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-024

TEST OF ONE TVL 2000 II CW

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 CW. 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

SUMMARY

Description:	TVL 2000 II CW

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	2266	2223
Total Power (W)	46.82	46.72
Luminaire Efficacy (LPW)	48.4	47.58

Criteria	Result
Power Factor	0.983
Current ATHD %	11.13
Correlated Color Temperature (CCT - K)	7546
Color Rendering Index (CRI - Ra)	93.4
Color Rendering Index (CRI - R9)	87.0
DUV	0.004
Chromaticity Coordinate (x)	0.298
Chromaticity Coordinate (y)	0.316
Chromaticity Coordinate (u')	0.193
Chromaticity Coordinate (v')	0.459

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

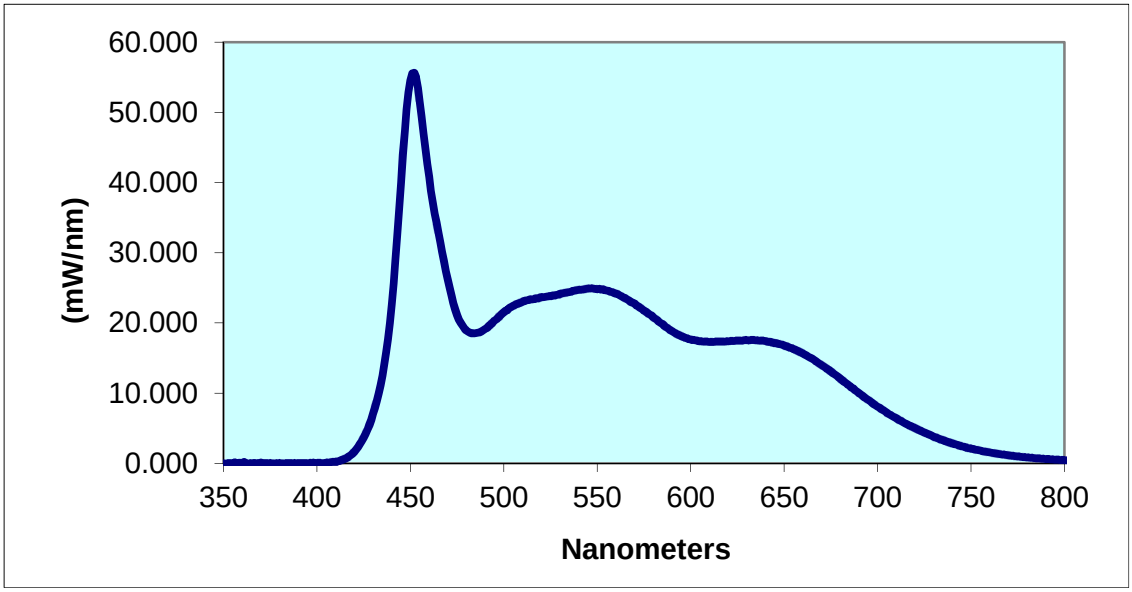
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1403210902-016	UP	120.0	397.0	46.82	0.983	11.13	2266	48.4

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')
7546	93.4	87.0	0.004	0.298	0.316	0.193	0.459

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	-0.065	440	22.660	530	24.140	620	17.380	710	6.405
355	-0.039	445	40.010	535	24.410	625	17.470	715	5.663
360	-0.057	450	54.610	540	24.710	630	17.530	720	4.994
365	-0.009	455	51.600	545	24.890	635	17.510	725	4.386
370	0.075	460	40.810	550	24.820	640	17.400	730	3.798
375	0.026	465	32.830	555	24.630	645	17.110	735	3.289
380	0.015	470	26.160	560	24.160	650	16.800	740	2.829
385	-0.012	475	21.100	565	23.520	655	16.280	745	2.418
390	-0.009	480	18.930	570	22.730	660	15.650	750	2.081
395	0.006	485	18.560	575	21.750	665	14.890	755	1.799
400	0.022	490	19.130	580	20.790	670	14.010	760	1.558
405	0.072	495	20.330	585	19.820	675	13.060	765	1.335
410	0.190	500	21.510	590	18.850	680	12.060	770	1.127
415	0.644	505	22.440	595	18.090	685	11.040	775	0.966
420	1.644	510	23.010	600	17.630	690	10.000	780	0.821
425	3.655	515	23.340	605	17.390	695	9.017		
430	6.999	520	23.650	610	17.290	700	8.078		
435	12.480	525	23.810	615	17.330	705	7.205		

Spectral Data Over Visible Wavelengths



RESULTS OF TEST (cont'd)

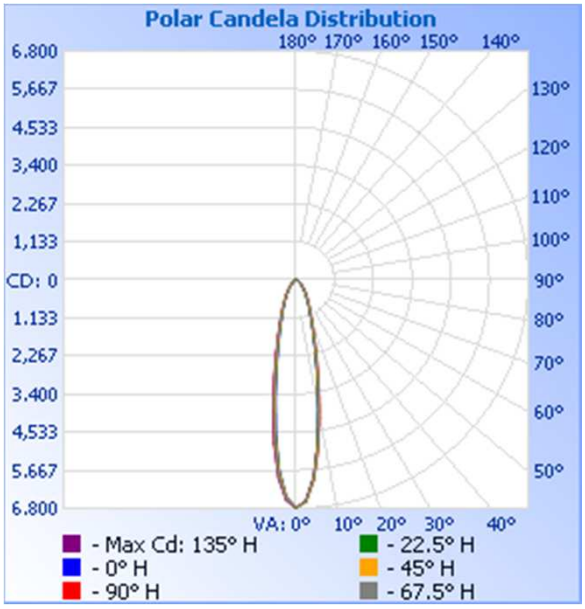
Photometric and Electrical Measurements at Ambient Temperature (25℃ +/- 1℃) – Distribution Method

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	396.3	46.72	0.982	2223	47.58

Intensity (Candlepower) Summary at 25℃ - Candelas

Maximum Candela Value: 6793

Angle	0	22.5	45	67.5	90
0	6770	6781	6767	6769	6769
5	5919	5915	5944	5971	5970
10	3725	3757	3870	3937	3983
15	2121	2162	2230	2298	2320
20	1312	1334	1367	1399	1413
25	873	893	943	966	955
30	613	642	671	683	684
35	439	467	476	499	493
40	319	314	326	351	355
45	229	226	235	246	256
50	163	178	177	182	184
55	115	128	130	131	137
60	85	87	106	111	90
65	21	75	72	59	22
70	4	44	41	33	23
75	16	45	33	42	22
80	20	31	23	22	22
85	3	25	11	1	6
90	0	2	0	2	5

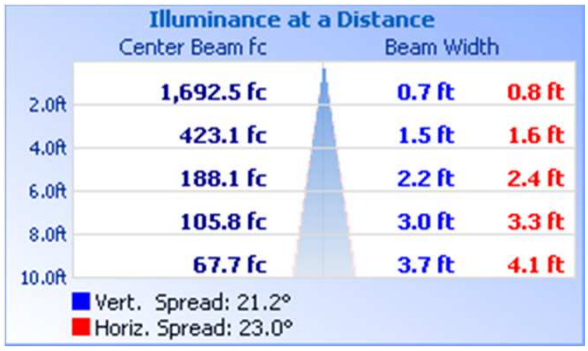


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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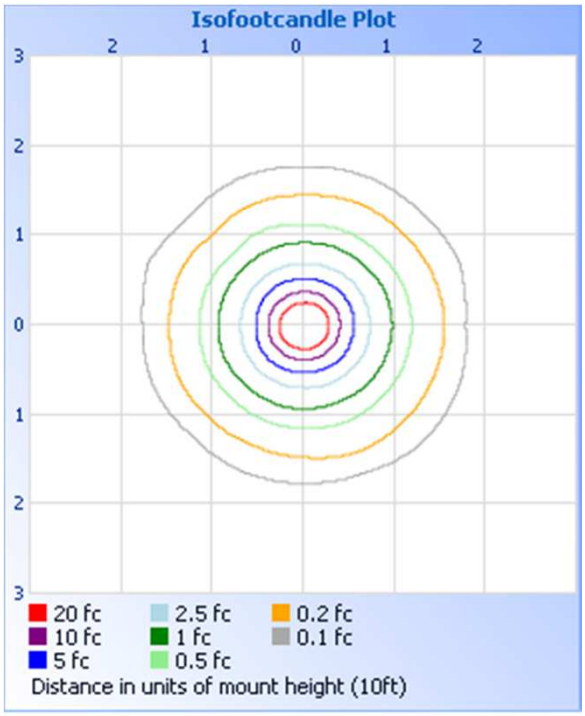


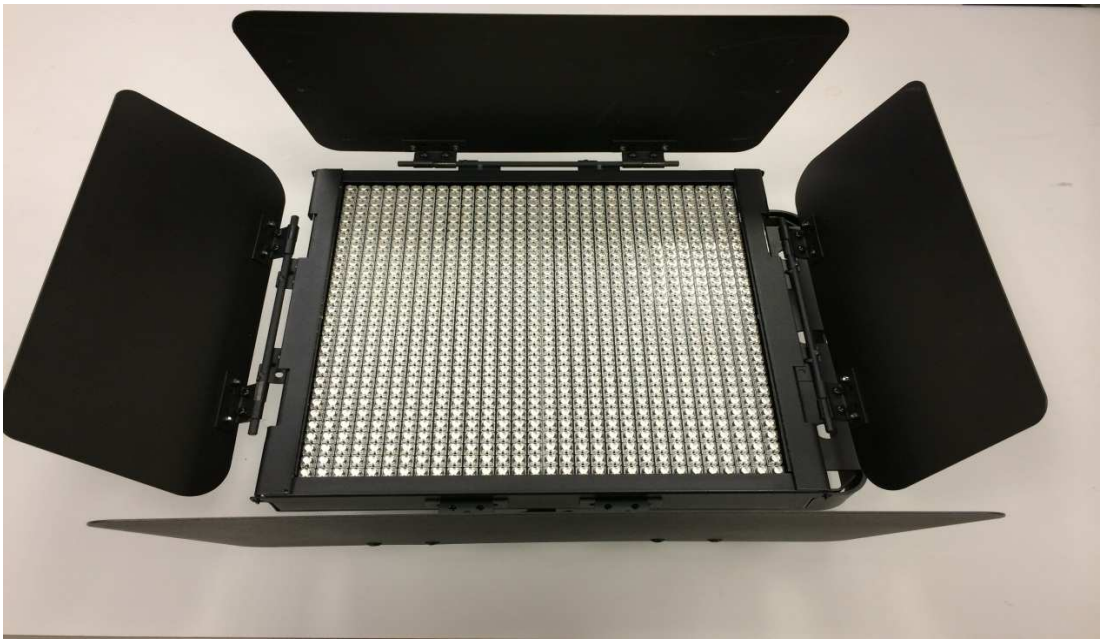
Zonal Lumen Summary and Percentages at 25℃

Zone	Lumens	% Luminaire
0-30	1537	69.1
0-40	1830	82.3
0-60	2122	95.5
60-90	100.4	4.5
0-90	2223	100.0
90-180	0.2	0.0
0-180	2223	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	487.1	21.9
10-20	623.1	28.0
20-30	426.6	19.2
30-40	292.6	13.2
40-50	180.5	8.1
50-60	112.3	5.0
60-70	55.0	2.5
70-80	31.3	1.4
80-90	14.2	0.6
90-100	0.2	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:

Jesse Reyna
Technician
Lighting Division

Report Reviewed By:

Kenda Branch
Engineer
Lighting Division

Attachment: None