



FOR THE SCOPE OF
ACCREDITATION UNDER NVLAP LAB
CODE 100402-0.

REPORT

3933 US ROUTE 11, CORTLAND, NEW YORK 13045

Project No. G101620590

Date: May 21, 2014

REPORT NO. 101620590CRT-019

TEST OF ONE LED A19 LAMP

MODEL NO. A19-L810-C30-B220-R

RENDERED TO

VERBATIM AMERICAS
1200 W.T. HARRIS BLVD.
CHARLOTTE, NC 28269

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 NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number 500522931.

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 A19-L810-C30-B220-R. The sample was received by Intertek on May 15, 2014, in undamaged condition and one sample was tested as received. The sample designation was CRT1405151101-001-4.

DATES OF TESTS: May 20, 2014.

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SUMMARY

Model No.:	A19-L810-C30-B220-R
Description:	LED A19 lamp

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	878.3	866.6
Total Power (W)	9.75	9.75
Luminaire Efficacy (LPW)	90.08	88.88

Criteria	Result
Power Factor	0.944
Current ATHD %	33.62
Correlated Color Temperature (CCT - K)	3089
Color Rendering Index (CRI - Ra)	83.2
Color Rendering Index (CRI - R9)	20.9
DUV	0.003
Chromaticity Coordinate (x)	0.427
Chromaticity Coordinate (y)	0.394
Chromaticity Coordinate (u')	0.248
Chromaticity Coordinate (v')	0.516

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
Cole-Parmer Hygro-Thermometer	---	N308	VBU	VBU
Labsphere Diode Array	CDS 600	W/N308	05/02/14	06/02/14
Yokogawa	WT1600	E473	04/22/14	04/22/15
Fluke Temp Meter	52 k/j	T801	10/23/13	10/23/14
Cole-Parmer Hygro-Thermometer	445703	T1366	11/27/13	11/27/14
Elgar AC power supply	CW1251	---	VBU	VBU
Intensity Standard	---	BS5186	05/01/13	05/31/14
SECONDARY LM STD. #1	---	882295	05/01/13	05/31/14
SECONDARY LM STD. #2	---	BS4743	05/01/13	05/31/14
SECONDARY LM STD. #3	---	BS3616	05/01/13	05/31/14
LSI High Speed Mirror Goniometer	6440	---	04/25/14	05/25/14
Elgar Power Supply	CW1251	---	VBU	VBU
Yokogawa Power Analyzer	WT210	E464	04/17/14	04/17/15
ExTech Hygro Thermometer	445703	T1357	11/25/13	11/25/14
Fisher Scientific	14-649-9	N1405	08/13/13	08/13/14
M-D Building Products	Smart Tool	L112	03/14/14	03/15/15



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

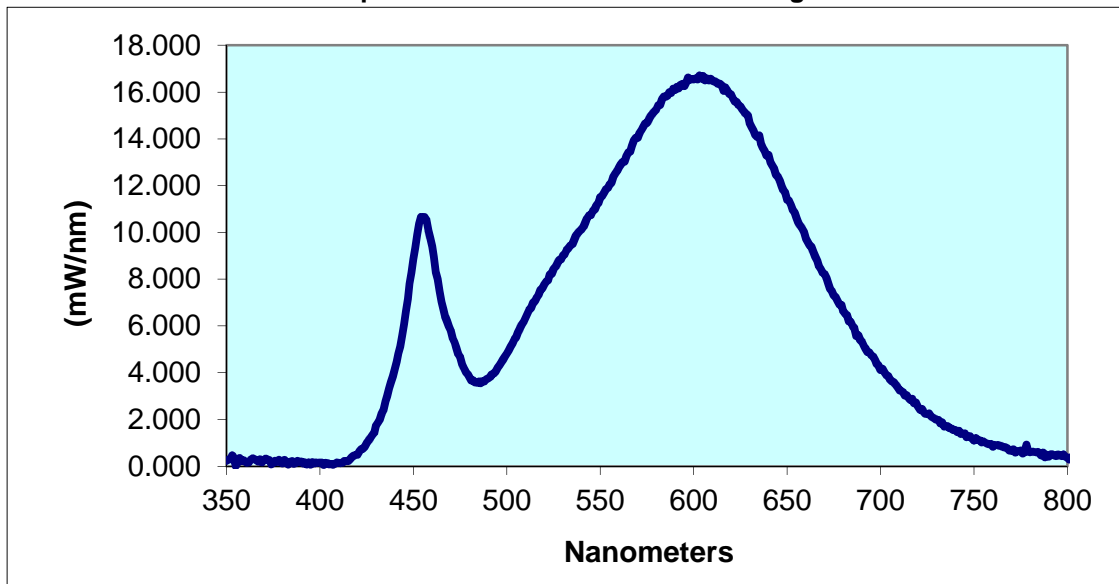
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
CRT1405151101-001-4	UP	120.0	85.94	9.75	0.944	33.62	878.3	90.08

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')
3089	83.2	20.9	0.003	0.427	0.394	0.248	0.516

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.234	440	4.152	530	9.004	620	15.91	710	3.254
355	0.012	445	6.078	535	9.492	625	15.40	715	2.913
360	0.185	450	8.867	540	10.13	630	14.67	720	2.536
365	0.303	455	10.62	545	10.74	635	14.14	725	2.231
370	0.261	460	9.394	550	11.49	640	13.31	730	1.996
375	0.140	465	7.030	555	12.04	645	12.38	735	1.706
380	0.117	470	5.803	560	12.79	650	11.39	740	1.544
385	0.211	475	4.679	565	13.43	655	10.63	745	1.406
390	0.197	480	3.811	570	14.03	660	9.733	750	1.111
395	0.068	485	3.618	575	14.68	665	8.957	755	1.066
400	0.147	490	3.754	580	15.26	670	8.225	760	0.835
405	0.072	495	4.194	585	15.80	675	7.310	765	0.848
410	0.144	500	4.813	590	16.09	680	6.639	770	0.647
415	0.217	505	5.517	595	16.25	685	5.991	775	0.664
420	0.484	510	6.357	600	16.54	690	5.327	780	0.593
425	0.980	515	7.056	605	16.70	695	4.745		
430	1.736	520	7.773	610	16.48	700	4.121		
435	2.781	525	8.430	615	16.28	705	3.723		

Spectral Data Over Visible Wavelengths



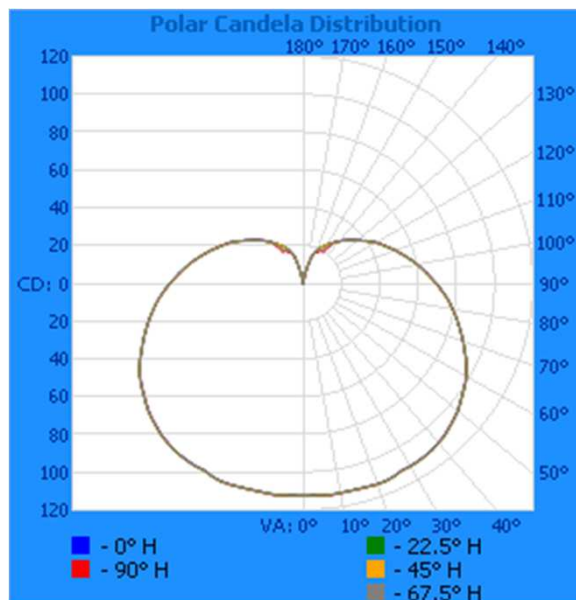
RESULTS OF TEST (cont'd)

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)
CRT1405151101-001-4	UP	120.1	86.00	9.75	0.944	866.6	88.88

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	112	112	112	112	112
5	112	112	112	112	113
10	112	112	113	113	113
15	112	112	112	113	113
20	113	113	113	113	113
25	112	113	113	113	113
30	112	112	112	112	112
35	111	111	111	111	111
40	110	110	110	110	110
45	108	108	108	108	108
50	105	105	105	105	105
55	102	102	102	102	101
60	98	98	98	98	98
65	94	94	94	94	94
70	89	89	89	89	89
75	84	84	84	84	84
80	79	79	79	79	79
85	74	74	74	74	74
90	70	69	69	69	69
95	65	64	64	64	64
100	60	60	60	60	60
105	55	55	55	55	56
110	51	51	51	51	51
115	47	47	47	47	47
120	43	43	43	43	44
125	39	39	39	39	39
130	36	35	35	35	36
135	32	32	32	32	32
140	29	29	29	29	29
145	26	26	26	26	24
150	23	23	23	20	20
155	21	21	21	20	18
160	18	17	17	17	17
165	10	11	12	11	11
170	1	1	1	1	2

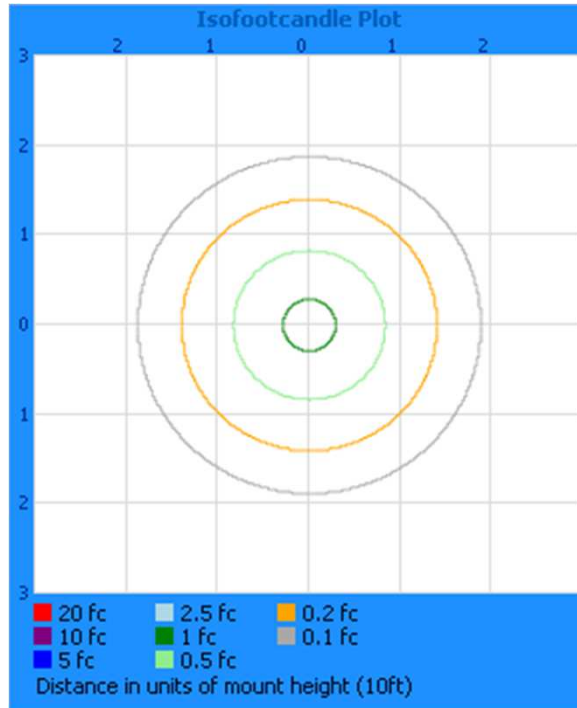


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	94.7	10.9
0-40	164.6	19.0
0-60	339.2	39.1
60-90	262.8	30.3
0-90	602.0	69.5
90-180	264.6	30.5
0-180	866.6	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	10.7	1.2
10-20	31.9	3.7
20-30	52.0	6.0
30-40	69.8	8.1
40-50	83.5	9.6
50-60	91.2	10.5
60-70	92.8	10.7
70-80	88.8	10.3
80-90	81.1	9.4
90-100	70.4	8.1
100-110	58.6	6.8
110-120	46.8	5.4
120-130	35.3	4.1
130-140	25.0	2.9
140-150	16.1	1.9
150-160	9.3	1.1
160-170	3.1	0.4
170-180	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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Attachment: None

Report Reviewed By:



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