REPORT

545 E. Algonquin Rd., Arlington Heights, IL 60005

Project No. G102406056 Date: March 11, 2016

REPORT NO. 102406056CHI-005

TEST OF ONE AR111 LAMP

MODEL NO. SR111-12-25D-930-03
LED MODEL NO. SORAA
DRIVER MODEL NO. SORAA

RENDERED TO

SORAA
6500 KAISER DR. SUITE 110
FREMONT, CA 94555

TEST: Electrical and Photometric tests as required to the IESNA test standard.

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00660665.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting

ANSI NEMA ANSLG C78.377: 2012: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number SR111-12-25D-930-03. The sample was received by Intertek on March 1, 2016, in undamaged condition and one sample was tested as received. The sample designation was AH03012016050546-5.

DATES OF TESTS: March 8, 2016 through March 11, 2016.

SUMMARY

Model No.:	SR111-12-25D-930-03
Description:	AR111 Lamp

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	724.5	746.6
Total Power (W)	12.55	12.57
Luminaire Efficacy (LPW)	57.73	59.40

Criteria	Result
Power Factor	0.920
Current ATHD %	34.78
Correlated Color Temperature (CCT - K)	2978
Color Rendering Index (CRI - Ra)	94.6
Color Rendering Index (CRI - R9)	98.0
DUV	0.001
Chromaticity Coordinate (x)	0.440
Chromaticity Coordinate (y)	0.408
Chromaticity Coordinate (u')	0.251
Chromaticity Coordinate (v')	0.523

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Yokogawa Power Meter	WT210	146919	07/14/15	07/14/16	03/11/16
Omega Thermometer	DPI8-C24	146920	10/09/15	10/09/16	03/11/16
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	03/11/16
Newport Hygrometer	iServer	146956	01/04/16	01/04/17	03/11/16
Elgar, AC Power Supply	CW1251P	146918	VBU	VBU	03/11/16
2 Meter Sphere & Spectroradiometer	MS760/CDS11C	146137	VBU	VBU	03/08/16
Elgar AC Power Supply	CW1251M	146113	VBU	VBU	03/08/16
Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU	03/08/16
Newport Humidity Recorder	iTHX-SD	146382	07/09/15	07/09/16	03/08/16
Yokogawa Power Meter	WT1600	146770	04/07/15	04/07/16	03/08/16
Omega Temperature Meter	MDSi8	146873	07/09/15	07/09/16	03/08/16

TEST METHODS

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model CDS 1100 CCD Array Spectroradiometer and Two Meter or Ten Foot Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

Photometric and Electrical Measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

RESULTS OF TEST

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

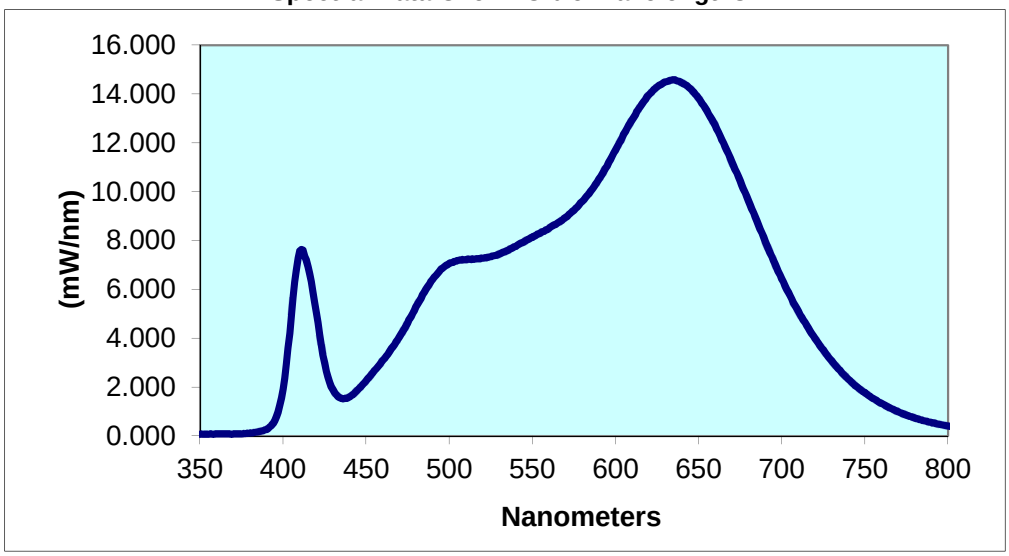
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH03012016050546-5	Up	12.0	1136	12.55	0.920	34.78	724.5	57.73

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
2978	94.6	98.0	0.001	0.440	0.408	0.251	0.523

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.069	440	1.597	530	7.446	620	13.96	710	5.098
355	0.070	445	1.889	535	7.594	625	14.29	715	4.521
360	0.082	450	2.262	540	7.759	630	14.50	720	3.984
365	0.074	455	2.672	545	7.956	635	14.57	725	3.515
370	0.076	460	3.099	550	8.146	640	14.46	730	3.074
375	0.087	465	3.555	555	8.319	645	14.22	735	2.683
380	0.119	470	4.056	560	8.508	650	13.82	740	2.327
385	0.169	475	4.633	565	8.716	655	13.32	745	2.022
390	0.268	480	5.279	570	8.952	660	12.72	750	1.765
395	0.630	485	5.889	575	9.240	665	11.99	755	1.533
400	1.910	490	6.411	580	9.602	670	11.23	760	1.336
405	4.939	495	6.830	585	10.03	675	10.44	765	1.154
410	7.582	500	7.064	590	10.52	680	9.628	770	0.994
415	6.918	505	7.182	595	11.07	685	8.809	775	0.858
420	5.037	510	7.207	600	11.69	690	7.975	780	0.735
425	2.971	515	7.238	605	12.35	695	7.195		
430	1.885	520	7.275	610	12.94	700	6.442		
435	1.538	525	7.347	615	13.49	705	5.740		

Spectral Data Over Visible Wavelengths



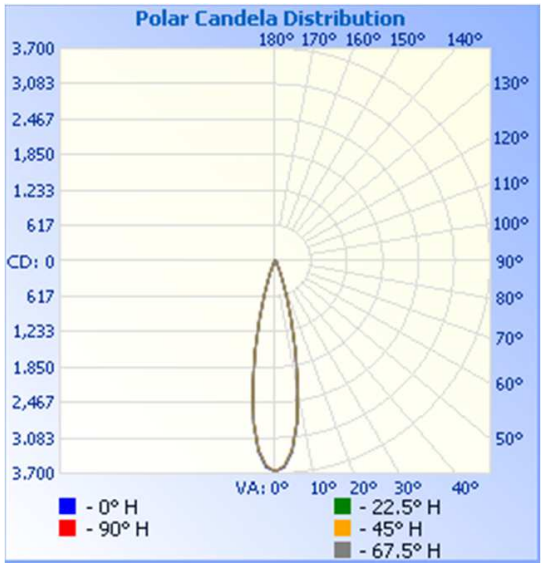
RESULTS OF TEST (cont'd)

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Distribution Method

Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH03012016050546-5	Up	12.1	1128	12.57	0.920	746.6	59.40

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	3663	3663	3663	3663	3663
5	3336	3316	3308	3300	3301
10	2235	2246	2244	2234	2236
15	1039	1065	1053	1040	1067
20	381	393	391	387	396
25	150	151	150	151	153
30	74	74	74	74	75
35	48	48	48	48	48
40	35	35	35	35	34
45	28	28	28	28	27
50	23	23	23	23	23
55	20	20	20	20	20
60	16	16	16	16	16
65	12	13	13	12	12
70	9	9	9	9	9
75	6	6	6	6	6
80	3	3	3	3	3
85	1	1	1	1	1
90	0	0	0	0	0

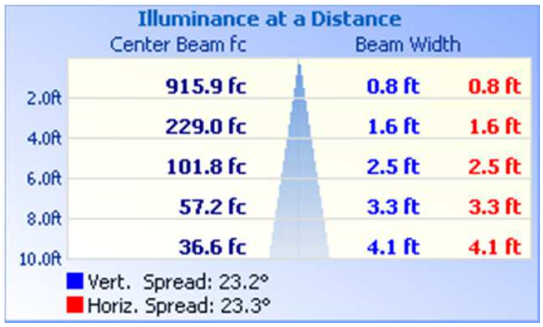


RESULTS OF TEST (cont'd)

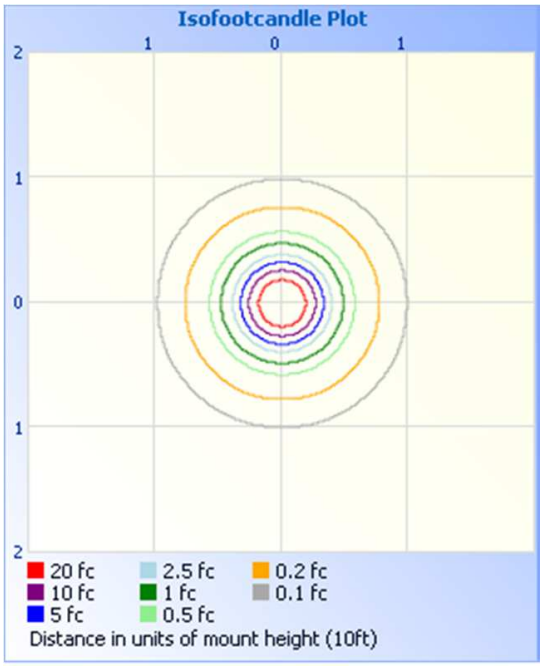
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



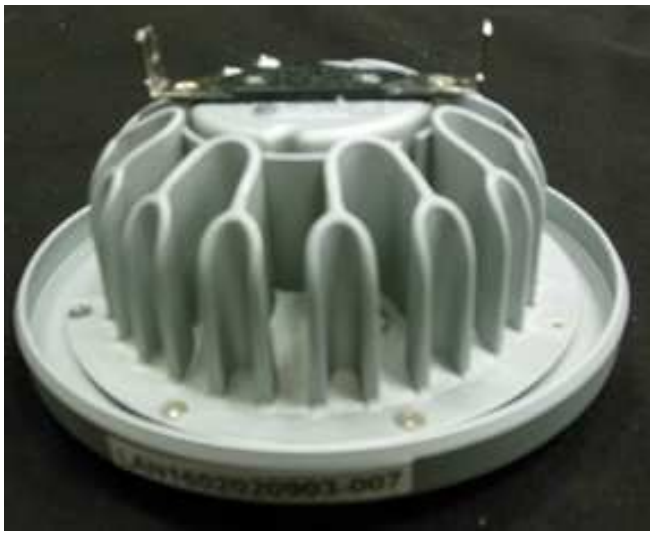
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	656.0	87.9
0-40	687.0	92.0
0-60	726.4	97.3
60-90	20.2	2.7
0-90	746.6	100.0
90-180	0.0	0.0
0-180	746.6	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	279.0	37.4
10-20	297.9	39.9
20-30	79.1	10.6
30-40	31.1	4.2
40-50	21.7	2.9
50-60	17.6	2.4
60-70	12.4	1.7
70-80	6.3	0.8
80-90	1.4	0.2

PICTURES (not to scale)



CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:

Timothy Quigley
Engineer
Lighting Division

Report Reviewed By:

Kenda Branch
Team Lead
Lighting Division

Attachment: None