intertek
Total Quality. Assured.

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

VERBATIM AMERICAS

TEST REPORT

SCOPE OF WORK
Electrical and Photometric tests as required to the IESNA test standard.

MODEL NUMBER
LED PANEL PN24-W36-C40-P

PROJECT NUMBER
G102710907

REPORT NUMBER
102710907CRT-039

ISSUE DATE
June 5, 2018

REVISION DATE
None

PAGES
10

DOCUMENT CONTROL NUMBER
TBD

© 2017 INTERTEK

3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

TEST OF (1) 2X4 PANEL

MODEL NO. LED PANEL PN24-W36-C40-P

RENDERED TO:

VERBATIM AMERICAS
8210 UNIVERSITY EXECUTIVE PARK DRIVE, SUITE 300
CHARLOTTE, NC 28262

STATEMENT OF LIMITATION

NVLAP Lab Code 100402-0. 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 Qu-00707669.

STANDARDS USED

IESNA LM-79 - 2008: Electrical and Photometric Measurements of Solid State Lighting
ANSI NEMA ANSLG C78.377: 2015: Specifications of the Chromaticity of Solid State Lighting Products

SAMPLE INFORMATION

CONTROL NO.	MODEL/SERIAL NO.	DESCRIPTION	TYPE	RECEIVED
CRT1805251459-001	LED PANEL PN24-W36-C40-P	2x4 Panel	Production	05/25/18

DATE OF TESTS

May 31, 2018 through June 5, 2018.

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

SUMMARY

MODEL NO:	LED PANEL PN24-W36-C40-P
DESCRIPTION:	2x4 Panel
PART NO:	99913

CRITERIA	RESULTS	
	INTEGRATING SPHERE	GONIOPHOTOMETER
Lumen Output (lumens)	4804.8	4681.0
Input Power (W) @ 100 (VAC)	36.53	36.47
Lumen Efficacy (lm/W)	131.5	128.4
Input Power Factor ( ) @ 100 (VAC)	0.993	0.994

CRITERIA	RESULTS
Input Current ATHD (%) @ 100 (VAC)	9.47
Correlated Color Temperature (K)	4252
Color Rendering Index - Ra ( )	80.8
Color Rendering - R9 ( )	-4.3
DUV ( )	0.0025
Chromaticity Coordinate (x)	0.371
Chromaticity Coordinate (y)	0.377
Chromaticity Coordinate (u')	0.219
Chromaticity Coordinate (v')	0.500
Input Power Factor ( ) @ 277 (VAC)	0.910
Input Current ATHD (%) @ 277 (VAC)	13.39

3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

EQUIPMENT LIST

EQUIPMENT USED	MODEL NO.	CONTROL NO.	LAST CAL DATE	CAL DUE DATE
LSI High Speed Mirror Goniometer	6440	---	05/10/18	06/10/18
Elgar AC Power Supply	CW1251	---	VBU	VBU
Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
Yokogawa Power Analyzer	WT210	E464	05/03/18	05/03/19
Omega Thermometer	DPi8-C24	M263	05/03/18	05/03/19
M-D Building Products Digital Level	Smart Tool	L112	04/21/18	04/21/19
NIST Luminous Intensity Standard Source	NBS10322	N1427	01/09/17	01/09/19
NIST Luminous Intensity Standard Source	NBS10332	N1435	01/09/17	01/09/19
NIST Luminous Intensity Standard Source	NBS10265	N1437	01/09/17	01/09/19
NIST Luminous Flux Standard Source	NBS10428	N1424	01/11/17	01/11/19
Elgar AC Power Supply	CW1251	---	VBU	VBU
Sorenson DC Power Supply	XFR 150-8	---	VBU	VBU
Yokogawa Power Analyzer	WT1600	E537	01/22/18	01/22/19
Fluke Thermometer	53 II	T1318	04/09/18	04/09/19
Fluke Multimeter	87V	D590	04/26/18	04/26/19
3M Integrating Sphere Spectrometer System	CDS 1100	---	05/02/18	06/02/18
Fisher Scientific Stopwatch	14-649-9	N1132	02/15/18	02/15/19
Secondary Spectral Intensity Standard Source	BS5186	RF5186	01/28/18	01/28/19
Secondary Luminous Flux Standard Source	BS3616	--	01/28/18	01/28/19
Secondary Luminous Flux Standard Source	BS4116	--	01/28/18	01/28/19
Secondary Luminous Flux Standard Source	6836	--	01/28/18	01/28/19

3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

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 Spectroradiometer and integrating sphere were used to measure light output, correlated color temperature, chromaticity coordinates, color rendering index, and the spectral distribution 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. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a 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 Type C Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for the SSL sample.

Ambient temperature was measured equal to the height of the sample mounted on the goniometer equipment. The SSL sample was operated on the client provided driver at rated input volts in its designated orientation. The SSL sample was allowed to stabilize for at least thirty minutes before measurements were made. Stabilization procedures to LM-79 were followed. Electrical measurements including voltage, current, and power were measured using a power analyzer.

3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

RESULTS OF TESTS

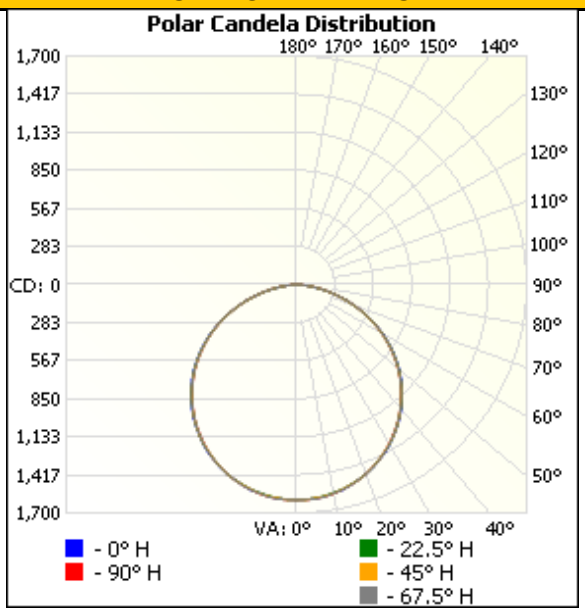
PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD (25°C +/- 1°C)

INTERTEK CONTROL NO.	BASE POSITION	INPUT VOLTAGE (VAC)	INPUT CURRENT (mA)	INPUT POWER (W)	INPUT POWER FACTOR ( )	LIGHT OUTPUT (lm)	LUMEN EFFICACY (lm/W)
CRT1805251459-001	Base Up	100.06	366.8	36.47	0.994	4681.0	128.4

INTENSITY SUMMARY - CANDELAS

Angle	0	22.5	45	67.5	90
0	1601	1601	1601	1601	1601
5	1597	1595	1594	1600	1598
10	1575	1572	1577	1577	1578
15	1544	1540	1542	1547	1544
20	1500	1499	1500	1499	1498
25	1441	1438	1440	1442	1438
30	1374	1373	1369	1370	1368
35	1292	1290	1288	1288	1285
40	1202	1198	1196	1195	1193
45	1100	1097	1094	1093	1091
50	991	986	983	982	980
55	869	866	861	860	859
60	738	734	732	731	730
65	600	596	594	595	594
70	455	453	453	455	454
75	314	312	313	317	316
80	179	180	183	188	187
85	71	72	75	79	79
90	0	0	0	0	0

POLAR CANDELA PLOT



3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

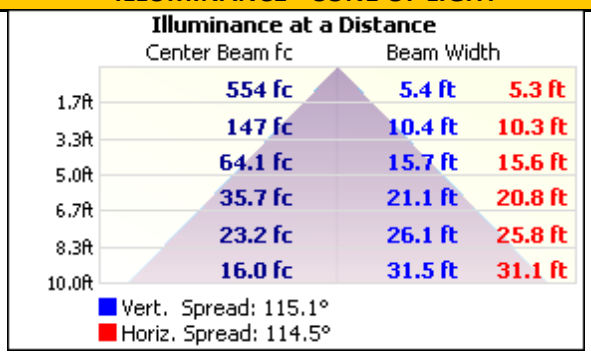
REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

RESULTS OF TESTS

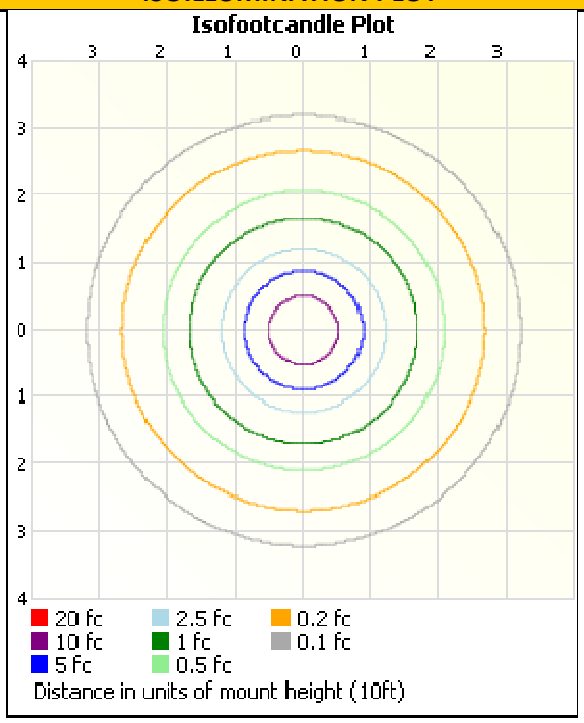
PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD (25°C +/- 1°C)

MOUNTING HEIGHT: 10ft

ILLUMINANCE - CONE OF LIGHT



ISOILLUMINATION PLOT



ZONAL LUMEN SUMMARY AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	1250.9	26.7
0-40	2057.0	43.9
0-60	3671.2	78.4
60-90	1009.8	21.6
0-90	4681.0	100.0
90-180	0.0	0.0
0-180	4681.0	100.0

ZONE	LUMENS	% LUMINAIRE
0-10	151.7	3.2
10-20	435.6	9.3
20-30	663.6	14.2
30-40	806.1	17.2
40-50	844.2	18.0
50-60	770.1	16.5
60-70	588.3	12.6
70-80	333.0	7.1
80-90	88.5	1.9

3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

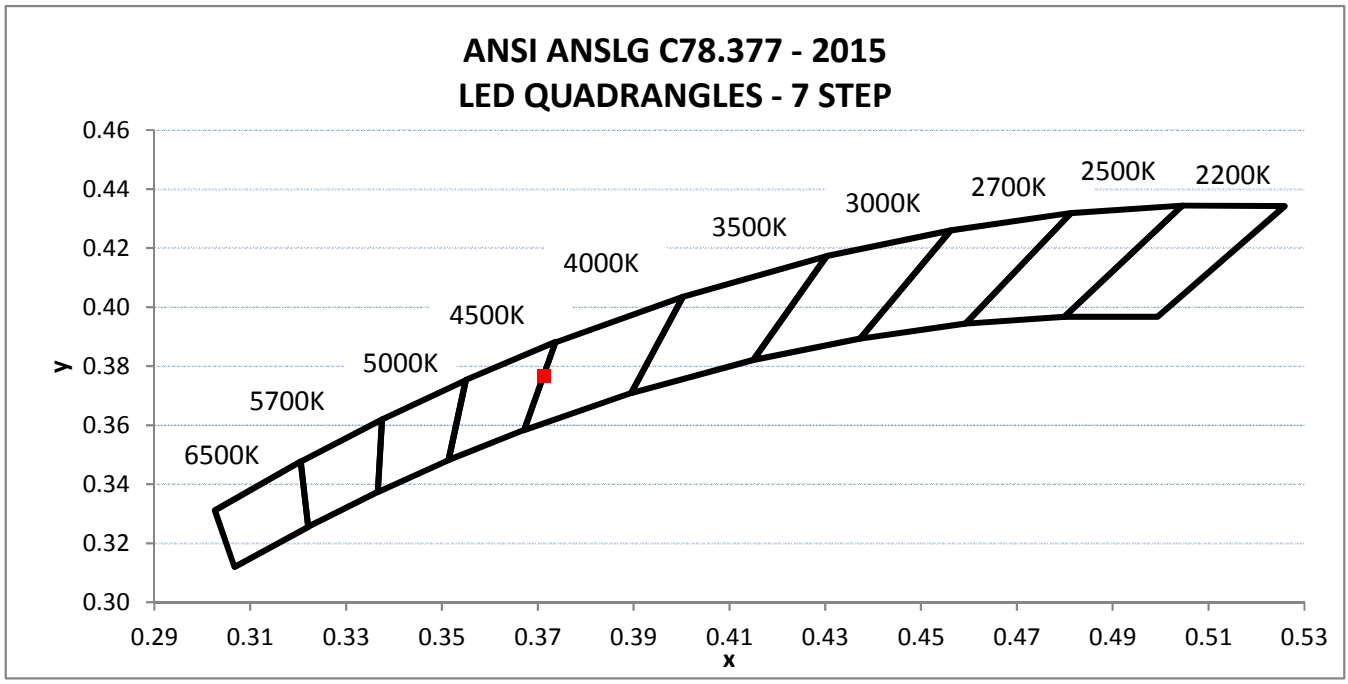
RESULTS OF TESTS

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - INTEGRATING SPHERE METHOD (25°C +/- 1°C)

INTERTEK CONTROL NO.	BASE POSITION	INPUT VOLTAGE (VAC)	INPUT CURRENT (mA)	INPUT POWER (W)	INPUT POWER FACTOR ( )	INPUT CURRENT ATHD (%)
CRT1805251459-001	Base Up	100.00	368.1	36.53	0.993	9.47
		277.03	142.9	36.01	0.910	13.39

LIGHT OUTPUT (lm)	LUMEN EFFICACY (lm/W)	CORRELATED COLOR TEMPERATURE - CCT (K)	CRI - Ra ( )	CRI - R9 ( )	DUV ( )
4804.8	131.5	4252	80.8	-4.3	0.0025

CIE 1931 CHROMATICITY COORDINATE (x)	CIE 1931 CHROMATICITY COORDINATE (y)	CIE 1976 CHROMATICITY COORDINATE (u')	CIE 1976 CHROMATICITY COORDINATE (v')
0.371	0.377	0.219	0.500



3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

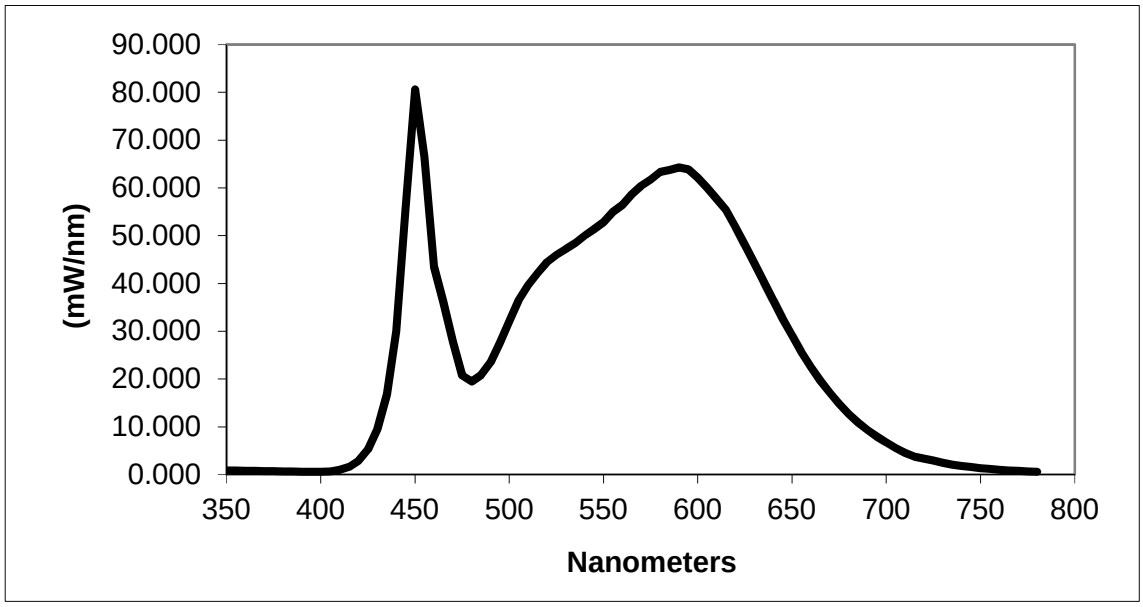
REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

RESULTS OF TESTS

PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - INTEGRATING SPHERE METHOD (25°C +/- 1°C)

SPECTRAL DISTRIBUTION OVER VISIBLE WAVELENGTHS*							
nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.837	460	43.535	570	60.448	680	12.697
355	0.834	465	36.172	575	61.773	685	10.897
360	0.824	470	27.847	580	63.361	690	9.386
365	0.815	475	20.769	585	63.767	695	7.949
370	0.755	480	19.464	590	64.256	700	6.724
375	0.696	485	20.834	595	63.881	705	5.573
380	0.660	490	23.489	600	62.130	710	4.528
385	0.660	495	27.587	605	59.999	715	3.734
390	0.605	500	31.986	610	57.725	720	3.306
395	0.605	505	36.564	615	55.325	725	2.906
400	0.569	510	39.630	620	51.842	730	2.456
405	0.674	515	42.197	625	48.027	735	2.087
410	0.971	520	44.460	630	44.293	740	1.787
415	1.599	525	45.995	635	40.285	745	1.565
420	2.875	530	47.200	640	36.461	750	1.361
425	5.256	535	48.512	645	32.675	755	1.172
430	9.476	540	50.035	650	29.142	760	1.027
435	16.819	545	51.355	655	25.626	765	0.878
440	30.010	550	52.868	660	22.484	770	0.769
445	55.577	555	55.007	665	19.668	775	0.663
450	80.619	560	56.449	670	17.117	780	0.582
455	66.474	565	58.652	675	14.780		

*Without correction of sample absorption.



End Of Test Results

3933 US RT 11
Cortland, NY 13045
Telephone: (607) 753-6711
www.intertek.com

TEST REPORT

REPORT NO.: 102710907CRT-039
REPORT DATE: June 5, 2018

PICTURES

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:

Melanie Brittain
Associate Engineer
Lighting Division

Report Reviewed By:

Jeff Davis
Engineering Supervisor
Lighting Division

Attachments: IES File

REVISION HISTORY

JOB NUMBER	DATE OF REVISION	PROJECT HANDLER	REVIEWED BY	REVISION NOTE
None				