



REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G102406056

Date: June 15, 2016

REPORT NO. 102406056LAX-081

TEST OF ONE LED LAMP

MODEL NO. SP20-11-60D-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 SP20-11-60D-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 LAN1606150659-004.

DATES OF TESTS: June 9, 2016 through June 10, 2016

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SUMMARY

Model No.:	SP20-11-60D-827-03
Description:	LED LAMP

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	653.7	669.8
Total Power (W)	10.36	10.34
Luminaire Efficacy (LPW)	63.10	64.78

Criteria	Result
Power Factor	0.947
Current ATHD %	31.23
Correlated Color Temperature (CCT - K)	2682
Color Rendering Index (CRI - Ra)	83.2
Color Rendering Index (CRI - R9)	7.8
DUV	0.001
Chromaticity Coordinate (x)	0.460
Chromaticity Coordinate (y)	0.408
Chromaticity Coordinate (u')	0.264
Chromaticity Coordinate (v')	0.526

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrate	Calibration Due Date	Date Used
LapSphere 2M Integrating Sphere	LMS760	000835	05/18/16	06/18/16	06/09/16
LabSphere Spectrometer	CDS-3020	000838	05/18/16	06/18/16	06/09/16
California Instruments Power Supply	CSW5550	001339	VBU	VBU	06/09/16
Yokogawa Power Meter	WT210	000912	04/30/16	04/30/17	06/09/16
Extech Instruments Stop Watch	365510	001379	11/19/15	11/19/16	06/09/16
Temp & HR Meter	971	001178	12/18/15	12/18/16	06/09/16
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

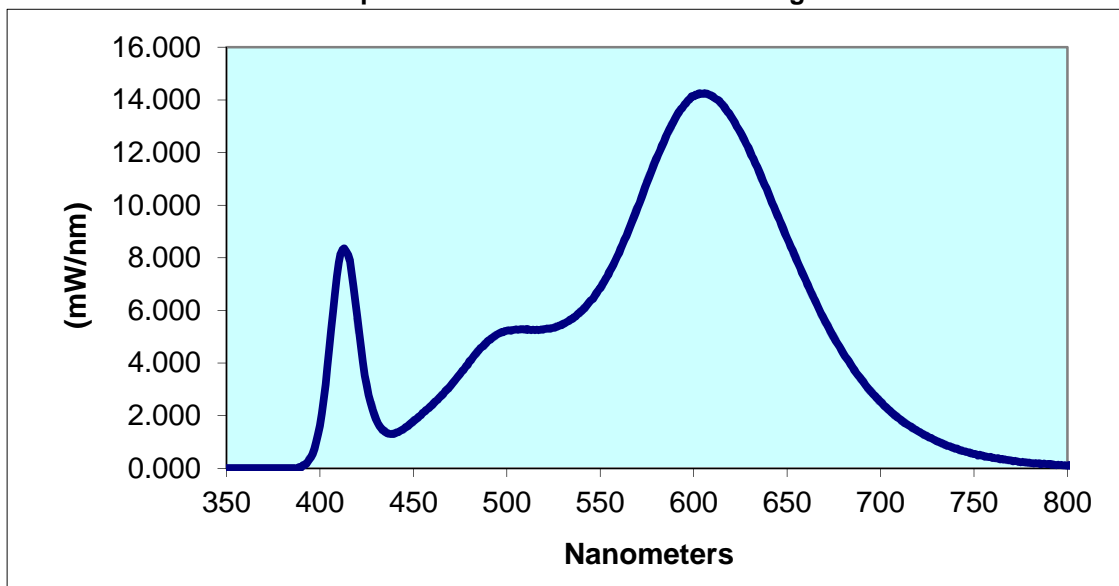
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1606150659-004	UP	120.0	91.11	10.36	0.947	31.23	653.7	63.10

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')
2682	83.2	7.8	0.001	0.460	0.408	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	0.002	440	1.320	530	5.489	620	13.370	710	1.882
355	0.002	445	1.510	535	5.683	625	12.770	715	1.631
360	0.002	450	1.786	540	5.980	630	12.060	720	1.406
365	0.002	455	2.098	545	6.381	635	11.270	725	1.218
370	0.002	460	2.401	550	6.850	640	10.440	730	1.033
375	0.002	465	2.759	555	7.476	645	9.583	735	0.877
380	0.002	470	3.136	560	8.189	650	8.747	740	0.744
385	0.002	475	3.578	565	9.020	655	7.932	745	0.637
390	0.031	480	4.058	570	9.919	660	7.121	750	0.540
395	0.404	485	4.484	575	10.850	665	6.356	755	0.470
400	1.613	490	4.849	580	11.760	670	5.629	760	0.391
405	4.540	495	5.093	585	12.600	675	4.972	765	0.348
410	7.818	500	5.224	590	13.290	680	4.374	770	0.283
415	8.108	505	5.274	595	13.810	685	3.829	775	0.234
420	5.741	510	5.261	600	14.140	690	3.338	780	0.206
425	3.174	515	5.251	605	14.230	695	2.901		
430	1.868	520	5.287	610	14.150	700	2.523		
435	1.373	525	5.336	615	13.860	705	2.182		

Spectral Data Over Visible Wavelengths



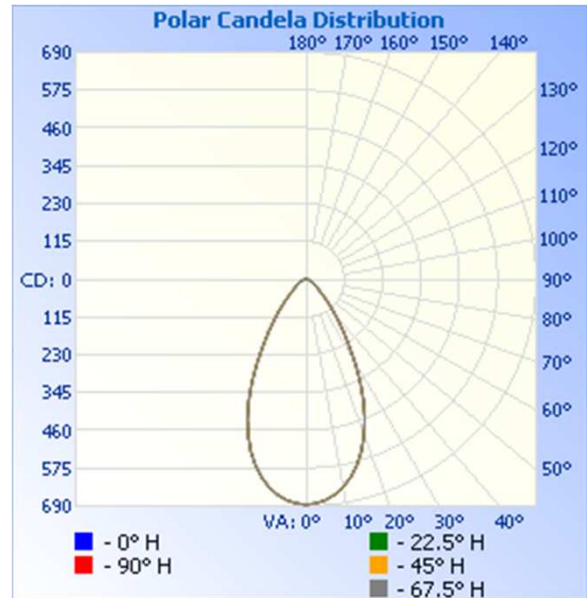
RESULTS OF TEST (cont'd)

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)
LAN1606150659-004	UP	120.0	91.40	10.34	0.943	669.8	64.78

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	685	685	685	685	685
5	674	674	674	674	674
10	641	641	641	641	641
15	586	586	586	586	586
20	507	507	507	507	507
25	407	407	407	407	407
30	294	294	294	294	294
35	197	197	197	197	197
40	128	128	128	128	128
45	80	80	80	80	80
50	51	51	51	51	51
55	37	37	37	37	37
60	28	28	28	28	28
65	21	21	21	21	21
70	16	16	16	16	16
75	12	12	12	12	12
80	8	8	8	8	8
85	4	4	4	4	4
90	0	0	0	0	0

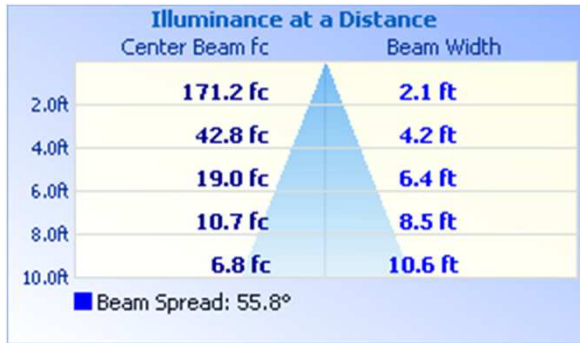


RESULTS OF TEST (cont'd)

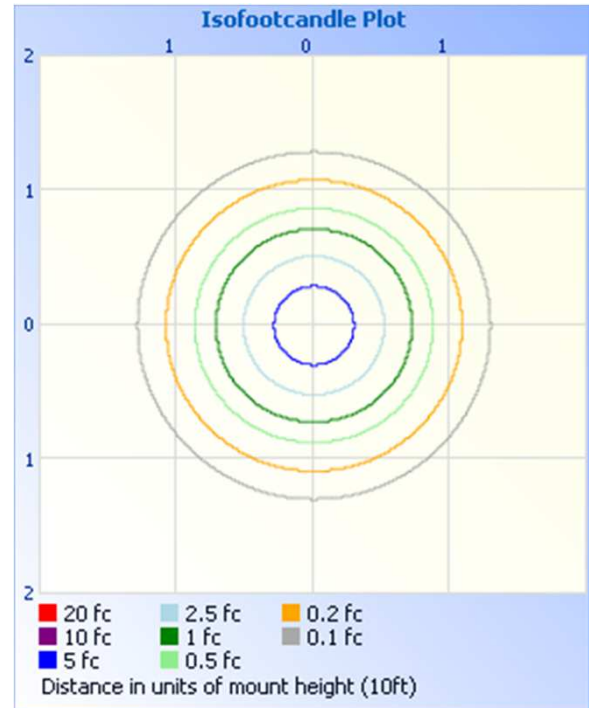
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	410.1	61.2
0-40	534.8	79.8
0-60	632.3	94.4
60-90	37.5	5.6
0-90	669.8	100.0
90-180	0.0	0.0
0-180	669.8	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	63.2	9.4
10-20	162.7	24.3
20-30	184.1	27.5
30-40	124.6	18.6
40-50	63.9	9.5
50-60	33.6	5.0
60-70	20.9	3.1
70-80	12.6	1.9
80-90	4.1	0.6

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:



Jesse Reyna
Engineer
Lighting Division

Attachment: None

Report Reviewed By:



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Lighting Division