FOR THE SCOPE OF
ACCREDITATION UNDER A2LA
TO ISO/IEC 17025:2005.

REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G101589308 Date: April 2, 2014

REPORT NO. 101589308LAX-025

TEST OF ONE TVL 2000 II WW

RENDERED TO

ELATION PROFESSIONAL
6122 S. EASTERN AVE.
COMMERCE, CA 90040

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 500515440.

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 TVL 2000 II WW. The sample was received by Intertek on January 0, 1900, in undamaged condition and one sample was tested as received. The sample designation was LAN1403210902-016.

DATES OF TESTS: March 25, 2014

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SUMMARY

Description:	TVL 2000 II WW

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	1702	1661
Total Power (W)	46.80	46.80
Luminaire Efficacy (LPW)	36.37	35.49

Criteria	Result
Power Factor	0.995
Current ATHD %	6.72
Correlated Color Temperature (CCT - K)	2863
Color Rendering Index (CRI - Ra)	95.9
Color Rendering Index (CRI - R9)	84.1
DUV	0.002
Chromaticity Coordinate (x)	0.444
Chromaticity Coordinate (y)	0.401
Chromaticity Coordinate (u')	0.256
Chromaticity Coordinate (v')	0.521

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
LabSphere Power Supply	LPS-100-0833	000832	05/23/13	05/23/14
LapSphere 3M Integrating Sphere	CA-11821-LRT	000830	VBU	VBU
LabSphere Spectrometer	CDS-3020	000834	VBU	VBU
California Instruments Power Supply	CSW5550	001338	N/A	N/A
Yokogawa Power Meter	WT333	001319	05/10/13	05/10/14
Extech Instruments Stop Watch	N/A	001380	04/22/13	04/22/14
Omega Environmental Monitor	N/A	000886	09/10/13	09/10/14
LSI High Speed Mirror Goniometer	6440T	000943	03/24/14	03/31/14
Elgar Power Supply	CW1251	000944	VBU	VBU
Yokogawa Power Analyzer	WT210	000945	11/14/13	11/14/14
Omega Environmental Monitor	N/A	000882	09/09/13	09/09/14
Extech Instruments Stop Watch	N/A	001380	04/22/13	04/22/14
Tape measure	N/A	000684	12/09/13	12/09/14

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℃ +/- 1℃) - Integrating Sphere Met hod

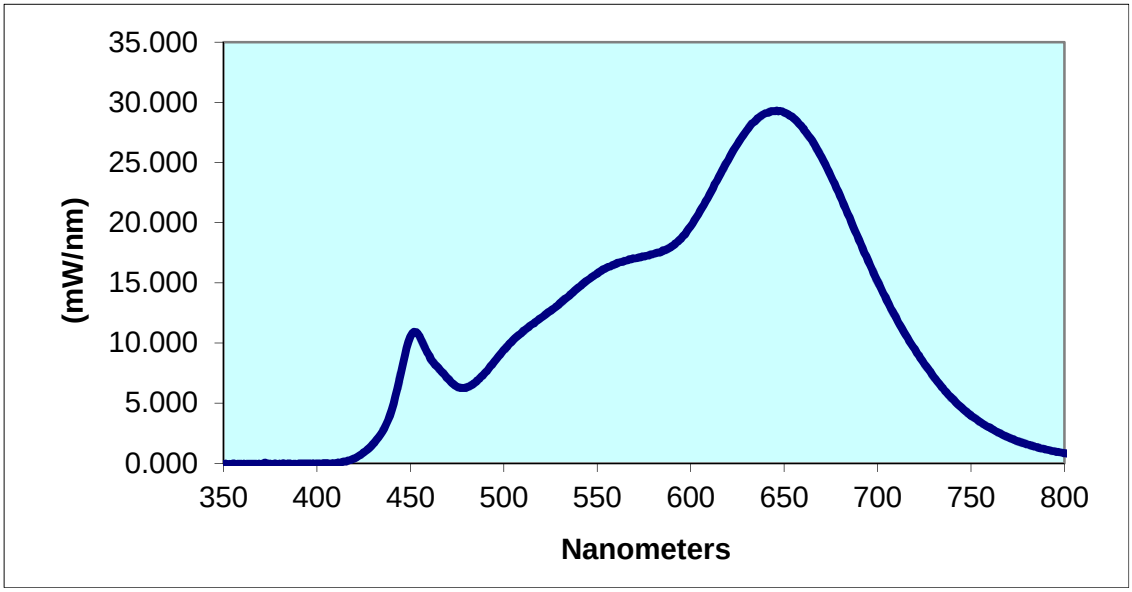
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1403210902-016	UP	120.0	396.9	46.80	0.995	6.72	1702	36.37

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')
2863	95.9	84.1	0.002	0.444	0.401	0.256	0.521

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	-0.050	440	4.432	530	13.300	620	25.200	710	12.040
355	-0.045	445	7.555	535	13.930	625	26.530	715	10.680
360	-0.056	450	10.530	540	14.630	630	27.680	720	9.459
365	-0.065	455	10.550	545	15.250	635	28.540	725	8.278
370	-0.069	460	8.949	550	15.780	640	29.110	730	7.196
375	-0.043	465	7.929	555	16.250	645	29.270	735	6.230
380	-0.042	470	7.037	560	16.580	650	29.160	740	5.363
385	-0.036	475	6.353	565	16.850	655	28.700	745	4.620
390	-0.034	480	6.307	570	17.030	660	27.870	750	3.963
395	-0.037	485	6.760	575	17.190	665	26.810	755	3.413
400	-0.020	490	7.516	580	17.390	670	25.450	760	2.966
405	-0.014	495	8.453	585	17.680	675	23.900	765	2.523
410	0.030	500	9.402	590	18.070	680	22.210	770	2.147
415	0.132	505	10.240	595	18.710	685	20.420	775	1.839
420	0.406	510	10.920	600	19.670	690	18.570	780	1.571
425	0.895	515	11.530	605	20.960	695	16.800		
430	1.594	520	12.110	610	22.350	700	15.130		
435	2.628	525	12.650	615	23.820	705	13.540		

Spectral Data Over Visible Wavelengths



RESULTS OF TEST (cont'd)

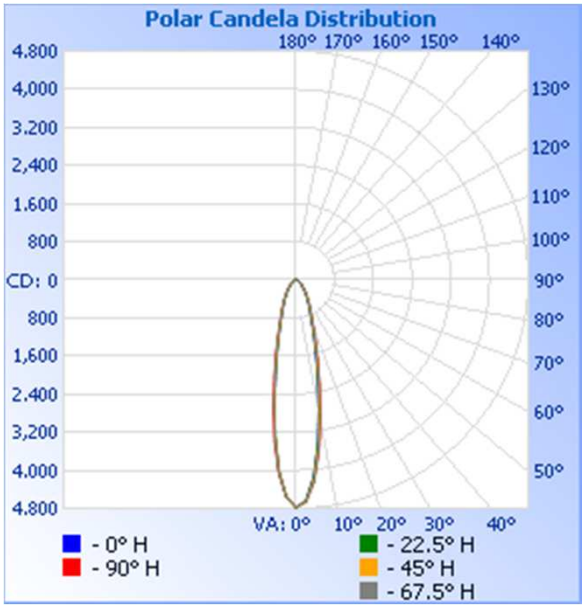
Photometric and Electrical Measurements at Ambient Temperature (25℃ +/- 1℃) – Distribution Method

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)
LAN1403210902-016	UP	120.0	396.9	46.80	0.982	1661	35.49

Intensity (Candlepower) Summary at 25℃ - Candelas

Maximum Candela Value: 4780

Angle	0	22.5	45	67.5	90
0	4777	4780	4778	4774	4771
5	4157	4172	4222	4261	4252
10	2708	2728	2807	2873	2918
15	1572	1594	1644	1709	1734
20	963	980	1012	1043	1054
25	655	667	694	709	706
30	466	481	506	506	490
35	349	357	370	365	357
40	252	255	260	263	261
45	178	180	175	185	185
50	134	133	128	135	133
55	105	103	100	101	102
60	82	80	77	78	76
65	17	56	54	54	17
70	10	29	28	28	13
75	22	31	24	27	19
80	15	21	16	17	14
85	5	14	10	11	5
90	0	0	0	0	1

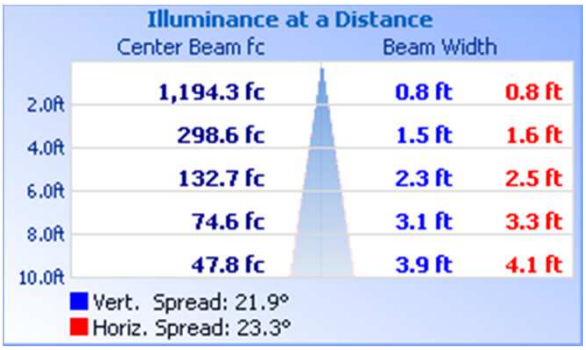


RESULTS OF TEST (cont'd)

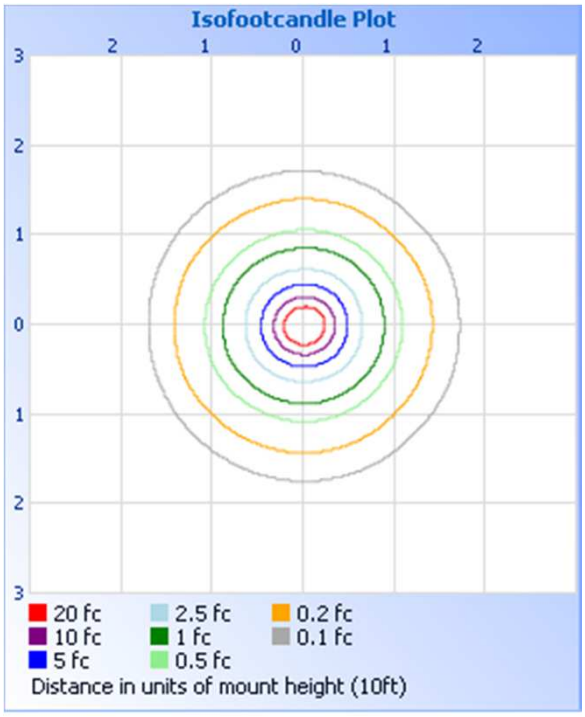
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



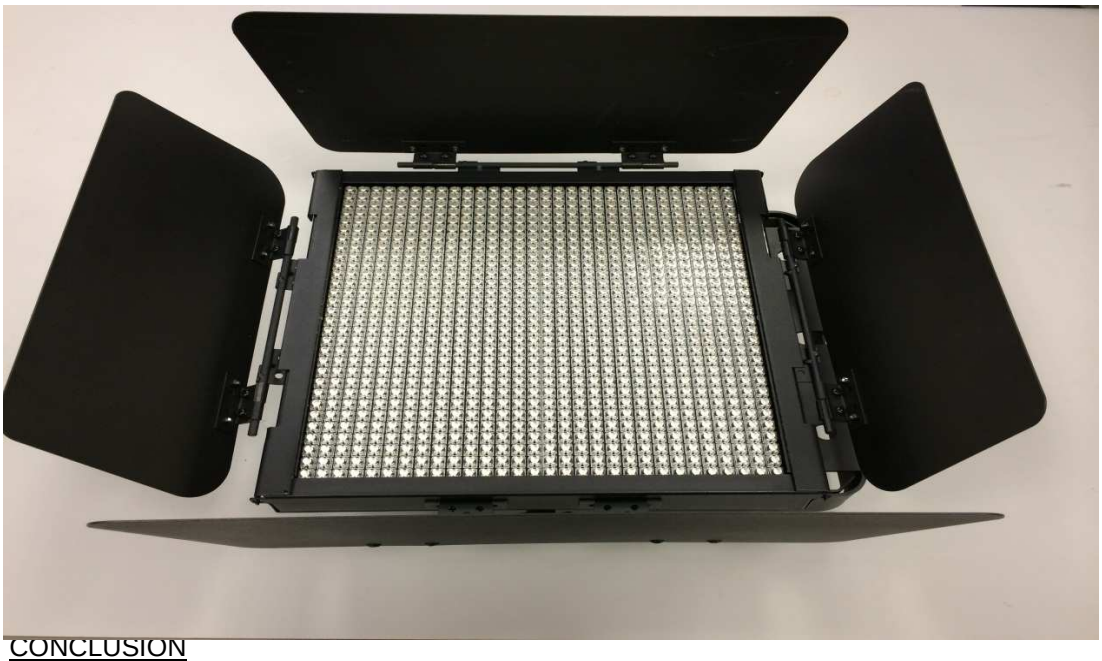
Zonal Lumen Summary and Percentages at 25℃

Zone	Lumens	% Luminaire
0-30	1117	67.3
0-40	1344	80.9
0-60	1580	95.1
60-90	81.7	4.9
0-90	1661	100.0
90-180	0.0	0.0
0-180	1661	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	345.5	20.8
10-20	454.4	27.4
20-30	317.4	19.1
30-40	226.7	13.6
40-50	143.1	8.6
50-60	92.6	5.6
60-70	47.0	2.8
70-80	24.8	1.5
80-90	10.0	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:

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Report Reviewed By:

Kenda Branch
Engineer
Lighting Division

Attachment: None