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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 PAR56 P56-W40-B25-C30

PROJECT NUMBER
G102710907

REPORT NUMBER
102710907CRT-032

ISSUE DATE
February 6, 2018

REVISION DATE
None

PAGES
10

DOCUMENT CONTROL NUMBER
TBD

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TEST REPORT

REPORT NO.: 102710907CRT-032
REPORT DATE: February 6, 2018

TEST OF (1) LED PAR56

MODEL NO. LED PAR56 P56-W40-B25-C30

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
CRT1802011442-001	LED PAR56 P56-W40-B25-C30	LED PAR56	Production	02/01/18

DATE OF TESTS

February 5, 2018 through February 6, 2018.

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TEST REPORT

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REPORT DATE: February 6, 2018

SUMMARY

MODEL NO:	LED PAR56 P56-W40-B25-C30
DESCRIPTION:	LED PAR56
PART NO:	70196

CRITERIA	RESULTS	
	INTEGRATING SPHERE	GONIOPHOTOMETER
Lumen Output (lumens)	3567	3631
Input Power (W) @ 120 (VAC)	40.92	40.98
Lumen Efficacy (lm/W)	87.17	88.60
Input Power Factor ( ) @ 120 (VAC)	0.992	0.992

CRITERIA	RESULTS
Input Current ATHD (%) @ 120 (VAC)	10.98
Correlated Color Temperature (K)	3046
Color Rendering Index - Ra ( )	91.9
Color Rendering - R9 ( )	73.1
DUV ( )	0.0001
Chromaticity Coordinate (x)	0.434
Chromaticity Coordinate (y)	0.403
Chromaticity Coordinate (u')	0.249
Chromaticity Coordinate (v')	0.521

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EQUIPMENT LIST

EQUIPMENT USED	MODEL NO.	CONTROL NO.	LAST CAL DATE	CAL DUE DATE
LSI High Speed Mirror Goniometer	6440	---	01/08/18	02/08/18
Elgar AC Power Supply	CW1251	---	VBU	VBU
Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
Yokogawa Power Analyzer	WT210	E464	05/02/17	05/02/18
Omega Thermometer	DPi8-C24	M263	05/02/17	05/02/18
M-D Building Products Digital Level	Smart Tool	L112	04/04/17	04/04/18
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
2M Integrating Sphere Spectrometer System	CDS 600	W/N308	01/11/18	02/11/18
Yokogawa Power Analyzer	WT1600	E440	09/18/17	09/18/18
Extech Hygro-Thermometer	445715	T1425	03/07/17	03/07/18
Sorensen DC Power Supply	XFR 35-35	---	VBU	VBU
Xantrex DC Power Supply	XTR 150-5.6	---	VBU	VBU
Elgar AC Power Supply	CW1251	---	VBU	VBU
Secondary Spectral Intensity Standard Source	BS5186	RF5186	01/28/17	01/28/18
Secondary Luminous Flux Standard Source	BS3616	---	01/28/17	01/28/18
Secondary Luminous Flux Standard Source	BS4116	---	01/28/17	01/28/18
Secondary Luminous Flux Standard Source	BS3612	---	01/28/17	01/28/18

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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.

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RESULTS OF TESTS

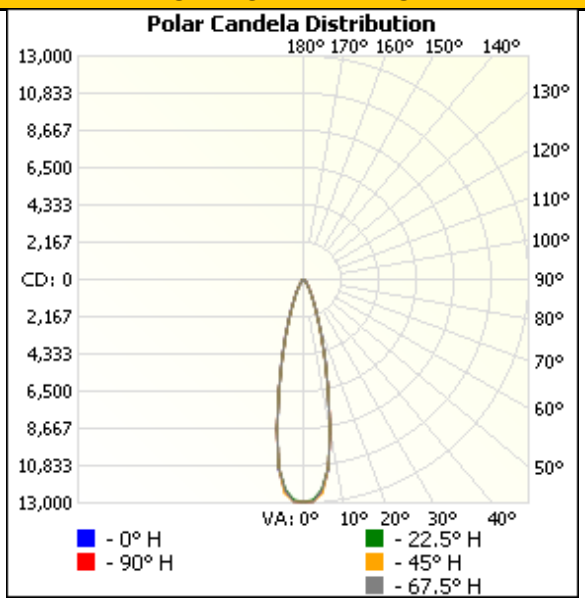
PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD (25°C +/- 1°C)

INTERTEK CONTROL NO.	BASE POSITION	INPUT VOLTAGE (VAC)	INPUT CURRENT (mA)	INPUT POWER (W)	INPUT POWER FACTOR ( )	LIGHT OUTPUT (lm)	LUMEN EFFICACY (lm/W)
CRT1802011442-001	Base Up	120.1	343.9	40.98	0.992	3631	88.60

INTENSITY SUMMARY - CANDELAS

Angle	0	22.5	45	67.5	90
0	12938	12938	12938	12938	12938
5	12338	12202	12492	12254	12294
10	8763	8785	8807	8811	8847
15	4821	4801	4778	4779	4807
20	2495	2453	2423	2460	2469
25	1324	1290	1295	1309	1326
30	759	733	747	770	778
35	432	420	439	447	458
40	267	263	268	274	281
45	201	198	201	203	206
50	154	152	153	154	153
55	111	109	110	109	108
60	71	70	71	70	70
65	43	43	43	42	41
70	25	25	25	24	24
75	11	10	10	10	10
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0

POLAR CANDELA PLOT



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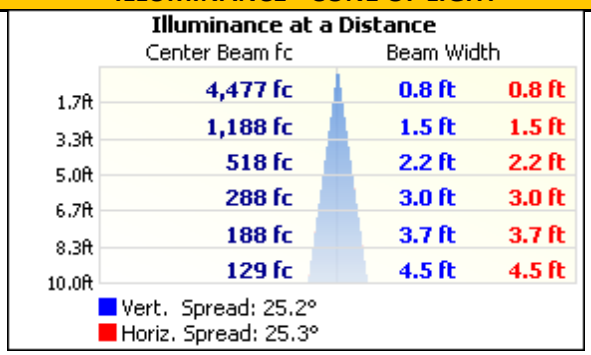
RESULTS OF TESTS

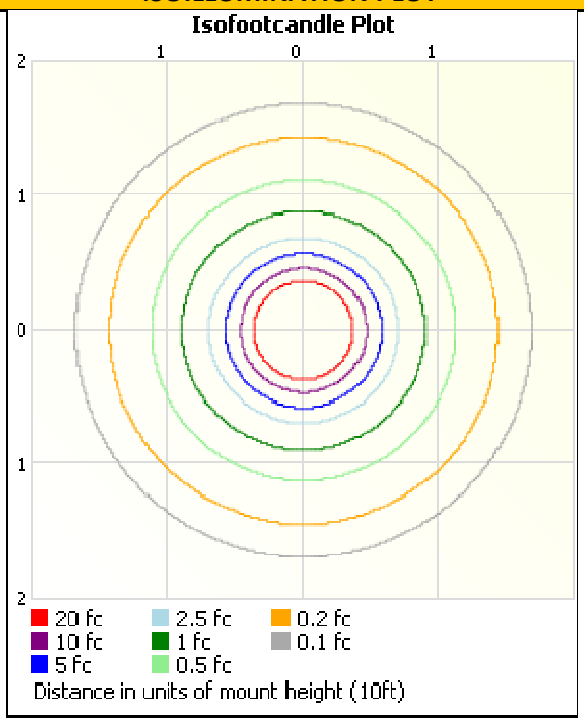
PHOTOMETRIC AND ELECTRICAL MEASUREMENTS - DISTRIBUTION METHOD (25°C +/- 1°C)

MOUNTING HEIGHT: 10ft

ILLUMINANCE - CONE OF LIGHT



ISOILLUMINATION PLOT



ZONAL LUMEN SUMMARY AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	3035.2	83.6
0-40	3321.0	91.5
0-60	3576.2	98.5
60-90	55.2	1.5
0-90	3631.4	100.0
90-180	0.0	0.0
0-180	3631.4	100.0

ZONE	LUMENS	% LUMINAIRE
0-10	1058.1	29.1
10-20	1345.9	37.1
20-30	631.2	17.4
30-40	285.8	7.9
40-50	157.1	4.3
50-60	98.1	2.7
60-70	43.8	1.2
70-80	11.4	0.3
80-90	0.0	0.0

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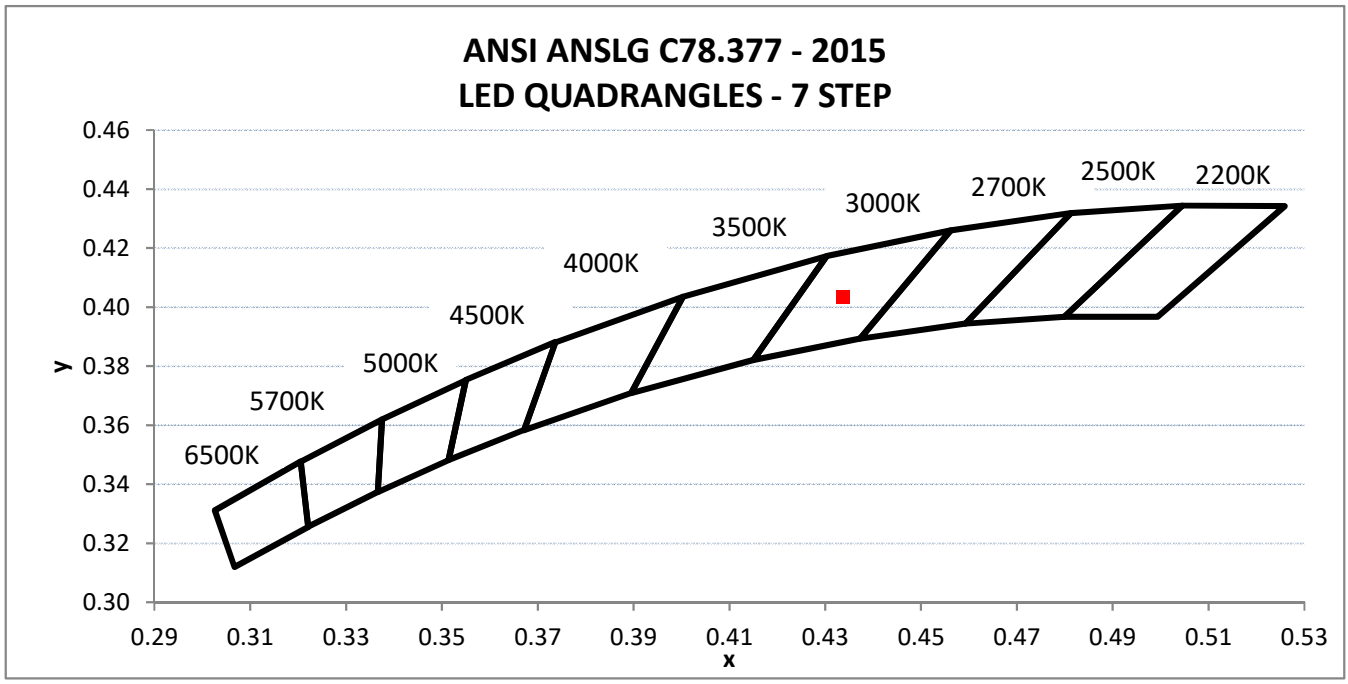
RESULTS OF TESTS

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 (%)
CRT1802011442-001	Base Up	120.0	343.7	40.92	0.992	10.98

LIGHT OUTPUT (lm)	LUMEN EFFICACY (lm/W)	CORRELATED COLOR TEMPERATURE - CCT (K)	CRI - Ra ( )	CRI - R9 ( )	DUV ( )
3567	87.17	3046	91.9	73.1	0.0001

CIE 1931 CHROMATICITY COORDINATE (x)	CIE 1931 CHROMATICITY COORDINATE (y)	CIE 1976 CHROMATICITY COORDINATE (u')	CIE 1976 CHROMATICITY COORDINATE (v')
0.434	0.403	0.249	0.521



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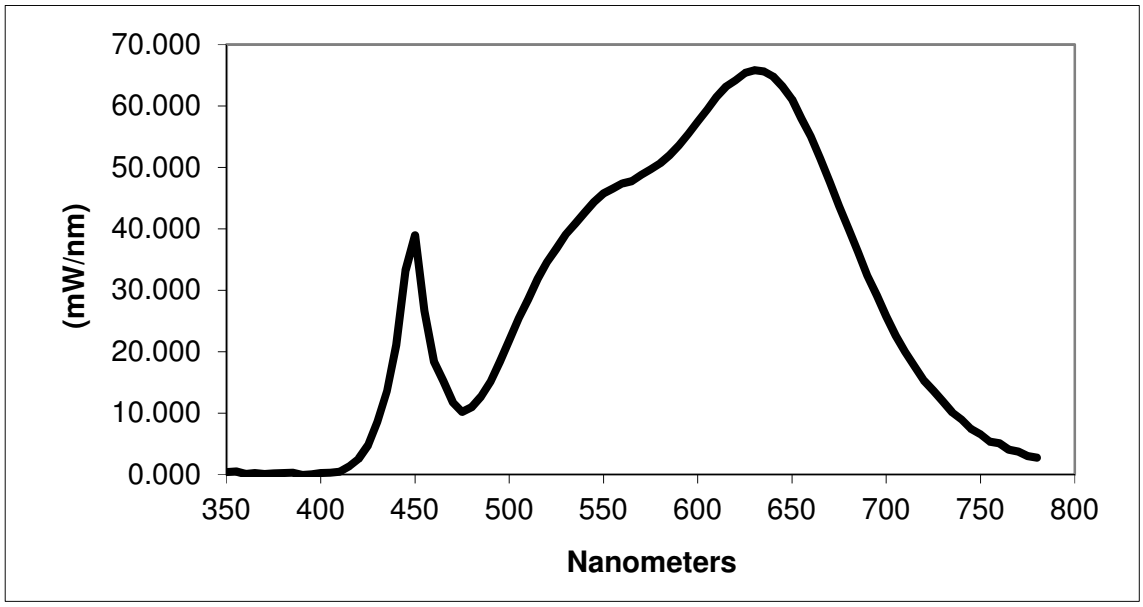
RESULTS OF TESTS

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	0.385	460	18.400	570	48.795	680	39.953
355	0.504	465	15.241	575	49.671	685	36.229
360	0.086	470	11.778	580	50.695	690	32.398
365	0.263	475	10.189	585	51.965	695	29.161
370	0.077	480	10.988	590	53.582	700	25.782
375	0.223	485	12.701	595	55.479	705	22.622
380	0.231	490	15.170	600	57.453	710	19.979
385	0.282	495	18.397	605	59.451	715	17.576
390	-0.042	500	21.817	610	61.477	720	15.325
395	0.069	505	25.462	615	63.191	725	13.633
400	0.247	510	28.482	620	64.166	730	11.947
405	0.295	515	31.889	625	65.381	735	10.110
410	0.452	520	34.590	630	65.817	740	8.969
415	1.351	525	36.810	635	65.617	745	7.456
420	2.567	530	39.097	640	64.821	750	6.551
425	4.787	535	40.891	645	63.206	755	5.376
430	8.603	540	42.661	650	61.078	760	5.101
435	13.564	545	44.371	655	57.973	765	4.065
440	21.104	550	45.770	660	55.064	770	3.727
445	33.226	555	46.540	665	51.478	775	3.037
450	38.940	560	47.389	670	47.593	780	2.743
455	26.667	565	47.758	675	43.684		

*Without correction of sample absorption.



End Of Test Results

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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

Melanie Brittain
Associate Engineer
Lighting Division

Report Reviewed By:

Jacki Swiernik

Jacki Swiernik
Staff Engineer
Lighting Division

Attachments: IES File

REVISION HISTORY

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