-S001

Test Method

The sample was tested according to the IES LM-79-2008.
Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º 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)	Power Factor	Orientation	Operate time (Min.)	Stabilization time (Min.)
Input	12.08	60	0.730	8.07	0.914	Base up	50	30

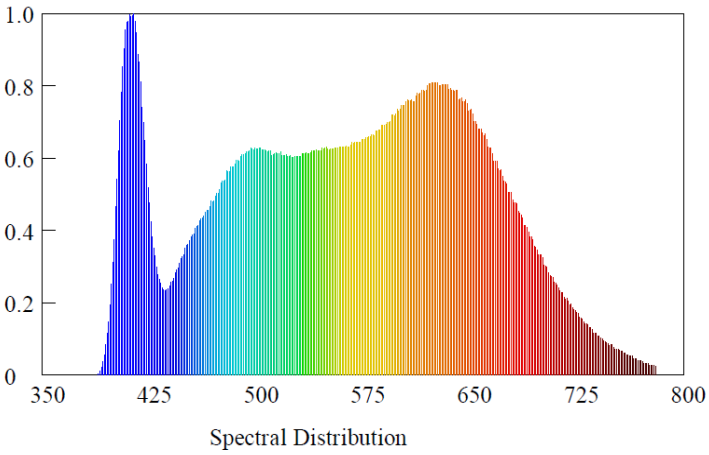
Test Type	CCT (K)	Luminous Flux (lm)	Color Rendering Index Ra	R9	Luminous Efficacy (lm/W)
Output	4048	464.2	96.4	97	57.5

Test Report

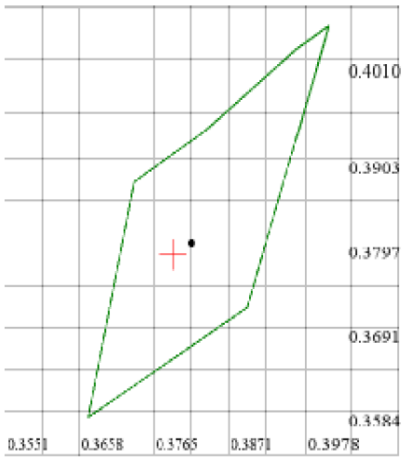
Test Condition

Temperature: 25.1°C RH: ----%
Spectrum Range: 380-780 nm Scan Step: 1 nm

Spectroradiometric Parameters



Spectral Distribution



Nominal CCT:LED_4000K
x0=0.3791 y0=0.3782

Chromaticity Coordinates: x=0.3791 y=0.3782 u'=0.2237 v'=0.502

Correlated Color Temperature: 4048 K Dominant Wavelength: 577.0 nm(E)

Luminous Flux: 464.160 lm Purity: 0.2728

Chromaticity Difference: +0.00105Duv Peak Wavelength: 414.1 nm

Color Ratio: Kr=37.3% Kg=49.6% Kb=13.0%

Bandwidth: 19.4nm Radiant Flux: 1.654 W

Rendering Index: Ra=96.4

R1=96 R2=97 R3=97 R4=95 R5=95 R6=93 R7=98 R8=99

R9=97 R10=92 R11=93 R12=83 R13=96 R14=99 R15=98

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	08/22/2013	08/21/2015
GVS-LE-CA008	Digital Calliper	09/18/2014	09/17/2015

Test Sample

2033562-S001

Test Method

The sample was tested according to the IES LM-79-2008.
Photometric paramters 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.

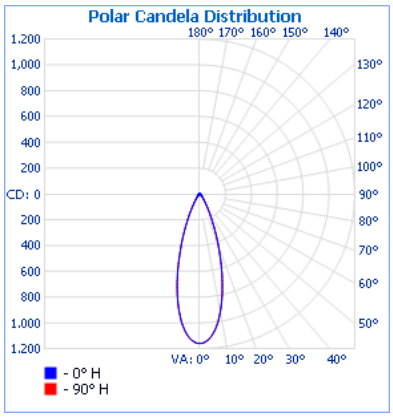
Test Results

Test Type	Voltage (V AC)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation	Opreate time (Min.)	Stabilization time (Min.)
Input	12.01	60	0.720	7.88	0.911	Base up	70	30

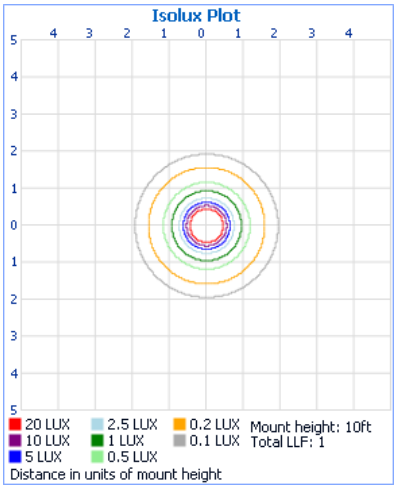
Test Type	Flux (lm)	Center Beam Candle Power (cd)	Field angle (10%)		Beam angle (50%)		Luminous Efficacy (lm/W)
			Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
Output	466.3	1159	59.2	59.2	33.4	33.4	59.1

Test Report

Light Distribution Curve



Isolux Plot



Test Report

Zonal Lumen Tabulation

Zonal Lumen Summary

Zone	Lumens	% Luminaire
0-30	385.0	82.6%
0-40	421.3	90.4%
0-60	450.5	96.6%
60-90	14.4	3.1%
70-100	6.0	1.3%
90-120	0.4	0.1%
0-90	464.9	99.7%
90-180	1.4	0.3%
0-180	466.3	100%

Lumens Per Zone

Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	27.0	5.8%	90-95	0.1	0%
5-10	72.2	15.5%	95-100	0.1	0%
10-15	93.8	20.1%	100-105	0.1	0%
15-20	87.7	18.8%	105-110	0.1	0%
20-25	64.6	13.9%	110-115	0.1	0%
25-30	39.7	8.5%	115-120	0.1	0%
30-35	22.6	4.8%	120-125	0.1	0%
35-40	13.7	2.9%	125-130	0.1	0%
40-45	9.5	2.0%	130-135	0.1	0%
45-50	7.6	1.6%	135-140	0.1	0%
50-55	6.5	1.4%	140-145	0.1	0%
55-60	5.6	1.2%	145-150	0.1	0%
60-65	4.7	1.0%	150-155	0.1	0%
65-70	3.8	0.8%	155-160	0.1	0%
70-75	2.8	0.6%	160-165	0.1	0%
75-80	1.8	0.4%	165-170	0.0	0%
80-85	0.9	0.2%	170-175	0.0	0%
85-90	0.3	0.1%	175-180	0.0	0%

Test Report

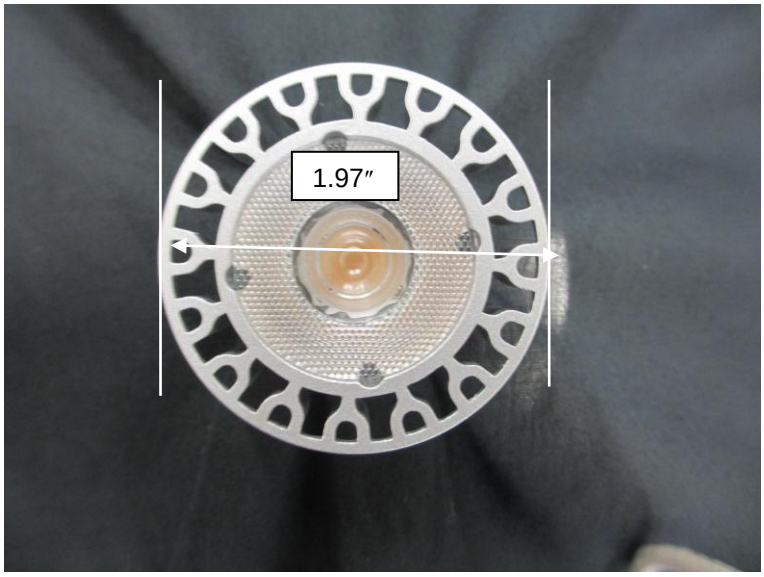
Intensity Data(cd)

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	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157	1157
0.5	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159	1159
1.5	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154	1154
2.5	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144	1144
3.5	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129	1129
4.5	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110	1110
5.5	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086	1086
6.5	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057	1057
7.5	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
8.5	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985	985
9.5	944	944	944	944	944	944	944	944	944	944	944	944	944	944	944	944	944
10.5	898	898	898	898	898	898	898	898	898	898	898	898	898	898	898	898	898
11.5	851	851	851	851	851	851	851	851	851	851	851	851	851	851	851	851	851
12.5	801	801	801	801	801	801	801	801	801	801	801	801	801	801	801	801	801
13.5	749	749	749	749	749	749	749	749	749	749	749	749	749	749	749	749	749
14.5	696	696	696	696	696	696	696	696	696	696	696	696	696	696	696	696	696
15.5	644	644	644	644	644	644	644	644	644	644	644	644	644	644	644	644	644
16.5	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590	590
17.5	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537	537
18.5	481	481	481	481	481	481	481	481	481	481	481	481	481	481	481	481	481
19.5	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437	437
24.5	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236	236
29.5	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
34.5	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
39.5	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
49.5	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
54.5	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
59.5	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
64.5	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
69.5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
74.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
79.5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
84.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
89.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
119.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
129.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
134.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
139.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
144.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
149.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
154.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
159.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
164.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179.5	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	0

Test Report

Photos of sample



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