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

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: **L101702904** **Issue Date: 10/18/2017**

Report Prepared For: Hunter Industries
1785 La Costa Meadows Dr, San Marcos, CA 92078

Model Number: **C-PL-4LED20W**

Test: Electrical and Photometric tests

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 no special conditions.

Sample Arrival Date: 10/16/17

Date of Tests: 10/17/17 - 10/18/17

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-S1	11/28/17
ITECH	IT6122	PS-DC03-S1	11/28/17
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/28/17
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:	Hunter Industries
Model Number:	C-PL-4LED20W
Driver Model Number:	N/A
Total Lumens:	34.50
Input Voltage (VAC/60Hz):	12.00
Input Current (Amp):	0.11
Input Power (W):	1.19
Input Power Factor:	0.92
Current ATHD @ 12V(%):	38%
Current ATHD @ 277V(%):	N/A
Efficacy:	29
Color Rendering Index (CRI):	85
Correlated Color Temperature (K):	2655
Chromaticity Coordinate x:	0.4589
Chromaticity Coordinate y:	0.4032
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:10



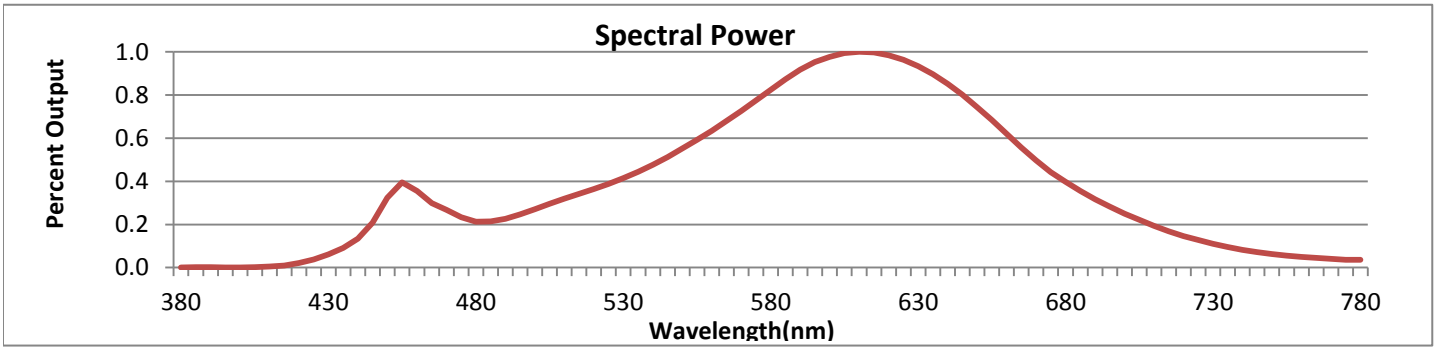
FIG. 1 LUMINAIRE

*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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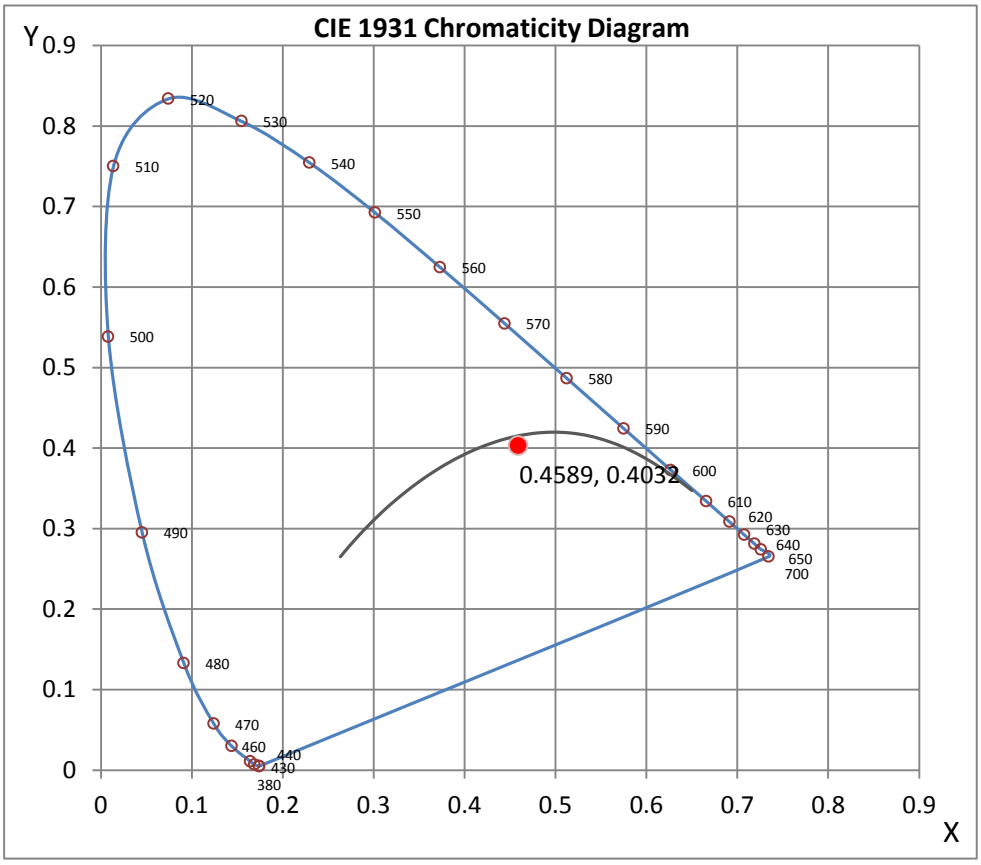
Wavelength	W/m²nm	440	0.1340	510	0.3196	580	0.8239	650	0.7439	720	0.1467
380	0.0002	450	0.3242	520	0.3641	590	0.9172	660	0.6206	730	0.1097
390	0.0019	460	0.3548	530	0.4147	600	0.9773	670	0.4971	740	0.0818
400	0.0011	470	0.2675	540	0.4768	610	1.0000	680	0.3983	750	0.0630
410	0.0043	480	0.2124	550	0.5524	620	0.9839	690	0.3164	760	0.0493
420	0.0213	490	0.2263	560	0.6337	630	0.9335	700	0.2505	770	0.0405
430	0.0611	500	0.2708	570	0.7256	640	0.8522	710	0.1933	780	0.0358

CRI & CCT

x	0.4589
y	0.4032
u'	0.2652
v'	0.5243
CRI	84.60
CCT	2655
Duv	-0.00267

R Values

R1	84.07
R2	94.60
R3	94.11
R4	80.78
R5	84.15
R6	93.55
R7	82.46
R8	63.44
R9	25.22
R10	87.31
R11	79.25
R12	80.73
R13	86.69
R14	97.65



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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

**Attached are photometric data reports. Total number of pages: 8*

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Photometric Test Report

IES FLOOD REPORT
PHOTOMETRIC FILENAME : L101702904.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L101702904
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 10/18/2017
[MANUFAC] Hunter Industries
[LUMCAT] C-PL-4LED20W
[LUMINAIRE] Path Light 4" Hat 20W
[BALLASTCAT] N/A
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 12VAC, 1.19W
[TEST PROCEDURE] IESNA:LM-79-08

Note: Candela values converted from Type-C to Type-B

CHARACTERISTICS

NEMA Type	7 H x 7 V
Maximum Candela	8.62
Maximum Candela Angle	-47.5H -3V
Horizontal Beam Angle (50%)	118.3
Vertical Beam Angle (50%)	139.7
Horizontal Field Angle (10%)	156.4
Vertical Field Angle (10%)	165.6
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	30
Beam Efficiency	N.A.
Field Lumens	34
Field Efficiency	N.A.
Spill Lumens	0
Luminaire Lumens	34
Total Efficiency	N.A.
Total Luminaire Watts	1.19
Ballast Factor	1.00

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Results derived from content of manufacturers photometric file.

IES FLOOD REPORT
PHOTOMETRIC FILENAME : L101702904.IES

AXIAL CANDELA

DEG.	HOR.	DEG.	VERT.
90	.001	90	.001
85	.458	85	.458
75	2.3	75	2.3
65	6.217	65	6.217
55	8.26	55	8.26
47.5	8.62	47.5	8.62
42.5	8.504	42.5	8.504
37.5	8.235	37.5	8.235
33	7.996	33	7.996
29	7.818	29	7.818
25.5	7.707	25.5	7.707
22.5	7.643	22.5	7.643
19.5	7.587	19.5	7.587
17	7.549	17	7.549
15	7.519	15	7.519
13	7.487	13	7.487
11	7.456	11	7.456
9	7.413	9	7.413
7	7.358	7	7.358
5	7.304	5	7.304
3	7.448	3	7.448
1	7.592	1	7.592
0	7.664	0	7.664
-1	7.592	-1	7.592
-3	7.448	-3	7.448
-5	7.304	-5	7.304
-7	7.358	-7	7.358
-9	7.413	-9	7.413
-11	7.456	-11	7.456
-13	7.487	-13	7.487
-15	7.519	-15	7.519
-17	7.549	-17	7.549
-19.5	7.587	-19.5	7.587
-22.5	7.643	-22.5	7.643
-25.5	7.707	-25.5	7.707
-29	7.818	-29	7.818
-33	7.996	-33	7.996
-37.5	8.235	-37.5	8.235
-42.5	8.504	-42.5	8.504
-47.5	8.62	-47.5	8.62
-55	8.26	-55	8.26
-65	6.217	-65	6.217
-75	2.3	-75	2.3
-85	.458	-85	.458
-90	.001	-90	.001

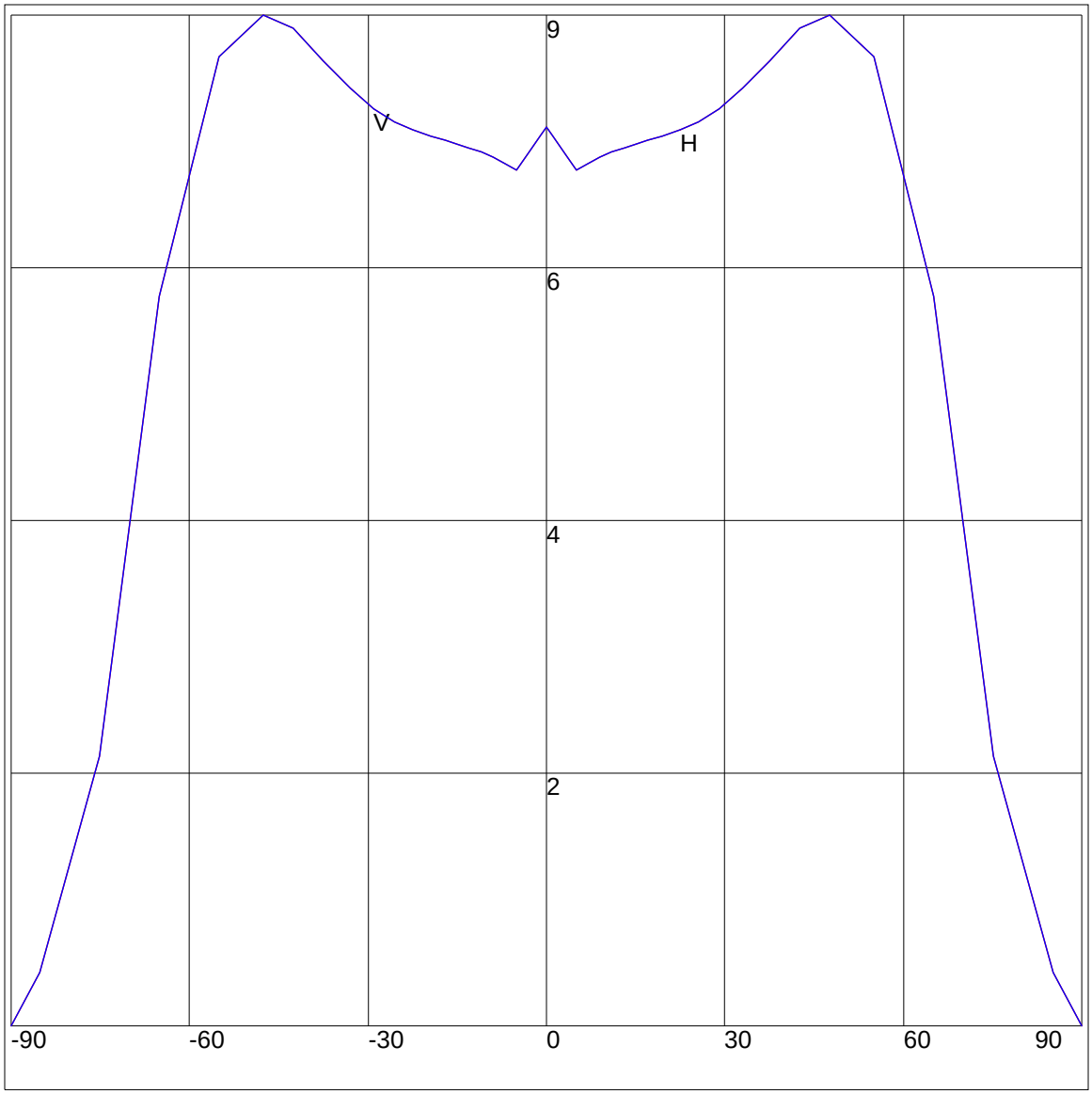
ZONAL LUMEN SUMMARY

Zone	%
0-20	8.2
0-30	18.5
0-40	33.3
0-60	73.6
0-80	98.4
0-90	100
10-90	97.9
20-40	25.1
20-50	44.2
40-70	57.8
60-80	24.8
70-80	7.4
80-90	1.6
90-110	0
90-120	0
90-130	0
90-150	0
90-180	0
110-180	0
0-180	100

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AXIAL CANDELA DISPLAY

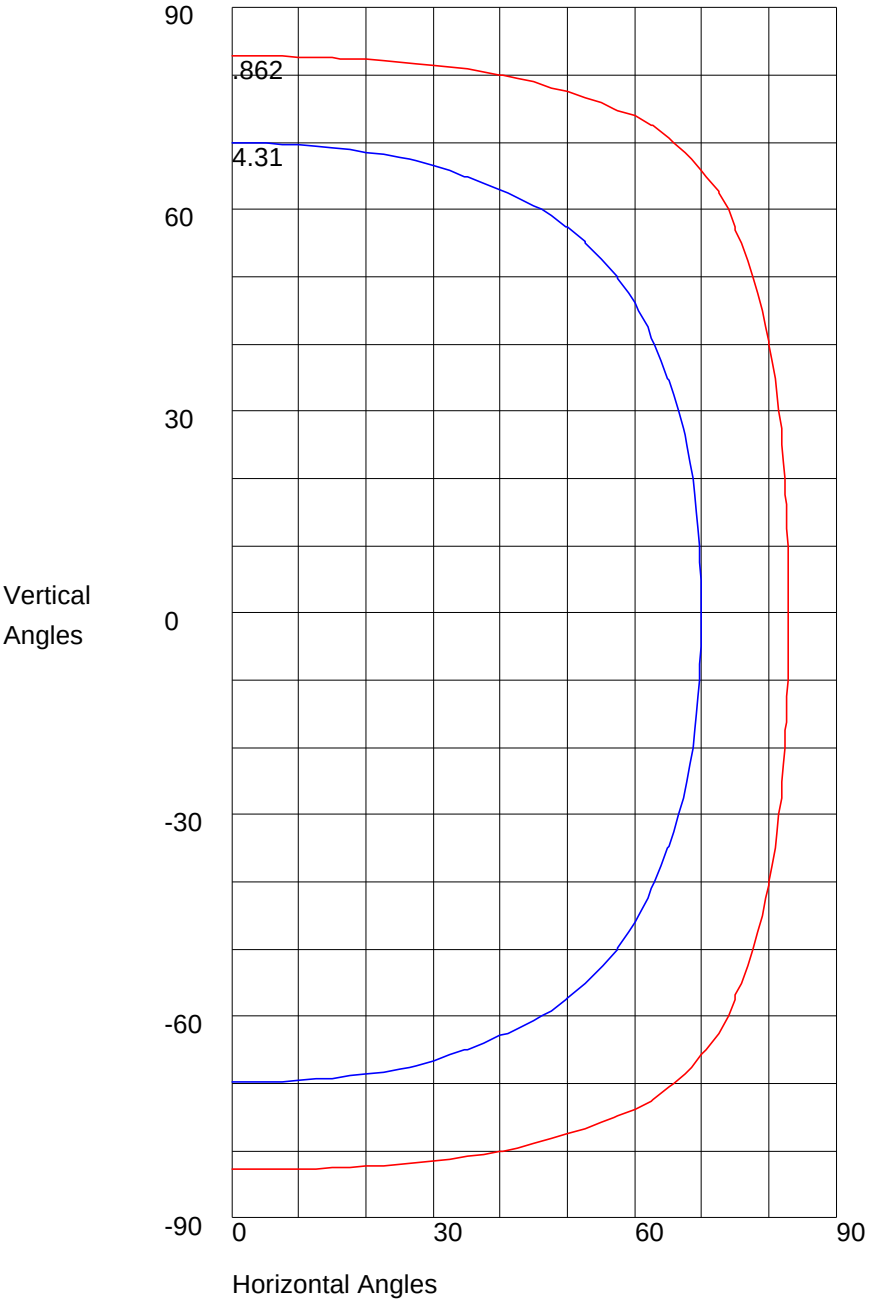


Maximum Candela = 8.62 Located At Horizontal Angle =-47.5, Vertical Angle =-3
H - Horizontal Axial Candela
V - Vertical Axial Candela

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ISOCANDELA CURVES



Maximum Candela = 8.62 Located At Horizontal Angle =-47.5, Vertical Angle =-3
50% Maximum Candela = 4.31
10% Maximum Candela = .862

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