REPORT

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

Project No. G102752895 Date: October 10, 2016

REPORT NO. 102752895CHI-001

TEST OF ONE LED LAMP

MODEL NO. SR111-06-04D-930-03

RENDERED TO

SORAA
6500 KAISER DR. SUITE 110
FREMONT, CA 94555

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

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00660665-1 .

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 SR111-06-04D-930-03. The sample was received by Intertek on September 29, 2016, in undamaged condition and one sample was tested as received. The sample designation was AH09292016041235-1.

DATES OF TESTS: October 4, 2016 through October 10, 2016.

SUMMARY

Model No.:	SR111-06-04D-930-03
Description:	LED lamp

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	327.9	330.3
Total Power (W)	6.400	6.368
Luminaire Efficacy (LPW)	51.23	51.87

Criteria	Result
Power Factor	0.918
Current ATHD %	37.22
Correlated Color Temperature (CCT - K)	2905
Color Rendering Index (CRI - Ra)	93.0
Color Rendering Index (CRI - R9)	92.7
DUV	0.001
Chromaticity Coordinate (x)	0.443
Chromaticity Coordinate (y)	0.404
Chromaticity Coordinate (u')	0.254
Chromaticity Coordinate (v')	0.522

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Yokogawa Power Meter	WT210	146919	07/11/16	07/11/17	10/10/16
Omega Newport Thermometer	DPI8-C24	146920	10/07/16	10/07/17	10/10/16
LSI High Speed Mirror Goniometer	6440T	146928	VBU	VBU	10/10/16
Newport Thermohygrometer	iServer	146956	01/04/16	01/04/17	10/10/16
Pacific, AC power supply	118-ACX	CHI0358	VBU	VBU	10/10/16
Labsphere 2M Sphere & Spectroradiometer	CDS1100	146137	VBU	VBU	10/04/16
Elgar AC Power Supply	CW1251M	146113	VBU	VBU	10/04/16
Sorenson DC Power Supply	XFR150-8	146847	VBU	VBU	10/04/16
Yokogawa Power Analyzer	WT1600	146767	04/14/16	04/14/17	10/04/16
Omega Temperature	MDSi8	146873	06/24/16	06/24/17	10/04/16
Newport Thermohygrometer	iTHX-M	146382	06/27/16	06/27/17	10/04/16

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

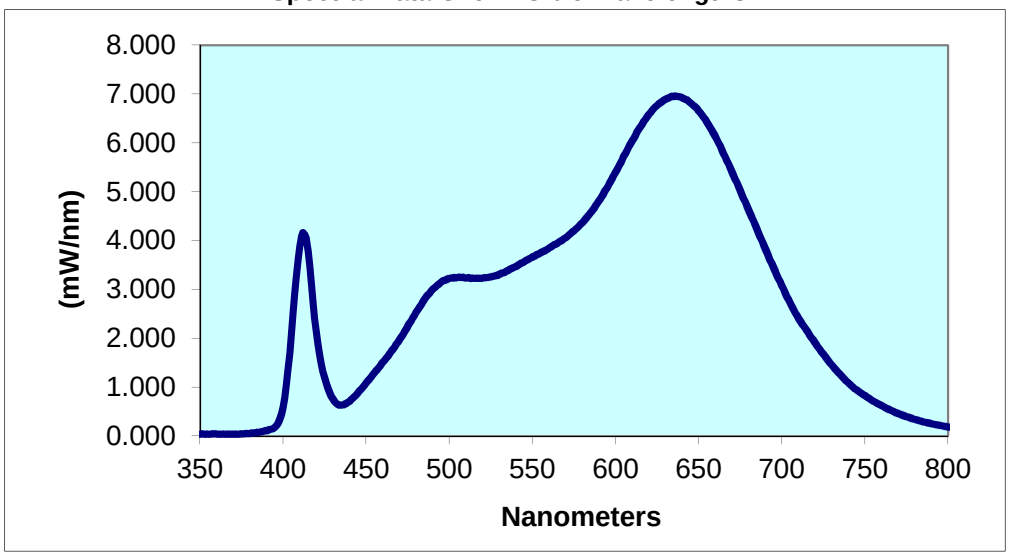
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
AH09292016041235-1	Up	12.0	581.0	6.400	0.918	37.22	327.9	51.23

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')
2905	93.0	92.7	0.001	0.443	0.404	0.254	0.522

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.036	440	0.712	530	3.308	620	6.578	710	2.414
355	0.034	445	0.881	535	3.381	625	6.765	715	2.155
360	0.040	450	1.082	540	3.466	630	6.890	720	1.907
365	0.035	455	1.292	545	3.567	635	6.944	725	1.674
370	0.033	460	1.508	550	3.662	640	6.927	730	1.459
375	0.039	465	1.727	555	3.755	645	6.825	735	1.262
380	0.052	470	1.970	560	3.848	650	6.655	740	1.087
385	0.074	475	2.241	565	3.943	655	6.425	745	0.943
390	0.108	480	2.528	570	4.060	660	6.138	750	0.824
395	0.177	485	2.791	575	4.199	665	5.782	755	0.716
400	0.588	490	2.999	580	4.366	670	5.416	760	0.623
405	2.097	495	3.149	585	4.574	675	5.029	765	0.536
410	3.879	500	3.222	590	4.817	680	4.632	770	0.460
415	3.797	505	3.242	595	5.087	685	4.243	775	0.397
420	2.112	510	3.234	600	5.392	690	3.840	780	0.340
425	1.190	515	3.227	605	5.721	695	3.454		
430	0.753	520	3.234	610	6.035	700	3.082		
435	0.630	525	3.258	615	6.324	705	2.726		

Spectral Data Over Visible Wavelengths



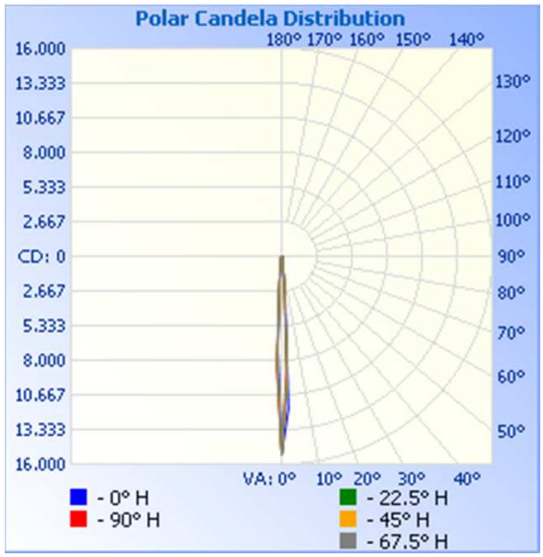
RESULTS OF TEST (cont'd)

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)
AH09292016041235-1	Up	12.0	578.2	6.368	0.917	330.3	51.87

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	15241	15241	15241	15241	15241
5	2846	2352	2322	2183	2128
10	374	352	356	353	352
15	143	139	141	142	142
20	77	78	79	81	81
25	53	55	55	57	57
30	46	49	48	49	49
35	39	41	40	40	40
40	27	27	26	27	26
45	11	12	12	13	12
50	8	9	9	9	9
55	6	7	7	7	7
60	5	6	6	6	6
65	4	5	5	5	5
70	3	4	3	4	4
75	2	3	3	3	2
80	0	1	2	1	1
85	0	0	0	0	0
90	0	0	0	0	0

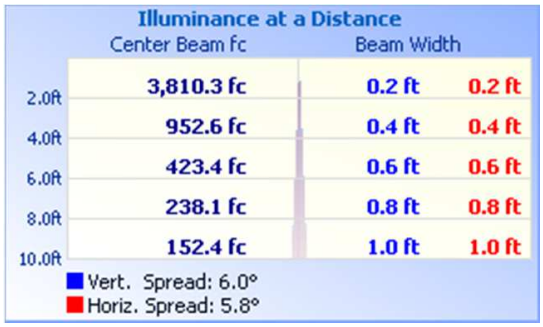


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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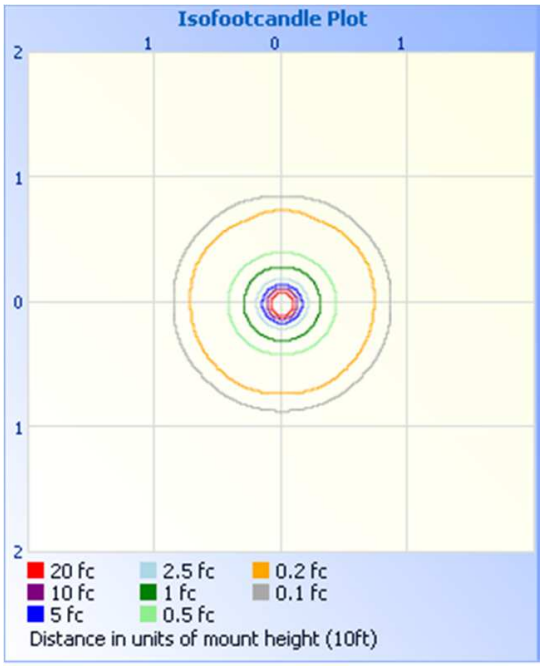


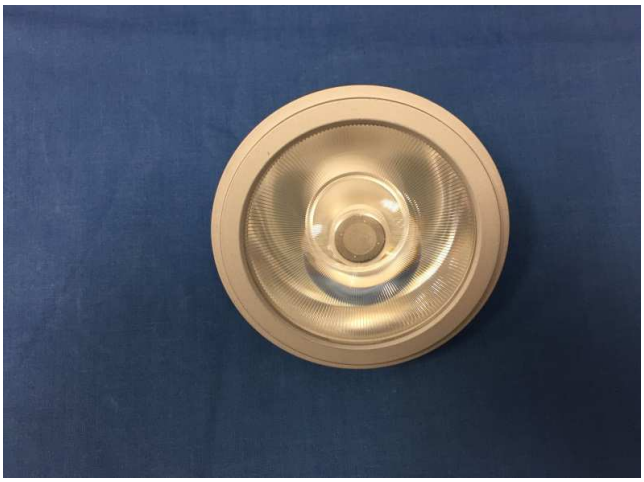
Zonal Lumen Summary and Percentages at 25°C

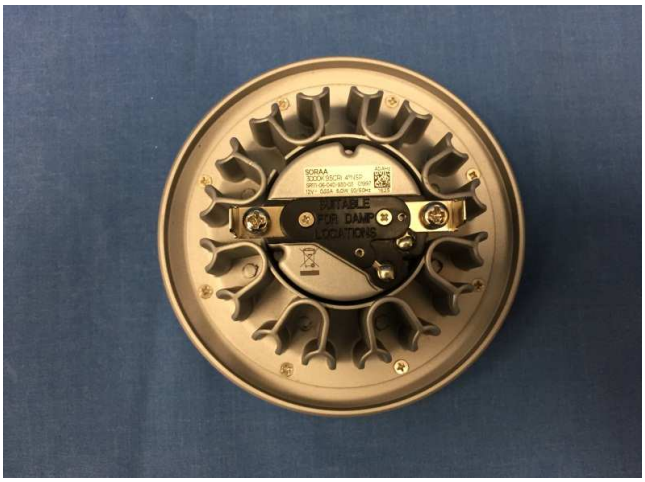
Zone	Lumens	% Luminaire
0-30	281.3	85.2
0-40	305.8	92.6
0-60	322.8	97.7
60-90	7.6	2.3
0-90	330.3	100.0
90-180	0.0	0.0
0-180	330.3	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	211.9	64.1
10-20	42.7	12.9
20-30	26.7	8.1
30-40	24.6	7.4
40-50	10.5	3.2
50-60	6.4	1.9
60-70	4.7	1.4
70-80	2.6	0.8
80-90	0.3	0.1

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:

Timothy Quigley
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Lighting Division

Attachment: None