REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G102406056 Date: June 15, 2016

REPORT NO. 102406056LAX-078

TEST OF ONE LED LAMPS

MODEL NO. SP20-11-10D-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 SP20-11-10D-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 LAN1606150659-001.

DATES OF TESTS: June 10, 2016 through June 13, 2016

SUMMARY

Model No.:	SP20-11-10D-827-03
Description:	LED LAMPS

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	694.4	717.6
Total Power (W)	10.51	10.49
Luminaire Efficacy (LPW)	66.07	68.41

Criteria	Result
Power Factor	0.941
Current ATHD %	31.71
Correlated Color Temperature (CCT - K)	2681
Color Rendering Index (CRI - Ra)	83.7
Color Rendering Index (CRI - R9)	11.1
DUV	0.002
Chromaticity Coordinate (x)	0.459
Chromaticity Coordinate (y)	0.407
Chromaticity Coordinate (u')	0.264
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	05/11/16	06/11/16	06/10/16
Elgar Power Supply	CW1251	000944	VBU	VBU	06/10/16
Yokogawa Power Analyzer	WT210	000945	12/04/15	12/04/16	06/10/16
Tape Measure	C1-25	000915	12/04/15	12/04/16	06/10/16

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

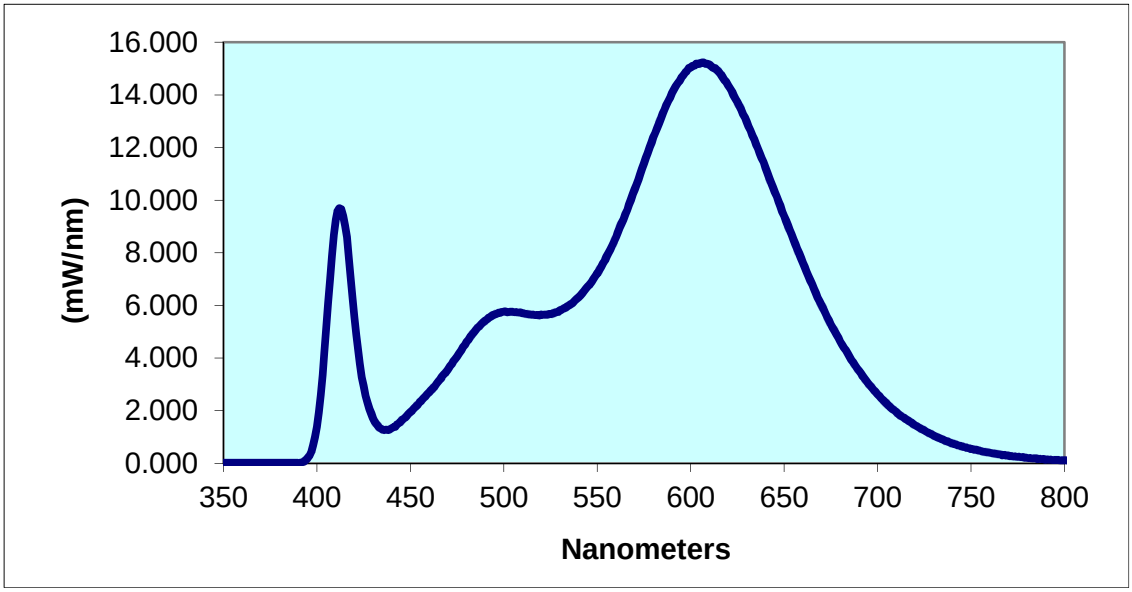
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1606150659-001	UP	119.9	93.23	10.51	0.941	31.71	694.4	66.07

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')
2681	83.7	11.1	0.002	0.459	0.407	0.264	0.526

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.009	440	1.330	530	5.808	620	14.370	710	1.939
355	0.009	445	1.599	535	6.005	625	13.740	715	1.677
360	0.009	450	1.946	540	6.308	630	12.980	720	1.450
365	0.009	455	2.315	545	6.719	635	12.110	725	1.247
370	0.009	460	2.697	550	7.217	640	11.230	730	1.055
375	0.009	465	3.109	555	7.858	645	10.300	735	0.895
380	0.009	470	3.548	560	8.595	650	9.405	740	0.748
385	0.009	475	4.053	565	9.468	655	8.510	745	0.643
390	0.010	480	4.601	570	10.410	660	7.630	750	0.544
395	0.188	485	5.071	575	11.390	665	6.792	755	0.468
400	1.387	490	5.428	580	12.390	670	6.008	760	0.397
405	5.139	495	5.657	585	13.300	675	5.280	765	0.338
410	9.252	500	5.758	590	14.070	680	4.629	770	0.291
415	9.040	505	5.755	595	14.650	685	4.033	775	0.239
420	5.568	510	5.696	600	15.040	690	3.510	780	0.209
425	2.937	515	5.642	605	15.200	695	3.043		
430	1.712	520	5.655	610	15.160	700	2.626		
435	1.279	525	5.666	615	14.870	705	2.257		

Spectral Data Over Visible Wavelengths



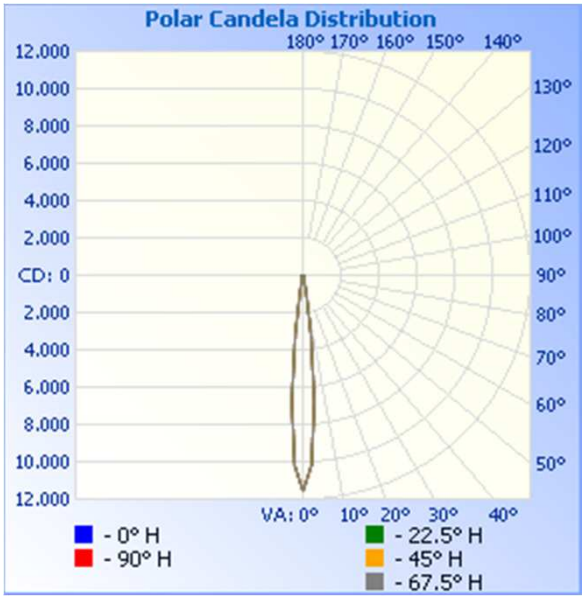
RESULTS OF TEST (cont'd)

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)
LAN1606150659-001	UP	120.0	92.80	10.49	0.942	717.6	68.41

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	11563	11563	11563	11563	11563
5	6799	6799	6799	6799	6799
10	921	921	921	921	921
15	223	223	223	223	223
20	127	127	127	127	127
25	87	87	87	87	87
30	78	78	78	78	78
35	74	74	74	74	74
40	57	57	57	57	57
45	32	32	32	32	32
50	27	27	27	27	27
55	28	28	28	28	28
60	31	31	31	31	31
65	34	34	34	34	34
70	27	27	27	27	27
75	22	22	22	22	22
80	17	17	17	17	17
85	6	6	6	6	6
90	1	1	1	1	1

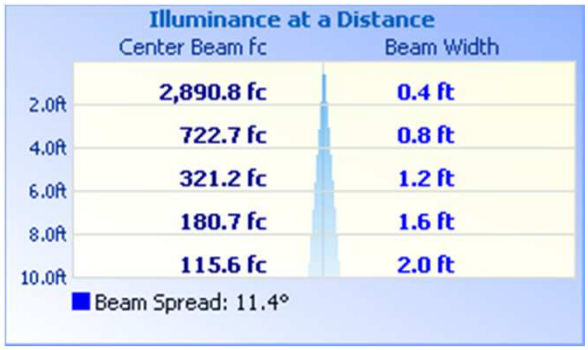


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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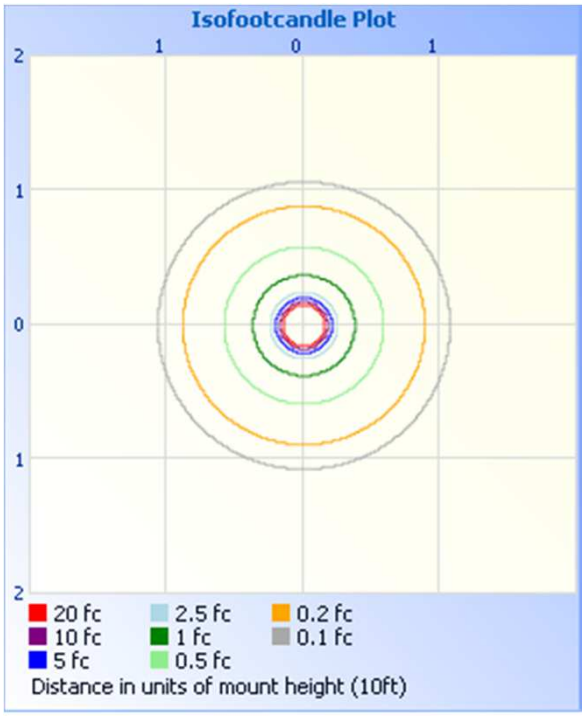

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	555.7	77.4
0-40	599.9	83.6
0-60	655.7	91.4
60-90	61.8	8.6
0-90	717.5	100.0
90-180	0.1	0.0
0-180	717.6	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	435.5	60.7
10-20	77.9	10.8
20-30	42.4	5.9
30-40	44.1	6.1
40-50	28.3	3.9
50-60	27.5	3.8
60-70	31.1	4.3
70-80	24.0	3.3
80-90	6.7	0.9
90-100	0.1	0.0

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