LIGHT LABORATORY INC.
8165 E Kaiser Blvd. Anaheim, CA 92808
www.lightlaboratory.com

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: L011802501 **Issue Date: 1/23/2018**

Prepared For: Horticulture Lighting Group
752 North State St, #208, Westerville, OH 43082

Model Number: Deep Red LED Strip

Test: Photometric/Colorimetric/Electrical Test

Standards Used: Appropriate part or all test guidelines were used for test performed:
IESNA LM79: 2008 Approved Methods for Electrical and Photometric Measurements of Solid-State Lighting Products
ANSI NEMA ANSLG C78.377: 2008 Specification of the Chromaticity of Solid State Lighting Products
ANSI C82.77:2002: Harmonic Emission Limits-Related Quality Requirements for Lighting Equipment

Description of Sample: Client submitted the sample. Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with 350mA constant current. Per client's request, nadir candela value (initial) was measured 30 seconds after the fixture was powered on. For this report, candela values were generated by using the ratio of nadir candela values between the initial and stabilized values which was 1.03.

Sample Arrival Date: 1/21/18

Date of Tests: 1/22/18 - 1/23/18

Seasoning of Sample: No seasoning was performed in accordance with IESNA LM-79.

Equipment List

Equipment Used	Model No	Stock No	Calibration Due Date
Chroma Programmable AC Source	61604	PS-AC02	--
Yokogawa Digital Power Meter	WT210	MT-EL06-S4	1/9/19
BK PRECISION	1747	PS-DC04	1/10/19
Fluke Digital Thermometer	52K/J	MT-TP05	1/10/19
LLI Type C Goniophotometer System	RMG-C-MKII	CD-LL04-GC	--
LLI 2M Sphere	2MR97	CD-SN03-S2	--
LLI Spectroradiometer	SPR-3000	MT-SC01-S2	Before Use

*All Results in accordance to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

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Test Summary			
Manufacturer:	Horticulture Lighting Group		
Model Number:	Deep Red LED Strip		
Driver Model Number:	N/A		
Total Lumens:	339.35		
Input Voltage @ 30 second (VDC):	24.40	**Input Voltage @ stabilized (VDC):**	24.27
Input Current @ 30 seconds (Amp):	0.35	**Input Current @ stabilized (Amp):**	0.35
Input Power @ 30 seconds (W):	8.54	**Input Power @ stabilized (W):**	8.51
Input Power Factor @ 30 seconds:	1.00	**Input Power Factor@ stabilized :**	1.00
Current ATHD @ 120V(%):	N/A		
Current ATHD @ 277V(%):	N/A		
Efficacy:	40		
Color Rendering Index (CRI):	15		
Correlated Color Temperature (K):	1000		
Chromaticity Coordinate x:	0.7173		
Chromaticity Coordinate y:	0.2814		
Ambient Temperature (°C):	25.0		
Stabilization Time (Hours):	0:40		
Total Operating Time (Hours):	1:00		
Radiant Flux @ 30 seconds (W):	4.75		

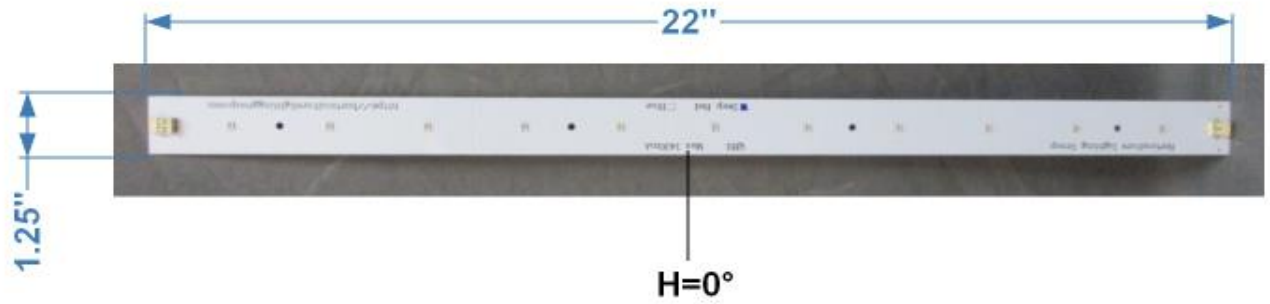

FIG.1 LUMINAIRE

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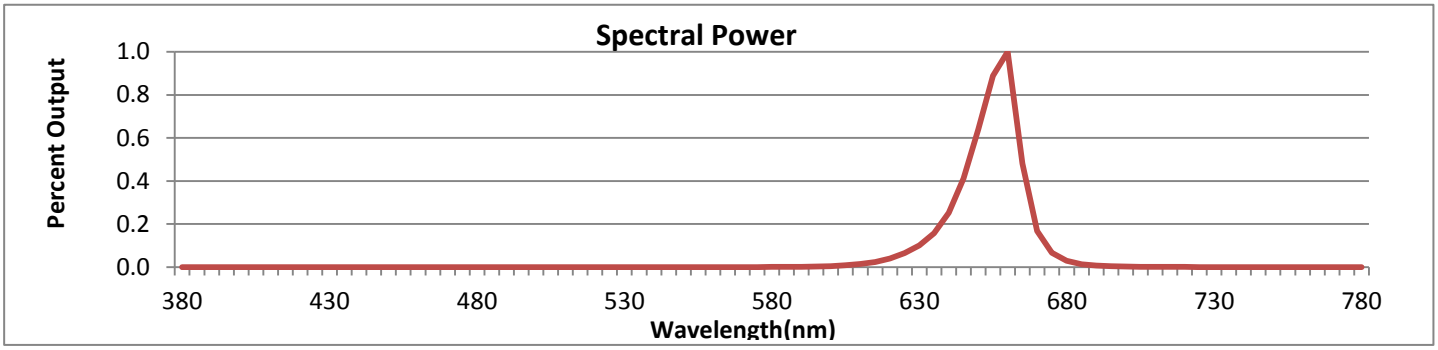


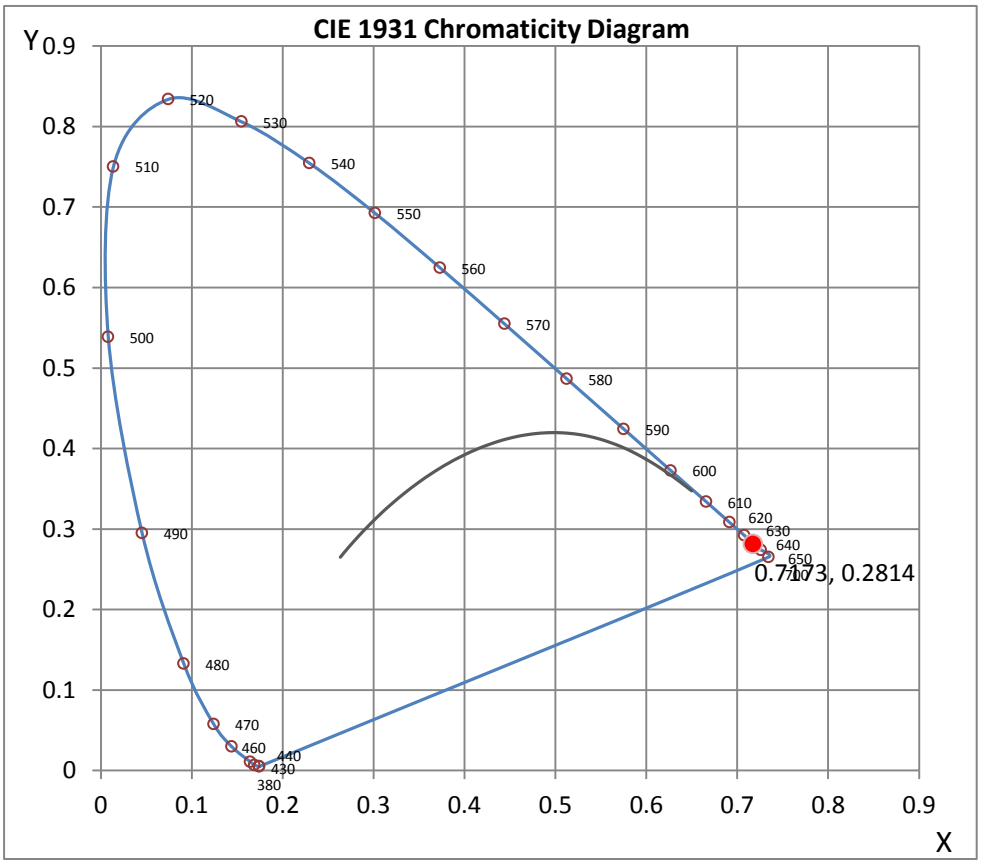
Wavelength	W/m²nm	440	0.0001	510	0.0000	580	0.0005	650	0.6383	720	0.0005
380	0.0000	450	0.0001	520	0.0000	590	0.0014	660	1.0000	730	0.0002
390	0.0000	460	0.0000	530	0.0000	600	0.0045	670	0.1676	740	0.0002
400	0.0001	470	0.0000	540	0.0001	610	0.0140	680	0.0290	750	0.0001
410	0.0001	480	0.0001	550	0.0001	620	0.0399	690	0.0069	760	0.0002
420	0.0001	490	0.0000	560	0.0001	630	0.1004	700	0.0021	770	0.0001
430	0.0002	500	0.0001	570	0.0002	640	0.2521	710	0.0009	780	0.0002

CRI & CCT

x	0.7173
y	0.2814
u'	0.5806
v'	0.5124
CRI	15.20
CCT	1000
Duv	0.24386

R Values

R1	6.33
R2	77.90
R3	31.28
R4	-24.72
R5	2.98
R6	79.18
R7	13.49
R8	-64.45
R9	-221.98
R10	76.46
R11	-14.43
R12	85.18
R13	30.99
R14	57.14



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Test Methods

Photometric Measurements - Goniophotometer

A Custom Light Laboratory Type C Rotating Mirror Goniophotometer was used to measure candelas(intensity) at each angle of distribution as defined by IESNA for the appropriate fixture type.

Ambient temperature is set to 25°C and is measured from the center of the fixture, within 1ft from the outside of the fixture. Temperature is maintained at 25°C throughout the testing process and the sample is stabilized for at least 30mins and longer as necessary for the sample to achieve stabilization.

Electrical measurements are measured using the listed equipment.

Spectral Measurements - Integrating Sphere

A Sensing Spectroradiometer SPR-3000, in conjunction with Light Laboratory 2 meter integrating sphere was used to measure chromaticity coordinates, correlated color temperature(CCT) and the color rendering index(CRI) for each sample.

Ambient temperature is set to 25°C and is measured from the center of the fixture, within 1ft from the outside of the fixture. Temperature is maintained at 25°C throughout the testing process and the sample is stabilized for at least 30mins and longer as necessary for the sample to achieve stabilization.

Electrical measurements are measured using the listed equipment.

Disclaimers:

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST or any agency of Federal Government.

Report Prepared by : Keyur Patel

Test Report Released by:

Jeff Ahn
Engineering Manager

Test Report Reviewed by:

Steve Kang
Quality Assurance

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