



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

REPORT

3933 US ROUTE 11, CORTLAND, NEW YORK 13045

Project No. G102585025

Date: May 27, 2016

REPORT NO. 102585024CRT-002

TEST OF ONE LED TRACK LUMINAIRE

MODEL NO. LP1-ZE411-903004
LED MODEL NO. LUMILEDS Z ES
DRIVER MODEL NO. MAGTECH M18-U13-C1200

RENDERED TO:

LIGHTING SERVICES INC.
2 HOLT DR
STONY POINT, NY 10980-1920

TESTS: 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 Qu-00694949.

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

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number LP1-ZE411-903004. The sample was received by Intertek on May 11, 2016 in undamaged condition and one sample was tested as received. The sample designation was CRT1605111157-001B.

DATE OF TESTS: May 25, 2016 through May 26, 2016.

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SUMMARY:

MODEL NO. LP1-ZE411-903004
DESCRIPTION: LED TRACK LUMINAIRE

Criteria	Integrating Sphere	Goniophotometer
Light Output (Lumens)	511.4	523.6
Total Power (W)	18.08	18.06
Lumen Efficacy (Lm/W)	28.3	29.0
Power Factor ()	0.992	0.994

Criteria	Results
Current ATHD (%)	7.21
Correlated Color Temp. (CCT-K)	3094
Color Rendering Index (CRI - Ra)	93.0
CRI - R9	70.3
DUV ()	0.001
Chromaticity Coordinate (x)	0.432
Chromaticity Coordinate (y)	0.405
Chromaticity Coordinate (u')	0.247
Chromaticity Coordinate (v')	0.521

EQUIPMENT LIST

Equipment Used	Model No.	Control No.	Last Cal.	Cal. Due
LSI High Speed Mirror Goniometer	6440	---	5/4/2016	6/4/2016
Elgar AC Power Supply	CW1251	---	VBU	VBU
Sorenson DC Power Supply	XG 150-10	---	VBU	VBU
Yokogawa Power Analyzer	WT210	E464	5/2/2016	5/2/2017
Omega Thermometer	DPI8-C24	M263	5/2/2016	5/2/2017
M-D Building Products Digital Level	Smart Tool	L112	4/8/2016	4/8/2017
NIST Luminous Intensity Standard Source	NBS10322	N1427	12/12/2014	12/12/2016
NIST Luminous Intensity Standard Source	NBS10215	N1432	12/12/2014	12/12/2016
NIST Luminous Intensity Standard Source	960629-3	N1428	12/12/2014	12/12/2016
NIST Luminous Flux Standard Source	NBS10428	N1424	12/17/2014	12/17/2016
Elgar AC Power Supply	CW1251	---	VBU	VBU
Sorenson DC Power Supply	XFR 150-8	---	VBU	VBU
Yokogawa Power Analyzer	WT1600	ZE475	6/9/2015	6/9/2016
Fluke Thermometer	53 II	N1324	4/7/2016	4/7/2017
Fisher Scientific Stopwatch	14-649-9	N1316	1/15/2016	1/15/2017
3M Integrating Sphere Spectrometer System	CDS 1100	---	4/28/2016	5/28/2016
Pearson Current Monitor	411	A203	6/26/2015	6/15/2016
Secondary Spectral Intensity Standard Source	BS5186	RF5186	1/27/2016	1/27/2017
Secondary Luminous Flux Standard Source	BS3616	--	1/27/2016	1/27/2017
Secondary Luminous Flux Standard Source	BS4116	--	1/27/2016	1/27/2017
Secondary Luminous Flux Standard Source	6836	--	1/27/2016	1/27/2017
Exttech Hygro Thermometer	445715	T1550	1/8/2016	1/8/2017



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. 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 LSI Type C High Speed Model 6440 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.



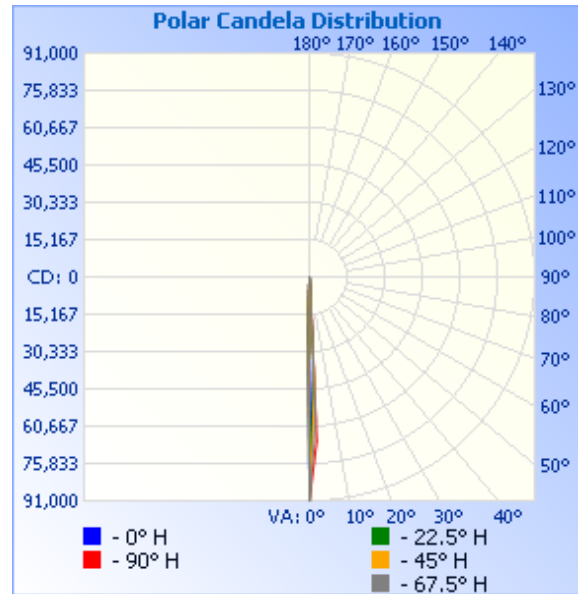
RESULTS:

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

Intertek Control No.	Base Orientation	Input Voltage (VAC)	Input Current (mA)	Input Power (W)	Input Power Factor ()	Light Output (Lumens)	Lumen Efficacy (lm/W)
CRT1605111157-001B	Base Up	120.04	151.4	18.06	0.994	523.6	29.0

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	90847	90847	90847	90847	90847
5	657	857	1462	2201	3015
10	55	49	54	61	62
15	23	24	22	21	27
20	17	14	15	18	19
25	3	2	1	1	0
30	0	0	0	0	0
35	0	0	0	0	0
40	0	0	0	0	0
45	0	0	0	0	0
50	0	0	0	0	0
55	0	0	0	0	0
60	0	0	0	0	0
65	0	0	0	0	0
70	0	0	0	0	0
75	0	0	0	0	0
80	0	0	0	0	0
85	0	0	0	0	0
90	0	0	0	0	0





RESULTS:

Illumination Plots

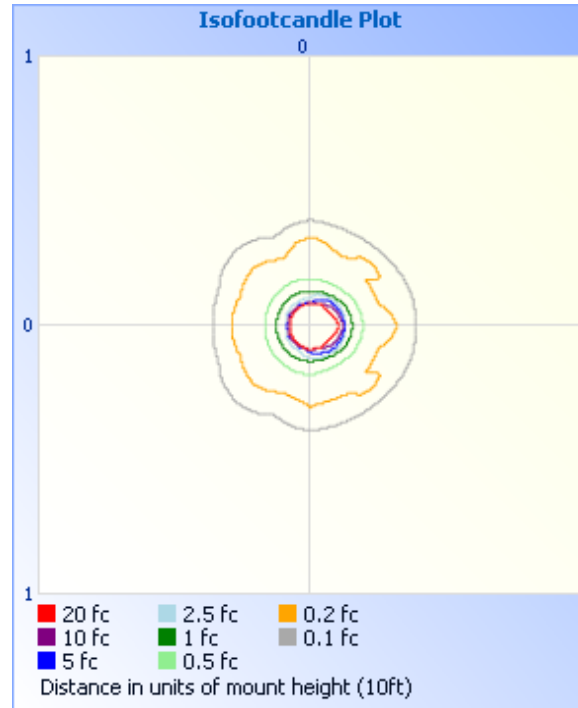
Mounting Height: 10ft

Illuminance - Cone of Light

Illuminance at a Distance			
	Center Beam fc	Beam Width	
1.7ft	31,435 fc	0.1 ft	0.1 ft
3.3ft	8,342 fc	0.2 ft	0.3 ft
5.0ft	3,634 fc	0.3 ft	0.4 ft
6.7ft	2,024 fc	0.4 ft	0.5 ft
8.3ft	1,319 fc	0.5 ft	0.7 ft
10.0ft	908 fc	0.6 ft	0.8 ft

■ Vert. Spread: 3.4°
■ Horiz. Spread: 4.7°

Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	523.6	100.0
0-40	523.6	100.0
0-60	523.6	100.0
60-90	0.0	0.0
0-90	523.6	100.0
90-180	0.0	0.0
0-180	523.6	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	514.4	98.2
10-20	7.4	1.4
20-30	1.8	0.3
30-40	0.0	0.0
40-50	0.0	0.0
50-60	0.0	0.0
60-70	0.0	0.0
70-80	0.0	0.0
80-90	0.0	0.0



RESULTS:

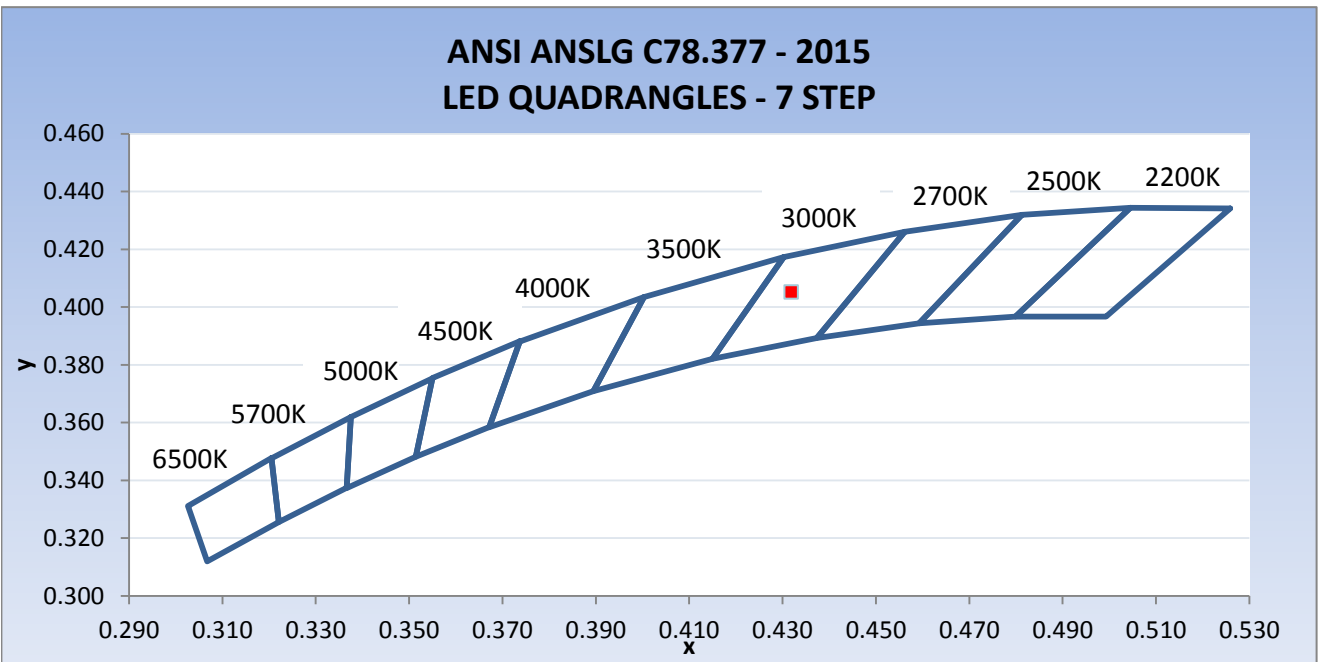
Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Sphere Method

Intertek Control No.	Base Orientation	Input Voltage (VAC)	Input Current (mA)	Input Power (W)	Input Power Factor ()	Current ATHD (%)
CRT1605111157-001B	Base Up	120.00	151.8	18.08	0.992	7.21

Light Output (Lumens)	Lumen Efficacy (lm/W)	Correlated Color Temperature - CCT (K)	CRI -Ra	CRI -R9	DUV ()
511.4	28.3	3094	93.0	70.3	0.001

CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
0.432	0.405	0.247	0.521

ANSI C78.377 SSL Chromaticity (2015 Version)



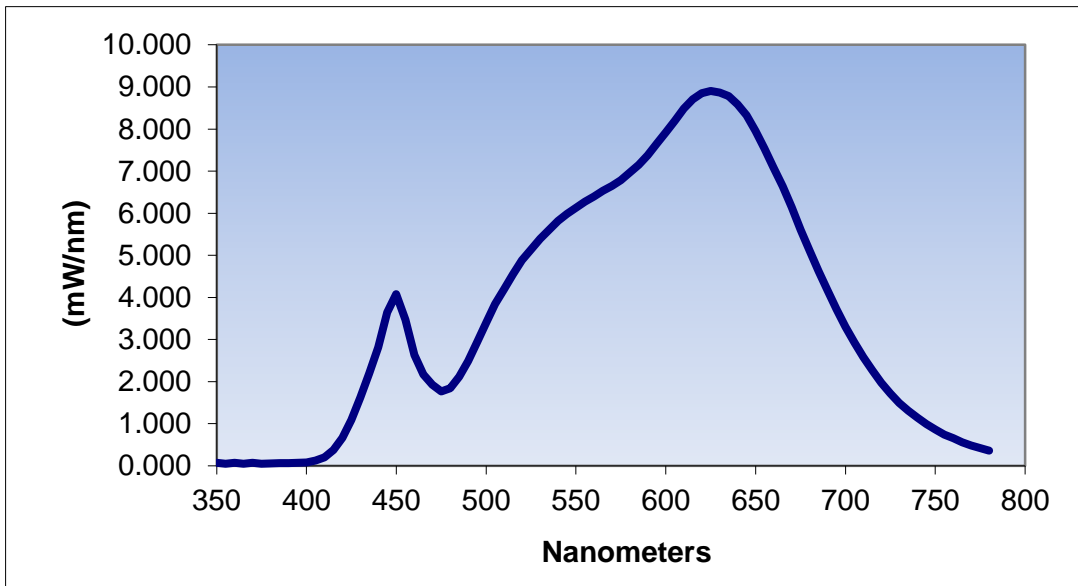


RESULTS:

Spectral Distribution Over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.071	460	2.633	570	6.646	680	5.109
355	0.051	465	2.170	575	6.785	685	4.627
360	0.069	470	1.923	580	6.967	690	4.166
365	0.050	475	1.763	585	7.148	695	3.720
370	0.074	480	1.839	590	7.378	700	3.298
375	0.051	485	2.118	595	7.661	705	2.932
380	0.055	490	2.486	600	7.925	710	2.582
385	0.065	495	2.933	605	8.201	715	2.267
390	0.065	500	3.393	610	8.487	720	1.969
395	0.071	505	3.840	615	8.706	725	1.723
400	0.077	510	4.188	620	8.853	730	1.493
405	0.122	515	4.547	625	8.905	735	1.311
410	0.203	520	4.881	630	8.866	740	1.140
415	0.376	525	5.145	635	8.782	745	0.994
420	0.667	530	5.396	640	8.585	750	0.858
425	1.090	535	5.606	645	8.326	755	0.743
430	1.619	540	5.815	650	7.958	760	0.657
435	2.200	545	5.988	655	7.535	765	0.556
440	2.813	550	6.126	660	7.089	770	0.479
445	3.646	555	6.275	665	6.637	775	0.417
450	4.080	560	6.395	670	6.144	780	0.359
455	3.468	565	6.532	675	5.602		

Spectral Data Over Visible Wavelengths



PRODUCT PICTURE:



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:



Jeffrey Davis
Engineering Supervisor
Lighting Division

Report Reviewed By:



Ryan Siddon
Engineer
Lighting Division

Attachments: IES File - CRT1605111157-001B