REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G102406056 Date: June 15, 2016

REPORT NO. 102406056LAX-080

TEST OF ONE LED LAMP

MODEL NO. SP20-11-36D-827-03
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 A2LA, 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

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number SP20-11-36D-827-03. The sample was received by Intertek on June 15, 2016, in undamaged condition and one sample was tested as received. The sample designation was LAN1606150659-003.

DATES OF TESTS: June 13, 2016

SUMMARY

Model No.:	SP20-11-36D-827-03
Description:	LED LAMP

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	737.2	708.0
Total Power (W)	10.41	10.44
Luminaire Efficacy (LPW)	70.82	67.82

Criteria	Result
Power Factor	0.962
Current ATHD %	25.01
Correlated Color Temperature (CCT - K)	2589
Color Rendering Index (CRI - Ra)	83.2
Color Rendering Index (CRI - R9)	11.8
DUV	0.002
Chromaticity Coordinate (x)	0.465
Chromaticity Coordinate (y)	0.406
Chromaticity Coordinate (u')	0.268
Chromaticity Coordinate (v')	0.526

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
LapSphere 2M Integrating Sphere	LMS760	000835	05/18/16	06/18/16	06/13/16
LabSphere Spectrometer	CDS-3020	000838	05/18/16	06/18/16	06/13/16
California Instruments Power Supply	CSW5550	001339	VBU	VBU	06/13/16
Yokogawa Power Meter	WT210	000912	04/30/16	04/30/17	06/13/16
Extech Instruments Stop Watch	365510	001379	11/19/15	11/19/16	06/13/16
Temp & HR Meter	971	001178	12/18/15	12/18/16	06/13/16
LSI High Speed Mirror Goniometer	6440T	000943	06/13/16	07/13/16	06/13/16
Elgar Power Supply	CW1251	000944	VBU	VBU	06/13/16
Yokogawa Power Analyzer	WT210	000945	12/04/15	12/04/16	06/13/16
Tape Measure	C1-25	000915	12/04/15	12/04/16	06/13/16

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 CDS 3020 Spectrometer and Three Meter 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 Yokogawa Power Analyzer.

The calibration of the sphere spectrometer 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 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

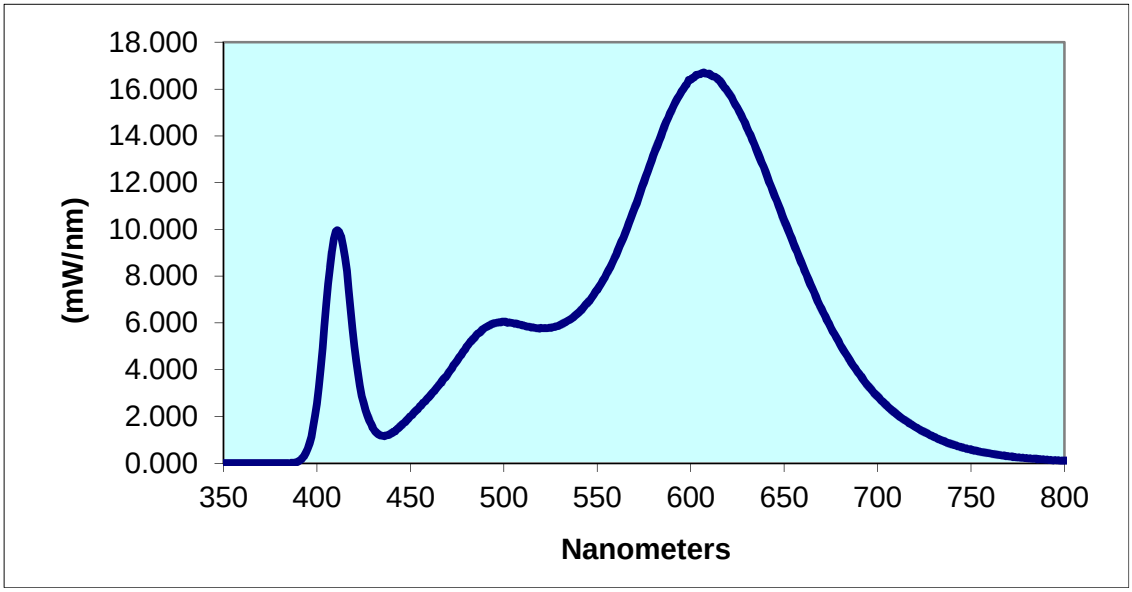
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1606150659-003	UP	120.0	90.22	10.41	0.962	25.01	737.2	70.82

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')
2589	83.2	11.8	0.002	0.465	0.406	0.268	0.526

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.002	440	1.287	530	5.915	620	15.870	710	2.108
355	0.002	445	1.608	535	6.124	625	15.200	715	1.816
360	0.002	450	2.007	540	6.444	630	14.370	720	1.555
365	0.002	455	2.418	545	6.881	635	13.430	725	1.340
370	0.002	460	2.844	550	7.412	640	12.460	730	1.134
375	0.002	465	3.312	555	8.104	645	11.410	735	0.957
380	0.002	470	3.811	560	8.901	650	10.410	740	0.803
385	0.002	475	4.376	565	9.865	655	9.406	745	0.682
390	0.081	480	4.971	570	10.910	660	8.426	750	0.579
395	0.615	485	5.448	575	12.030	665	7.488	755	0.493
400	2.538	490	5.795	580	13.160	670	6.604	760	0.416
405	6.780	495	5.989	585	14.220	675	5.799	765	0.355
410	9.907	500	6.041	590	15.150	680	5.070	770	0.301
415	8.803	505	5.995	595	15.890	685	4.416	775	0.248
420	5.010	510	5.889	600	16.410	690	3.830	780	0.219
425	2.582	515	5.793	605	16.630	695	3.311		
430	1.500	520	5.788	610	16.650	700	2.856		
435	1.168	525	5.785	615	16.400	705	2.458		

Spectral Data Over Visible Wavelengths



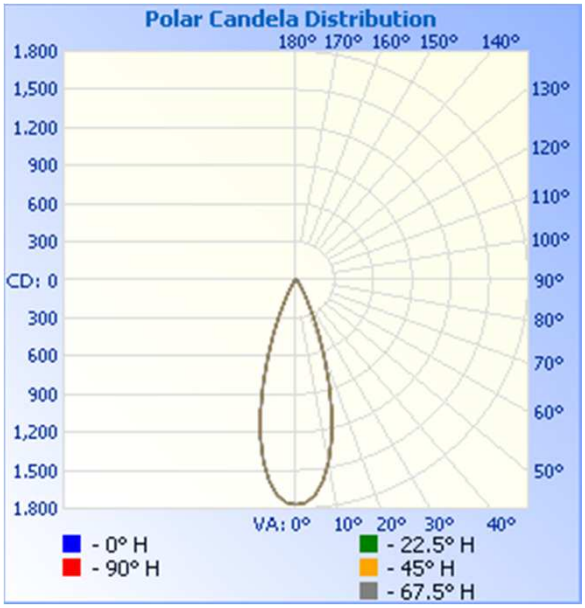
RESULTS OF TEST (cont'd)

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 (Lumens Per Watt)
LAN1606150659-003	UP	120.0	90.70	10.44	0.960	708.0	67.82

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	1766	1766	1766	1766	1766
5	1699	1699	1699	1699	1699
10	1453	1453	1453	1453	1453
15	1067	1067	1067	1067	1067
20	635	635	635	635	635
25	314	314	314	314	314
30	138	138	138	138	138
35	72	72	72	72	72
40	44	44	44	44	44
45	31	31	31	31	31
50	25	25	25	25	25
55	22	22	22	22	22
60	17	17	17	17	17
65	15	15	15	15	15
70	10	10	10	10	10
75	7	7	7	7	7
80	4	4	4	4	4
85	2	2	2	2	2
90	0	0	0	0	0

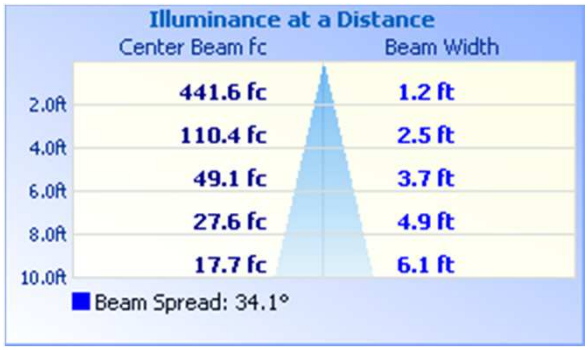


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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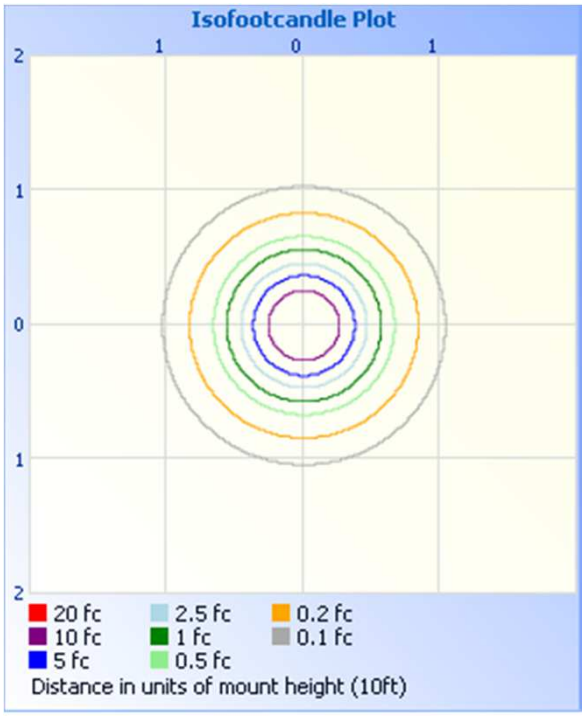

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	590.8	83.4
0-40	639.2	90.3
0-60	683.5	96.5
60-90	24.5	3.5
0-90	708.0	100.0
90-180	0.0	0.0
0-180	708.0	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	153.7	21.7
10-20	286.5	40.5
20-30	150.6	21.3
30-40	48.4	6.8
40-50	24.9	3.5
50-60	19.4	2.7
60-70	14.7	2.1
70-80	7.6	1.1
80-90	2.3	0.3

PICTURE (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:

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Attachment: None