



REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G102406056

Date: June 6, 2016

REPORT NO. 102406056LAX-062

TEST OF ONE LED LAMP

MODEL NO. SP20-11-10D-927-03

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-927-03. The sample was received by Intertek on June 2, 2016, in undamaged condition and one sample was tested as received. The sample designation was LAN1606021358-001.

DATES OF TESTS: June 2, 2016 through June 3, 2016.

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SUMMARY

Model No.: SP20-11-10D-927-03
Description: LED LAMP

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	548.3	539.7
Total Power (W)	10.35	10.39
Luminaire Efficacy (LPW)	52.98	51.94

Criteria	Result
Power Factor	0.938
Current ATHD %	33.37
Correlated Color Temperature (CCT - K)	2684
Color Rendering Index (CRI - Ra)	94.2
Color Rendering Index (CRI - R9)	96.8
DUV	0.003
Chromaticity Coordinate (x)	0.456
Chromaticity Coordinate (y)	0.402
Chromaticity Coordinate (u')	0.264
Chromaticity Coordinate (v')	0.524

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
LapSphere 2M Integrating Sphere	LMS760	000835	05/18/16	06/18/16
LabSphere Spectrometer	CDS-3020	000838	05/18/16	06/18/16
California Instruments Power Supply	CSW5550	001339	VBU	VBU
Yokogawa Power Meter	WT333	001320	06/03/15	06/03/16
Extech Instruments Stop Watch	365510	001379	11/19/15	11/19/16
Temp & HR Meter	971	001178	12/18/15	12/18/16
DC Power Supply	LPS-100-0833	000836	05/11/16	05/11/17
LSI High Speed Mirror Goniometer	6440T	000943	05/11/16	06/11/16
Elgar Power Supply	CW1251	000944	VBU	VBU
Yokogawa Power Analyzer	WT210	000945	12/04/15	12/04/16
Tape Measure	C1-25	000915	12/04/15	12/04/16



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 CDS 3020 Spectrometer and Two 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

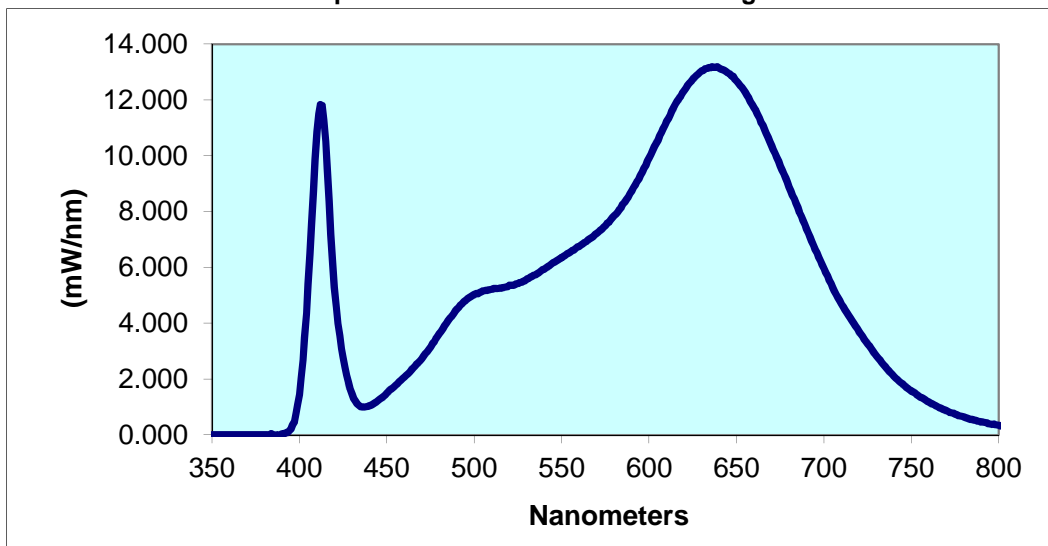
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1606021358-001	UP	120.0	91.80	10.35	0.938	33.37	548.3	52.98

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
2684	94.2	96.8	0.003	0.456	0.402	0.264	0.524

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.000	440	1.043	530	5.584	620	12.340	710	4.688
355	0.000	445	1.238	535	5.739	625	12.750	715	4.189
360	0.000	450	1.501	540	5.940	630	13.040	720	3.709
365	0.000	455	1.784	545	6.167	635	13.160	725	3.256
370	0.000	460	2.077	550	6.355	640	13.140	730	2.820
375	0.000	465	2.395	555	6.557	645	12.970	735	2.442
380	0.000	470	2.735	560	6.755	650	12.680	740	2.102
385	0.011	475	3.150	565	6.987	655	12.280	745	1.821
390	0.031	480	3.639	570	7.221	660	11.720	750	1.577
395	0.212	485	4.098	575	7.505	665	11.090	755	1.359
400	1.451	490	4.511	580	7.853	670	10.360	760	1.184
405	5.401	495	4.815	585	8.265	675	9.633	765	1.010
410	10.870	500	5.038	590	8.744	680	8.889	770	0.869
415	10.520	505	5.162	595	9.299	685	8.139	775	0.748
420	5.284	510	5.214	600	9.916	690	7.375	780	0.639
425	2.778	515	5.259	605	10.560	695	6.643		
430	1.465	520	5.355	610	11.240	700	5.955		
435	1.015	525	5.424	615	11.850	705	5.288		

Spectral Data Over Visible Wavelengths



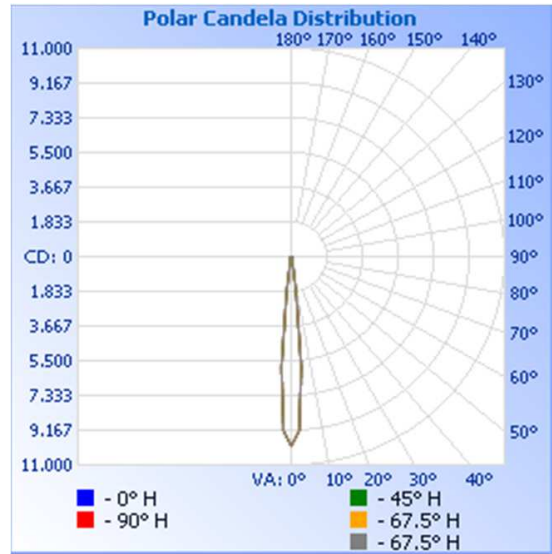
RESULTS OF TEST (cont'd)

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)
LAN1606021358-001	UP	120.0	92.00	10.39	0.941	539.7	51.94

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	10005	10005	10005	10005	10005
5	5872	5872	5872	5872	5872
10	430	430	430	430	430
15	172	172	172	172	172
20	99	99	99	99	99
25	68	68	68	68	68
30	54	54	54	54	54
35	56	56	56	56	56
40	37	37	37	37	37
45	24	24	24	24	24
50	21	21	21	21	21
55	21	21	21	21	21
60	26	26	26	26	26
65	24	24	24	24	24
70	20	20	20	20	20
75	15	15	15	15	15
80	7	7	7	7	7
85	0	0	0	0	0
90	0	0	0	0	0

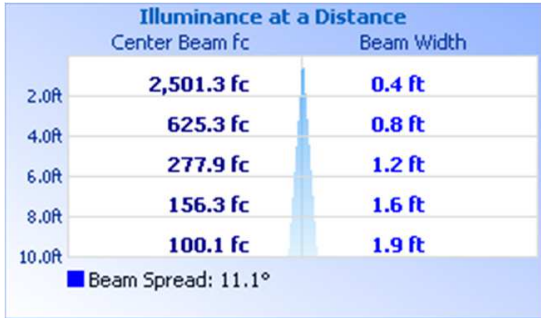


RESULTS OF TEST (cont'd)

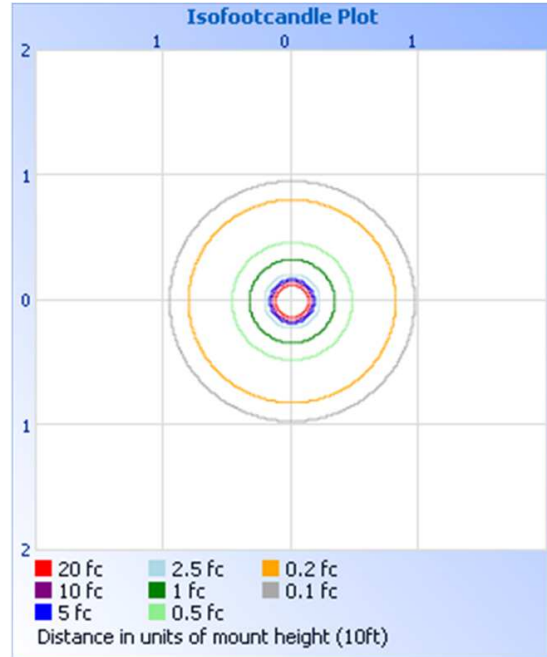
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	426.3	79.0
0-40	459.7	85.2
0-60	499.1	92.5
60-90	40.6	7.5
0-90	539.7	100.0
90-180	0.0	0.0
0-180	539.7	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	341.0	63.2
10-20	52.2	9.7
20-30	33.1	6.1
30-40	33.3	6.2
40-50	19.6	3.6
50-60	19.8	3.7
60-70	22.5	4.2
70-80	15.6	2.9
80-90	2.5	0.5

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:



Kenda Branch
Lighting Performance Team Lead
Lighting Division

Attachment: None

Report Reviewed By:



Timothy Quigley
Engineer
Lighting Division