REPORT

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

Project No. G102406056 Date: March 11, 2016

REPORT NO. 102406056CHI-004

TEST OF ONE AR111 LAMP

MODEL NO. SR111-12-08D-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 SR111-12-08D-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 AH03012016050546-4.

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

SUMMARY

Model No.:	SR111-12-08D-930-03
Description:	AR111 Lamp

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	682.9	694.4
Total Power (W)	12.76	12.77
Luminaire Efficacy (LPW)	53.52	54.38

Criteria	Result
Power Factor	0.920
Current ATHD %	34.61
Correlated Color Temperature (CCT - K)	2986
Color Rendering Index (CRI - Ra)	94.9
Color Rendering Index (CRI - R9)	98.7
DUV	0.001
Chromaticity Coordinate (x)	0.440
Chromaticity Coordinate (y)	0.409
Chromaticity Coordinate (u')	0.250
Chromaticity Coordinate (v')	0.524

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

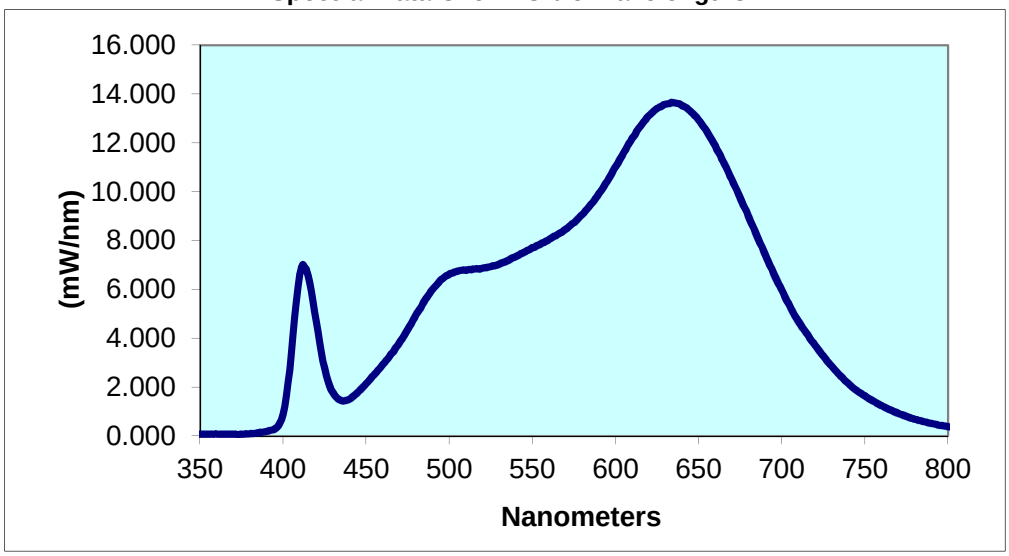
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH03012016050546-4	Up	12.0	1156	12.76	0.920	34.61	682.9	53.52

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')
2986	94.9	98.7	0.001	0.440	0.409	0.250	0.524

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.065	440	1.512	530	7.035	620	13.11	710	4.691
355	0.067	445	1.787	535	7.175	625	13.41	715	4.191
360	0.075	450	2.140	540	7.337	630	13.58	720	3.713
365	0.068	455	2.523	545	7.524	635	13.65	725	3.266
370	0.067	460	2.929	550	7.705	640	13.53	730	2.856
375	0.070	465	3.352	555	7.860	645	13.31	735	2.482
380	0.091	470	3.821	560	8.042	650	12.94	740	2.149
385	0.125	475	4.350	565	8.242	655	12.46	745	1.864
390	0.185	480	4.953	570	8.465	660	11.88	750	1.638
395	0.288	485	5.514	575	8.736	665	11.21	755	1.429
400	0.889	490	6.002	580	9.076	670	10.50	760	1.245
405	3.424	495	6.399	585	9.473	675	9.756	765	1.075
410	6.623	500	6.626	590	9.930	680	8.985	770	0.927
415	6.563	505	6.752	595	10.43	685	8.219	775	0.798
420	4.659	510	6.779	600	11.00	690	7.433	780	0.688
425	2.764	515	6.826	605	11.60	695	6.688		
430	1.771	520	6.868	610	12.17	700	5.978		
435	1.450	525	6.929	615	12.68	705	5.299		

Spectral Data Over Visible Wavelengths



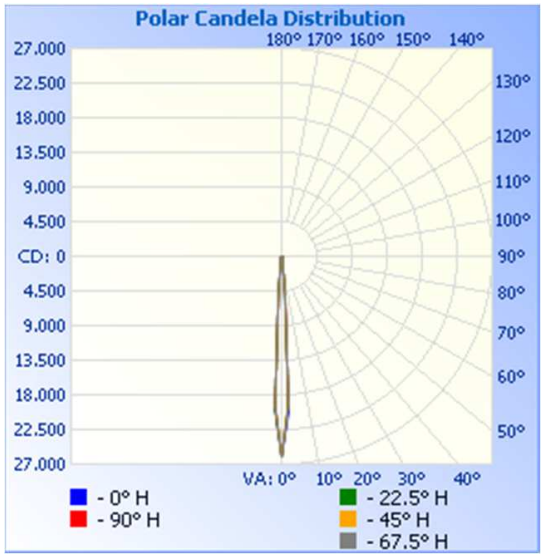
RESULTS OF TEST (cont'd)

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)
AH03012016050546-4	Up	12.1	1147	12.77	0.921	694.4	54.38

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	26037	26037	26037	26037	26037
5	4729	4350	4662	4925	5025
10	576	563	574	582	585
15	275	272	272	278	278
20	161	160	160	165	165
25	115	114	112	119	118
30	102	96	93	103	103
35	91	85	80	90	90
40	67	61	56	61	63
45	28	27	27	27	28
50	22	22	22	22	22
55	19	19	19	19	18
60	15	16	15	15	15
65	12	12	13	12	12
70	9	9	10	9	10
75	6	7	7	7	7
80	4	4	4	4	4
85	2	2	2	2	2
90	0	0	0	0	0

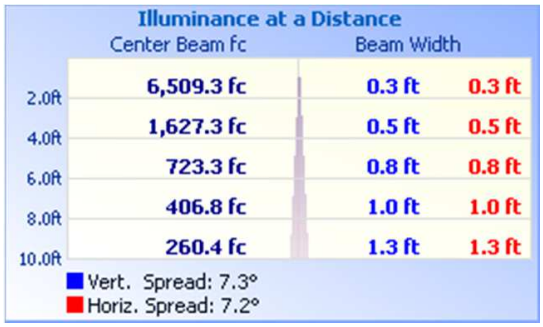


RESULTS OF TEST (cont'd)

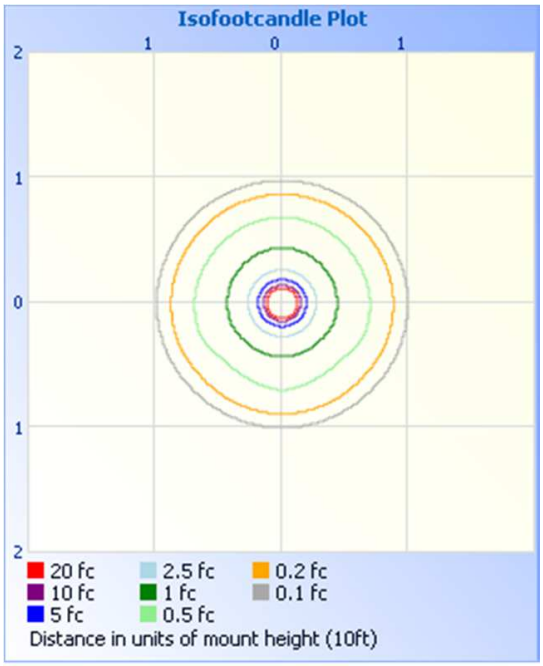
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



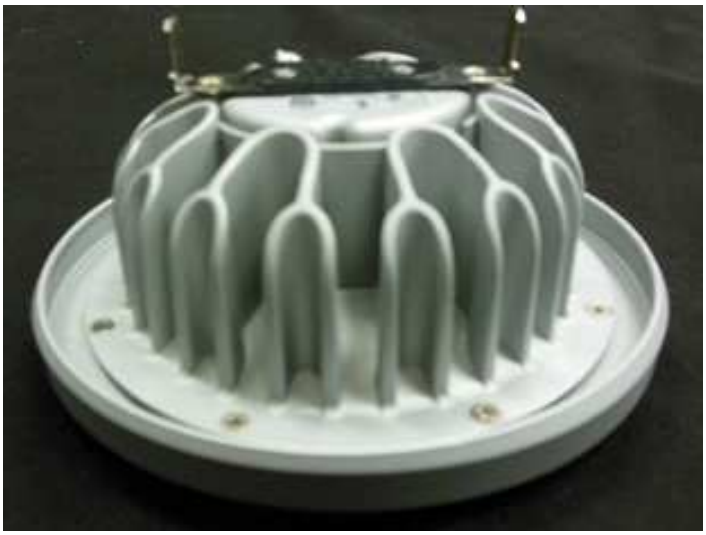
Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	580.5	83.6
0-40	632.7	91.1
0-60	673.1	96.9
60-90	21.3	3.1
0-90	694.4	100.0
90-180	0.0	0.0
0-180	694.4	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	443.1	63.8
10-20	81.5	11.7
20-30	55.9	8.0
30-40	52.2	7.5
40-50	23.9	3.4
50-60	16.5	2.4
60-70	12.0	1.7
70-80	7.1	1.0
80-90	2.2	0.3

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:

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Report Reviewed By:

Kenda Branch
Team Lead
Lighting Division

Attachment: None