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

REPORT

3933 US ROUTE 11, CORTLAND, NEW YORK 13045

Project No. G102585025 Date: June 3, 2016

REPORT NO. 102585024CRT-003

TEST OF ONE LED TRACK LUMINAIRE

MODEL NO. LP2-ZE822-903004
LED MODEL NO. LUMILEDS Z ES
DRIVER MODEL NO. MAGTECH M38-U30-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 LP2-ZE822-903004. The sample was received by Intertek on May 11, 2016 in undamaged condition and one sample was tested as received. The sample designation was CRT1605111157-001C.

DATE OF TESTS: May 26, 2016 through June 3, 2016.

SUMMARY:

MODEL NO. LP2-ZE822-903004
DESCRIPTION: LED TRACK LUMINAIRE

Criteria	Integrating Sphere	Goniophotometer
Light Output (Lumens)	959.1	989.2
Total Power (W)	30.27	29.87
Lumen Efficacy (Lm/W)	31.7	33.1
Power Factor ( )	0.991	0.992

Criteria	Results
Current ATHD (%)	9.61
Correlated Color Temp. (CCT-K)	3081
Color Rendering Index (CRI - Ra)	94.0
CRI - R9	73.1
DUV ( )	0.001
Chromaticity Coordinate (x)	0.433
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	---	6/2/2016	7/2/2016
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
Extech 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.

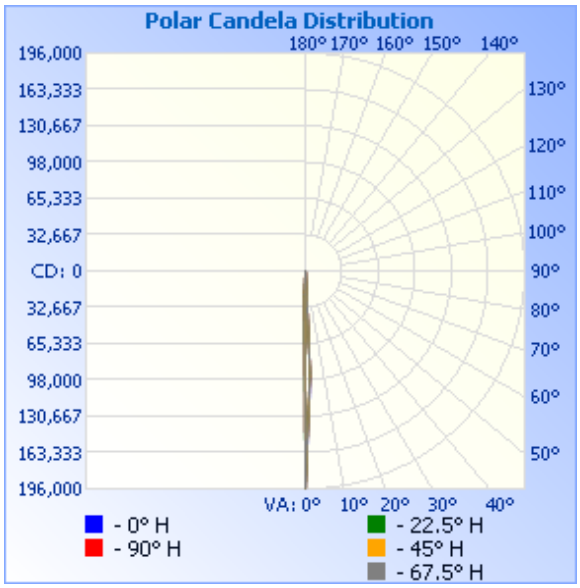
RESULTS:

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)
CRT1605111157-001C	Base Up	120.04	250.9	29.87	0.992	989.2	33.1

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	195551	195551	195551	195551	195551
5	1569	1263	1308	1325	1551
10	0	0	0	0	0
15	0	0	0	0	0
20	0	0	0	0	0
25	0	0	0	0	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

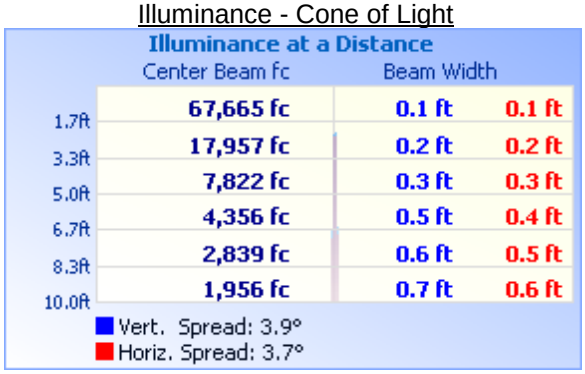


RESULTS:

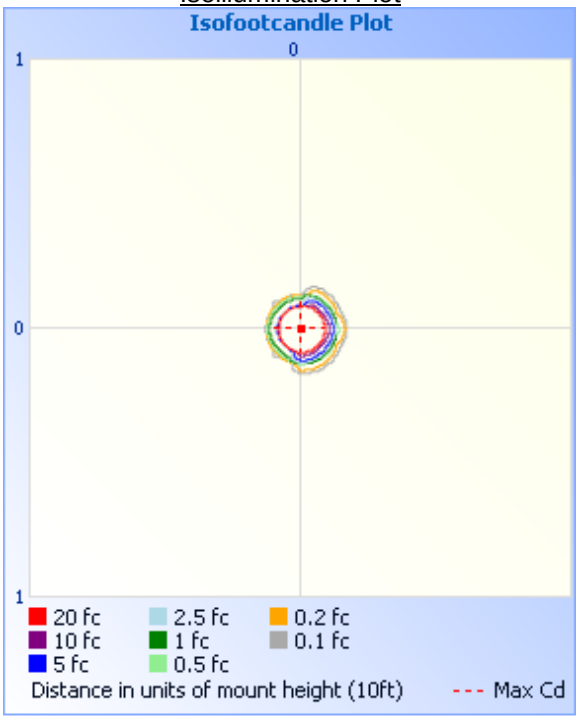
Illumination Plots

Mounting Height: 10ft

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	989.2	100.0
0-40	989.2	100.0
0-60	989.2	100.0
60-90	0.0	0.0
0-90	989.2	100.0
90-180	0.0	0.0
0-180	989.2	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	989.2	100.0
10-20	0.0	0.0
20-30	0.0	0.0
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:

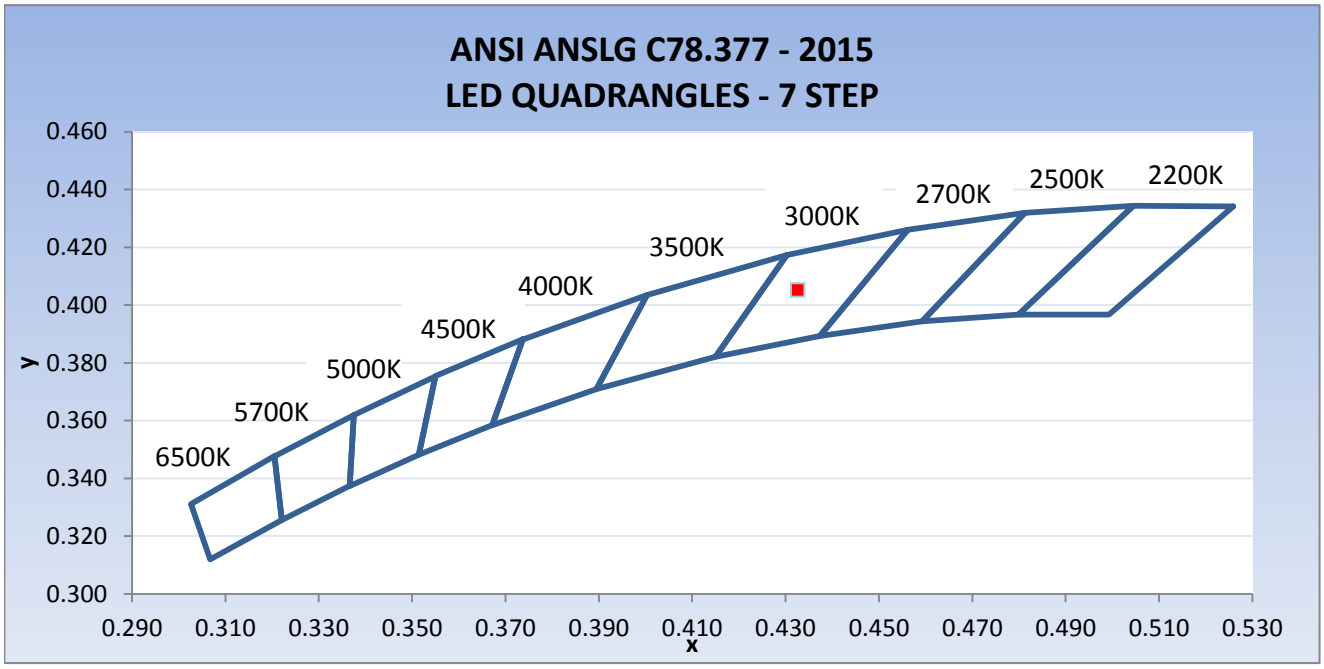
Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – Sphere Method

Intertek Control No.	Base Orientation	Input Voltage (VAC)	Input Current (mA)	Input Power (W)	Input Power Factor ( )	Current ATHD (%)
CRT1605111157-001C	Base Up	120.04	254.5	30.27	0.991	9.61

Light Output (Lumens)	Lumen Efficacy (lm/W)	Correlated Color Temperature - CCT (K)	CRI -Ra	CRI -R9	DUV ( )
959.1	31.7	3081	94.0	73.1	0.001

CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
0.433	0.405	0.247	0.521

ANSI C78.377 SSL Chromaticity (2015 Version)

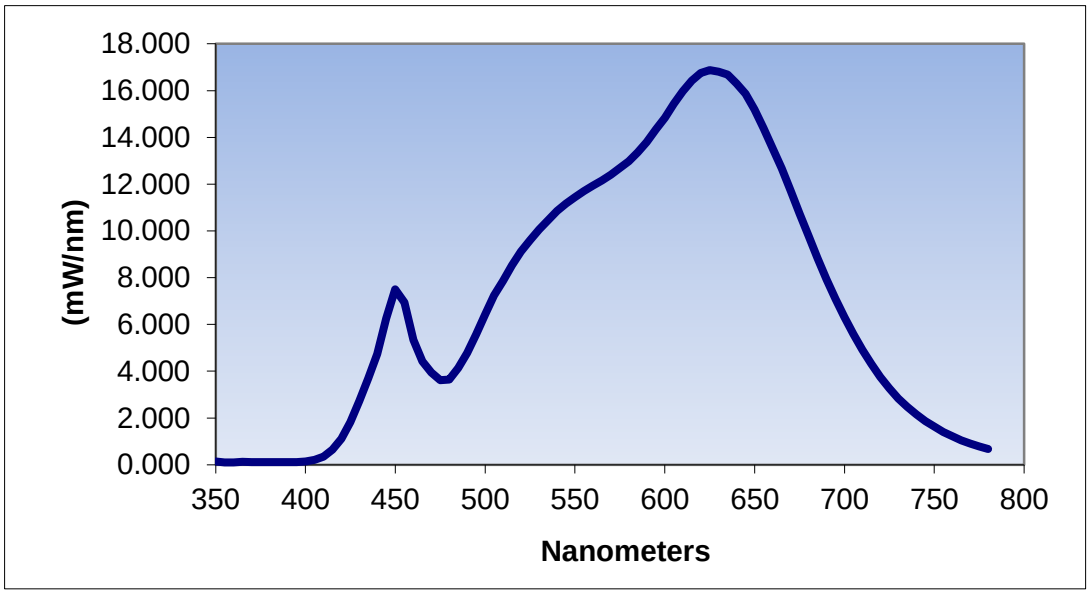


RESULTS:

Spectral Distribution Over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.141	460	5.342	570	12.402	680	9.782
355	0.098	465	4.431	575	12.691	685	8.836
360	0.103	470	3.944	580	12.972	690	7.922
365	0.129	475	3.614	585	13.360	695	7.093
370	0.114	480	3.644	590	13.795	700	6.307
375	0.119	485	4.137	595	14.351	705	5.584
380	0.109	490	4.786	600	14.842	710	4.921
385	0.116	495	5.578	605	15.437	715	4.316
390	0.113	500	6.421	610	15.973	720	3.758
395	0.118	505	7.238	615	16.422	725	3.273
400	0.145	510	7.859	620	16.751	730	2.831
405	0.205	515	8.532	625	16.878	735	2.479
410	0.352	520	9.119	630	16.815	740	2.149
415	0.643	525	9.611	635	16.689	745	1.863
420	1.118	530	10.063	640	16.310	750	1.628
425	1.825	535	10.465	645	15.867	755	1.402
430	2.731	540	10.860	650	15.196	760	1.216
435	3.703	545	11.170	655	14.399	765	1.047
440	4.733	550	11.441	660	13.556	770	0.902
445	6.255	555	11.704	665	12.676	775	0.782
450	7.498	560	11.940	670	11.717	780	0.672
455	6.946	565	12.151	675	10.734		

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 - CRT1605111157-001C