



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

REPORT

3933 US ROUTE 11, CORTLAND, NEW YORK 13045

Project No. G101936679

Date: January 29, 2015

REPORT NO. 101936679CRT-040

TEST OF ONE PAR38 LED 3000K 120-277V

LAMP MODEL NO.: P38-L1200-C30-B25-V277-90-W
PART NO.: 98862

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 500565507.

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 P38-L1200-C30-B25-V277-90-W. The sample was received by Intertek on January 21, 2015, in undamaged condition and one sample was tested as received. The sample designation was CRT1501211028-001-2.

DATES OF TESTS: January 22, 2015 through January 29, 2015.

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SUMMARY

Lamp Model No.:	P38-L1200-C30-B25-V277-90-W
Part No.:	98862
Description:	PAR38 LED 3000K 120-277V

Criteria	Result	
	Sphere	Goniometer
Total Lumen Output (Lumens)	1252	1226
Total Power (W)	16.36	16.38
Luminaire Efficacy (LPW)	76.53	74.85

Criteria	Result
Power Factor	0.978
Current ATHD %	17.20
Correlated Color Temperature (CCT - K)	2983
Color Rendering Index (CRI - Ra)	91.2
Color Rendering Index (CRI - R9)	51.4
DUV	0.002
Chromaticity Coordinate (x)	0.435
Chromaticity Coordinate (y)	0.398
Chromaticity Coordinate (u')	0.252
Chromaticity Coordinate (v')	0.519

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
LSI High Speed Mirror Goniometer	6440	---	01/19/15	02/19/15	01/22/15
Elgar Power Supply	CW1251	---	VBU	VBU	01/22/15
Yokogawa Power Analyzer	WT210	E464	04/17/14	04/17/15	01/22/15
ExTech Hygro Thermometer	445703	T1357	12/10/14	12/10/15	01/22/15
Fisher Scientific Stopwatch	14-649-9	N1405	08/25/14	08/25/15	01/22/15
M-D Building Products Digital Level	Smart Tool	L112	03/14/14	03/15/15	01/22/15
2M Integrating Sphere	--	N308	VBU	VBU	01/29/15
Labsphere CCD Array	CDS 600	W/N308	01/05/15	02/05/15	01/29/15
Yokogawa Power Analyzer	WT1600	E536	10/14/14	10/14/15	01/29/15
Fluke Temperature Meter	53	D587	04/20/14	04/20/15	01/29/15
Extech Hygro-thermometer	445703	T1366	12/10/14	12/10/15	01/29/15
Elgar AC power supply	CW1251	--	VBU	VBU	01/29/15
Intensity Standard	--	BS5186	01/05/15	02/05/15	01/29/15
NIST Spectral Flux Standard Source	RF1024	--	09/18/10	100 hrs of use	01/29/15



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

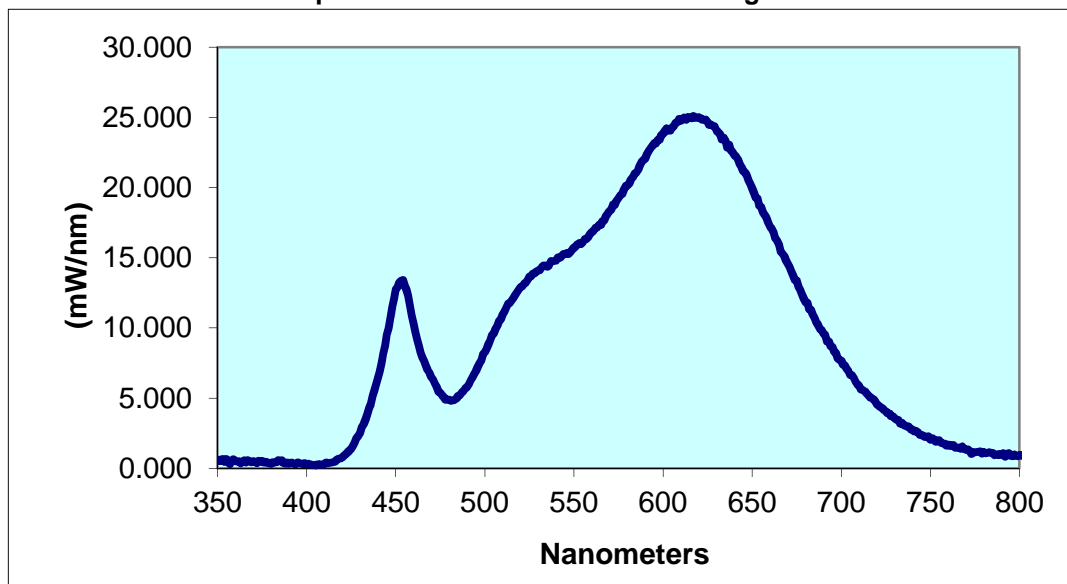
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
CRT1501211028-001-2	UP	120.0	139.3	16.36	0.978	17.20	1252	76.53

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')
2983	91.2	51.4	0.002	0.435	0.398	0.252	0.519

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.517	440	6.477	530	14.09	620	25.01	710	5.888
355	0.660	445	9.501	535	14.37	625	24.66	715	5.252
360	0.495	450	12.72	540	14.79	630	24.05	720	4.563
365	0.572	455	13.03	545	15.25	635	23.34	725	4.061
370	0.492	460	10.31	550	15.70	640	22.33	730	3.545
375	0.516	465	7.863	555	16.11	645	21.18	735	3.099
380	0.309	470	6.462	560	16.83	650	19.95	740	2.764
385	0.495	475	5.389	565	17.32	655	18.63	745	2.365
390	0.312	480	4.883	570	18.34	660	17.21	750	2.055
395	0.414	485	5.157	575	19.23	665	15.94	755	1.971
400	0.286	490	5.781	580	20.17	670	14.59	760	1.678
405	0.195	495	6.935	585	21.08	675	13.39	765	1.449
410	0.281	500	8.277	590	22.08	680	11.84	770	1.313
415	0.428	505	9.614	595	23.18	685	10.71	775	1.138
420	0.766	510	10.94	600	23.86	690	9.605	780	1.166
425	1.391	515	11.94	605	24.27	695	8.629		
430	2.524	520	12.90	610	24.76	700	7.663		
435	4.285	525	13.66	615	25.01	705	6.659		

Spectral Data Over Visible Wavelengths



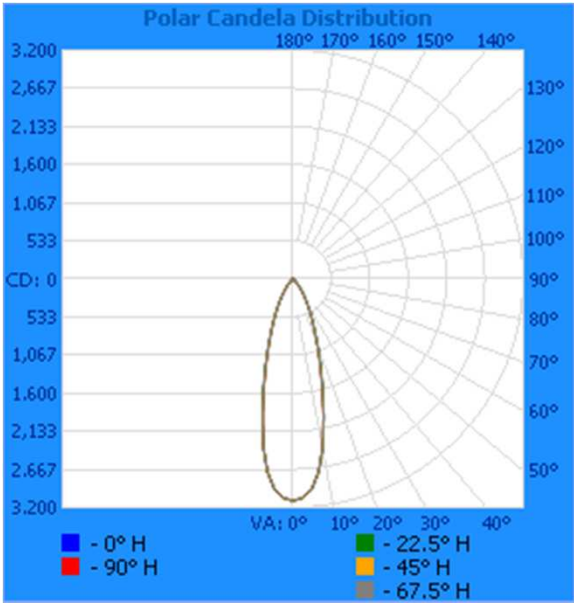
RESULTS OF TEST (cont'd)

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)
CRT1501211028-001-2	UP	120.0	139.5	16.38	0.978	1226	74.85

Intensity (Candlepower) Summary at 25°C - Candelas

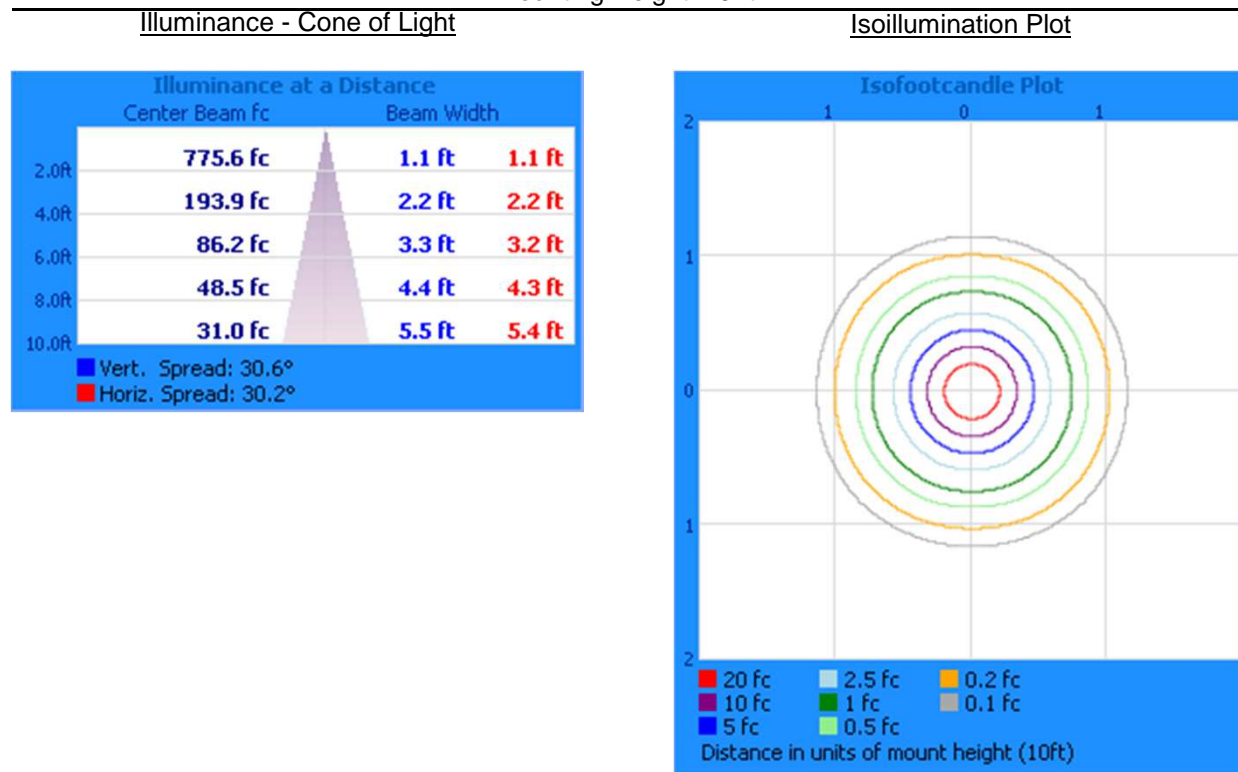
Angle	0	22.5	45	67.5	90
0	3102	3102	3102	3102	3102
5	2956	2950	2946	2950	2956
10	2385	2386	2388	2381	2381
15	1588	1594	1571	1572	1561
20	1002	1013	991	996	986
25	629	640	626	632	629
30	393	404	388	394	383
35	229	237	230	230	217
40	125	131	130	126	121
45	61	66	67	63	60
50	31	31	33	31	30
55	19	19	20	19	19
60	13	13	14	14	13
65	9	9	9	9	9
70	5	6	6	5	6
75	2	2	2	2	2
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0



RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	994.9	81.2
0-40	1143	93.3
0-60	1214	99.1
60-90	11.5	0.9
0-90	1226	100.0
90-180	0.0	0.0
0-180	1226	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	262.4	21.4
10-20	437.7	35.7
20-30	294.7	24.0
30-40	148.2	12.1
40-50	52.9	4.3
50-60	18.1	1.5
60-70	9.2	0.8
70-80	2.3	0.2
80-90	0.0	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:



Vladimir Kozak
Associate Engineer
Lighting Division

Attachment: None

Report Reviewed By:



Peter Leshkiv
Engineering Supervisor
Lighting Division