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

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: L121912502 **Issue Date: 1/3/2020**

Report Prepared For: Hunter Industries
1940 Diamond St. San Marcos, CA 92078 US

Model Number: CL-LED203NF-WG

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.

Special Test Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 12/20/19

Date of Tests: 12/24/19 - 1/3/20

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	1/9/21
BK PRECISION	1747	PS-DC04	1/10/21
Fluke Digital Thermometer	52K/J	MT-TP05	1/10/21
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

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NVLAP LAB CODE 200927-0

General Information	
Manufacturer:	Hunter Industries
Model Number:	CL-LED203NF-WG
Driver Model Number:	N/A

Test Summary	
Total Lumens:	157.04
Efficacy:	85.52
Color Redering Index:	84.3
Correlated Color Temperature:	2949
Input Voltage (VAC/60Hz):	12.00
Input Current (Amp):	0.2233
Input Power (W):	1.84
Input Power Factor:	0.6852
Current ATHD (%):	61.9%

Test Condition	
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:45
Total Operating Time (Hours):	1:30

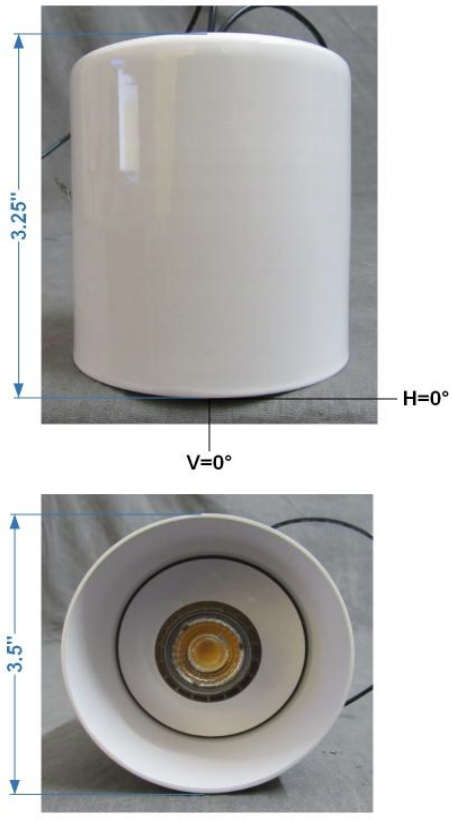


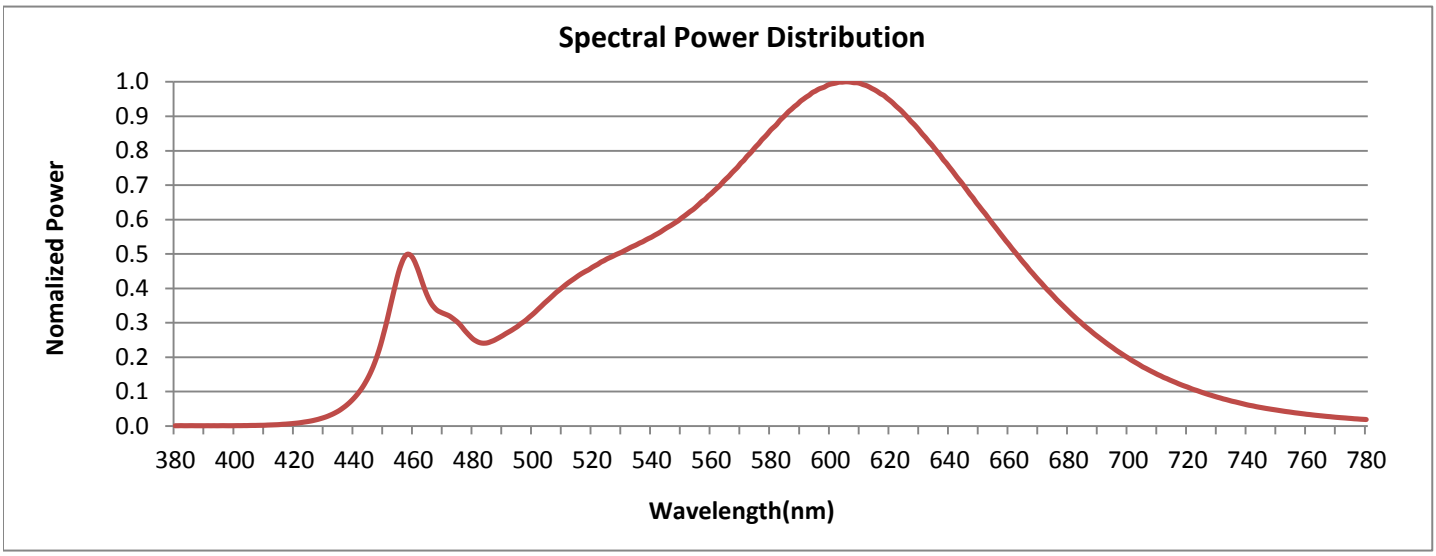
FIG. 1 LUMINAIRE

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Colorimetry Test Results

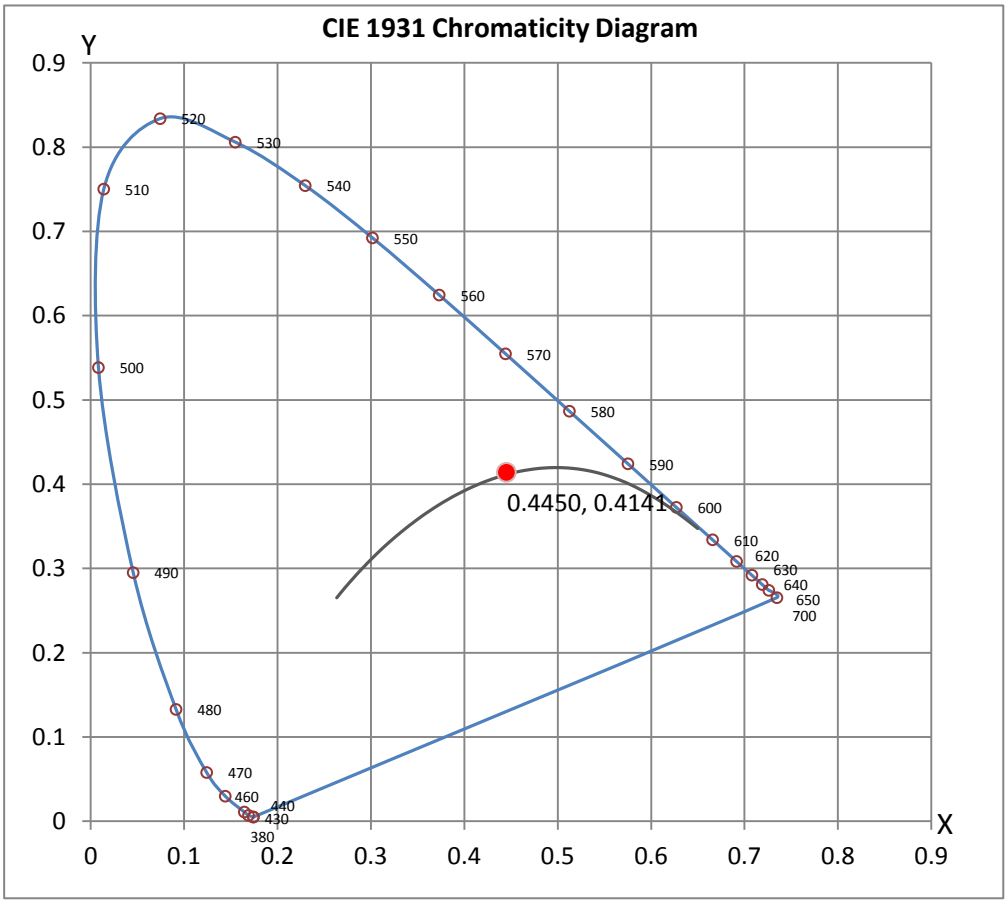


CRI & CCT

x	0.4450
y	0.4141
u'	0.2514
v'	0.5265
CRI	84.30
CCT	2949
Duv	0.00286

R Values

R1	83.11
R2	93.15
R3	95.56
R4	81.21
R5	83.18
R6	92.82
R7	83.25
R8	61.88
R9	16.37
R10	84.38
R11	80.76
R12	71.28
R13	85.62
R14	98.21
R15	75.40



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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 : Dennis Malonzo

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 : L121912502.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L121912502
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 1/3/2019
[MANUFAC] Hunter Industries
[LUMCAT] CL-LED203NF-WG
[LUMINAIRE] CL AR11 LED 3000K White Gloss
[BALLASTCAT] N/A
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 12.00VAC, 1.84W
[TEST PROCEDURE] IESNA:LM-79-08

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

CHARACTERISTICS

NEMA Type	4 H x 4 V
Maximum Candela	332.03
Maximum Candela Angle	0H 0V
Horizontal Beam Angle (50%)	34.0
Vertical Beam Angle (50%)	34.0
Horizontal Field Angle (10%)	68.6
Vertical Field Angle (10%)	68.6
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	65
Beam Efficiency	N.A.
Field Lumens	130
Field Efficiency	N.A.
Spill Lumens	27
Luminaire Lumens	157
Total Efficiency	N.A.
Total Luminaire Watts	1.84
Ballast Factor	1.00

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Results derived from content of manufacturers photometric file.

IES FLOOD REPORT
PHOTOMETRIC FILENAME : L121912502.IES

AXIAL CANDELA

DEG.	HOR.	DEG.	VERT.
90	0	90	0
85	.42	85	.42
75	.56	75	.56
65	1.57	65	1.57
55	5.65	55	5.65
47.5	8.94	47.5	8.94
42.5	13.65	42.5	13.65
37.5	23.35	37.5	23.35
33	37.23	33	37.23
29	56.57	29	56.57
25.5	79.33	25.5	79.33
22.5	105	22.5	105
19.5	134.57	19.5	134.57
17	165.86	17	165.86
15	195.47	15	195.47
13	223.51	13	223.51
11	248.92	11	248.92
9	273.04	9	273.04
7	290.28	7	290.28
5	306.47	5	306.47
3	323.39	3	323.39
1	331.55	1	331.55
0	332.03	0	332.03
-1	331.55	-1	331.55
-3	323.39	-3	323.39
-5	306.47	-5	306.47
-7	290.28	-7	290.28
-9	273.04	-9	273.04
-11	248.92	-11	248.92
-13	223.51	-13	223.51
-15	195.47	-15	195.47
-17	165.86	-17	165.86
-19.5	134.57	-19.5	134.57
-22.5	105	-22.5	105
-25.5	79.33	-25.5	79.33
-29	56.57	-29	56.57
-33	37.23	-33	37.23
-37.5	23.35	-37.5	23.35
-42.5	13.65	-42.5	13.65
-47.5	8.94	-47.5	8.94
-55	5.65	-55	5.65
-65	1.57	-65	1.57
-75	.56	-75	.56
-85	.42	-85	.42
-90	0	-90	0

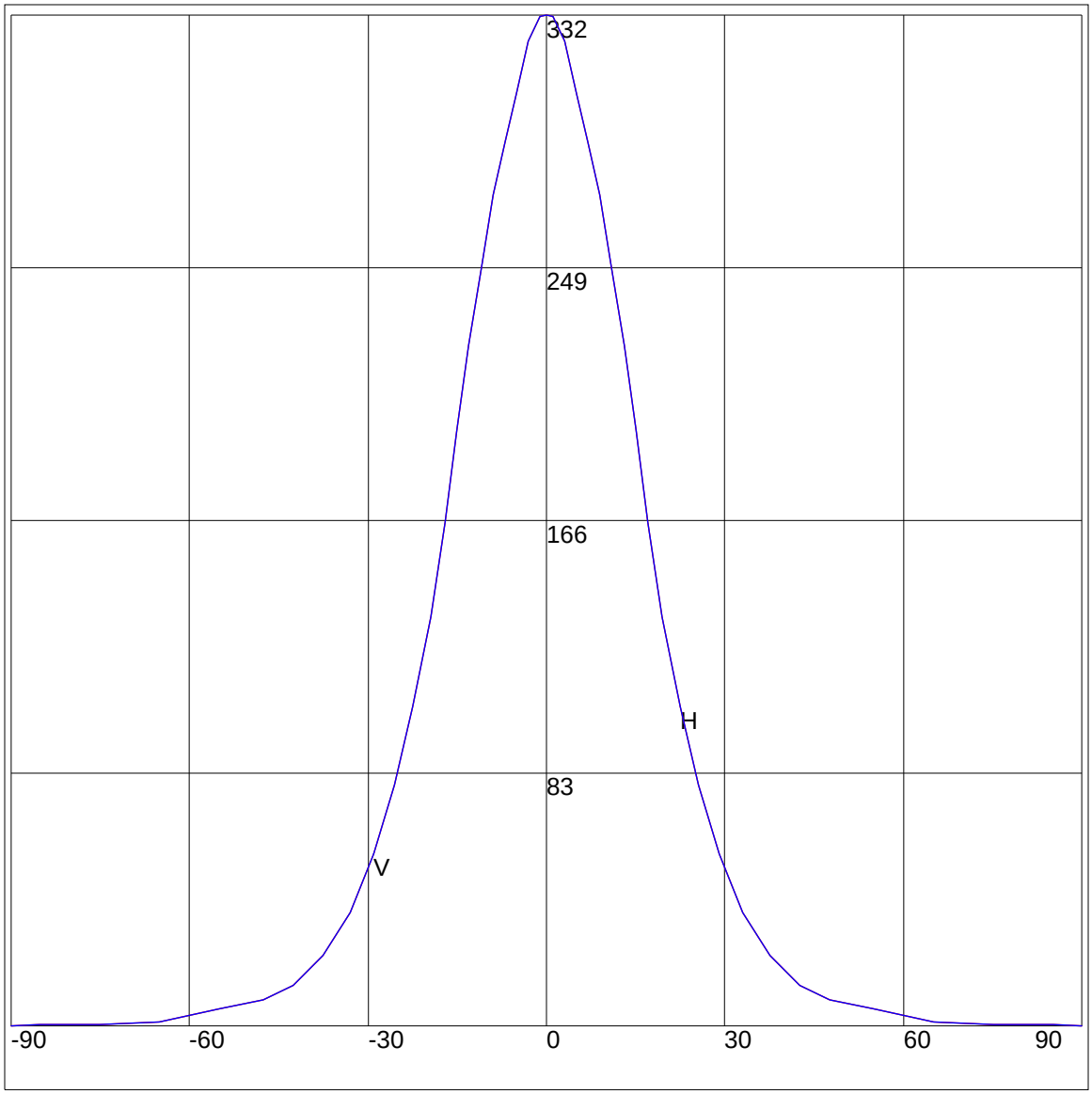
ZONAL LUMEN SUMMARY

Zone	%
0-20	50.1
0-30	74.6
0-40	86.8
0-60	96.7
0-80	99.6
0-90	100
10-90	85.3
20-40	36.7
20-50	43.6
40-70	12.1
60-80	2.9
70-80	0.7
80-90	0.4
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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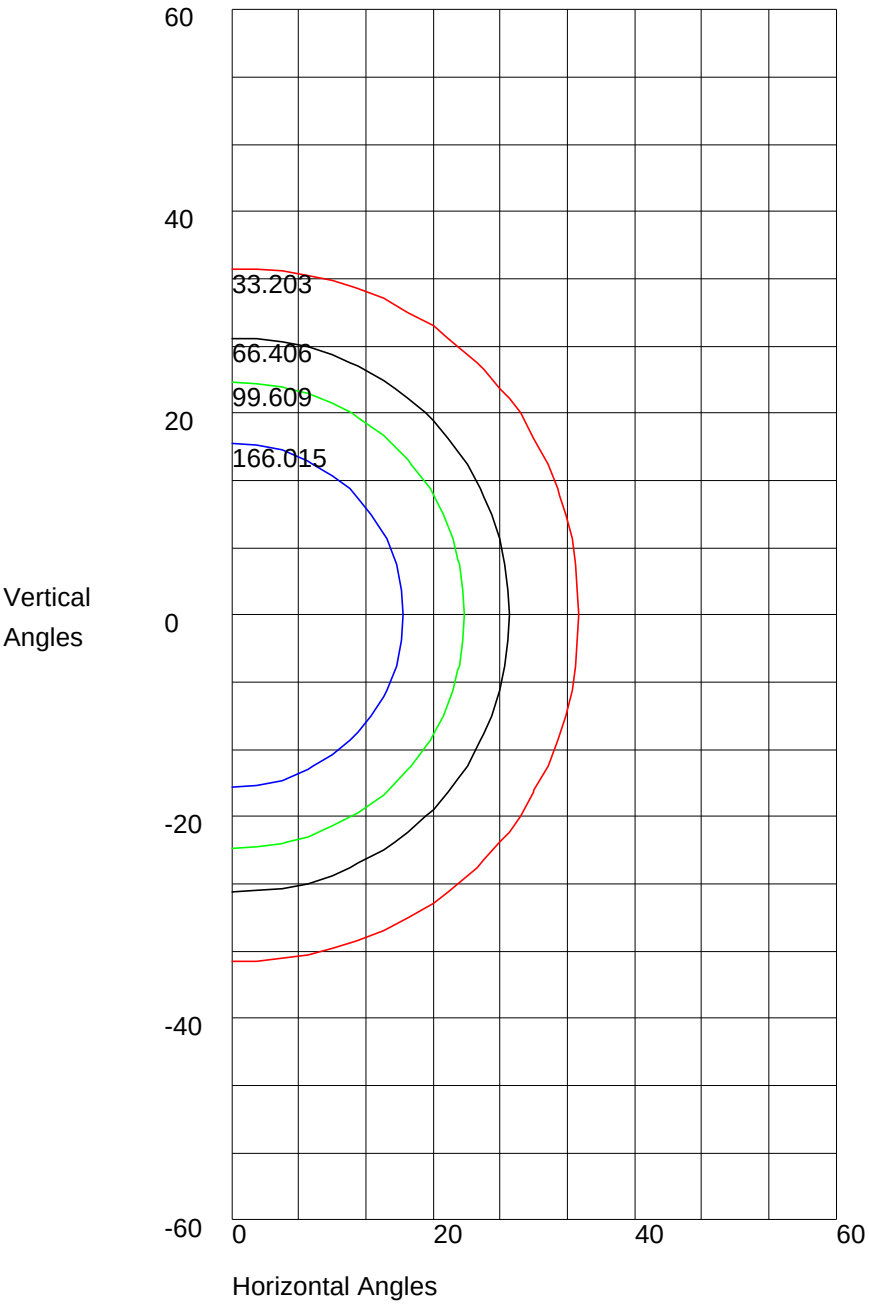
AXIAL CANDELA DISPLAY



Maximum Candela = 332.03 Located At Horizontal Angle = 0, Vertical Angle = 0
H - Horizontal Axial Candela
V - Vertical Axial Candela

IES FLOOD REPORT
PHOTOMETRIC FILENAME : L121912502.IES

ISOCANDELA CURVES



Maximum Candela = 332.03 Located At Horizontal Angle = 0, Vertical Angle = 0
50% Maximum Candela = 166.015
10% Maximum Candela = 33.203

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NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: L111807404 **Issue Date: 12/10/2018**

Report Prepared For: Hunter Industries
1940 Diamond St, San Marcos, CA 92078

Model Number: CL-LED-20-N-NF-CU

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.

Special Test Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 11/30/18

Date of Tests: 12/3/18 - 12/10/18

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

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NVLAP TESTING
NVLAP LAB CODE 200927-0

General Information	
Manufacturer:	Hunter Industries
Model Number:	CL-LED-20-N-NF-CU
Driver Model Number:	N/A

Photometric & Electrical Test Results	
Total Lumens:	133.24
Efficacy:	57.31
Input Voltage (VAC/60Hz):	12.00
Input Current (Amp):	0.3189
Input Power (W):	2.32
Input Power Factor:	0.6073
Current ATHD (%):	75.6%

Test Condition	
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:35

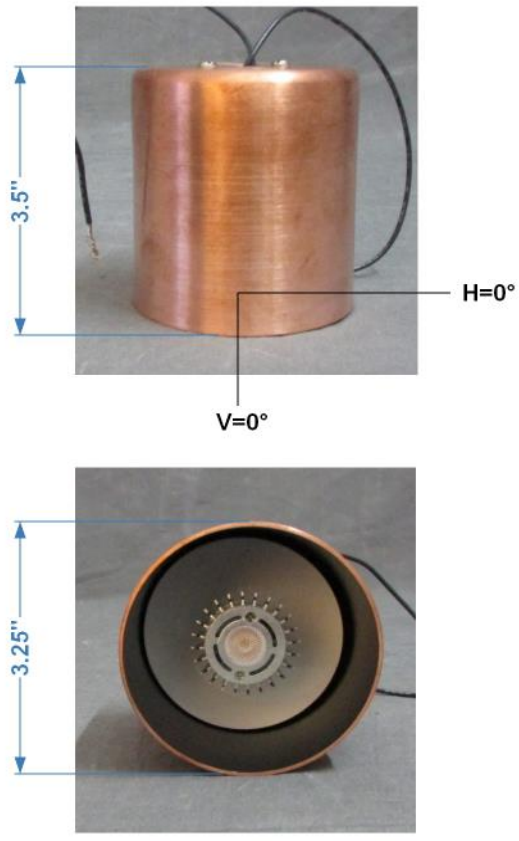


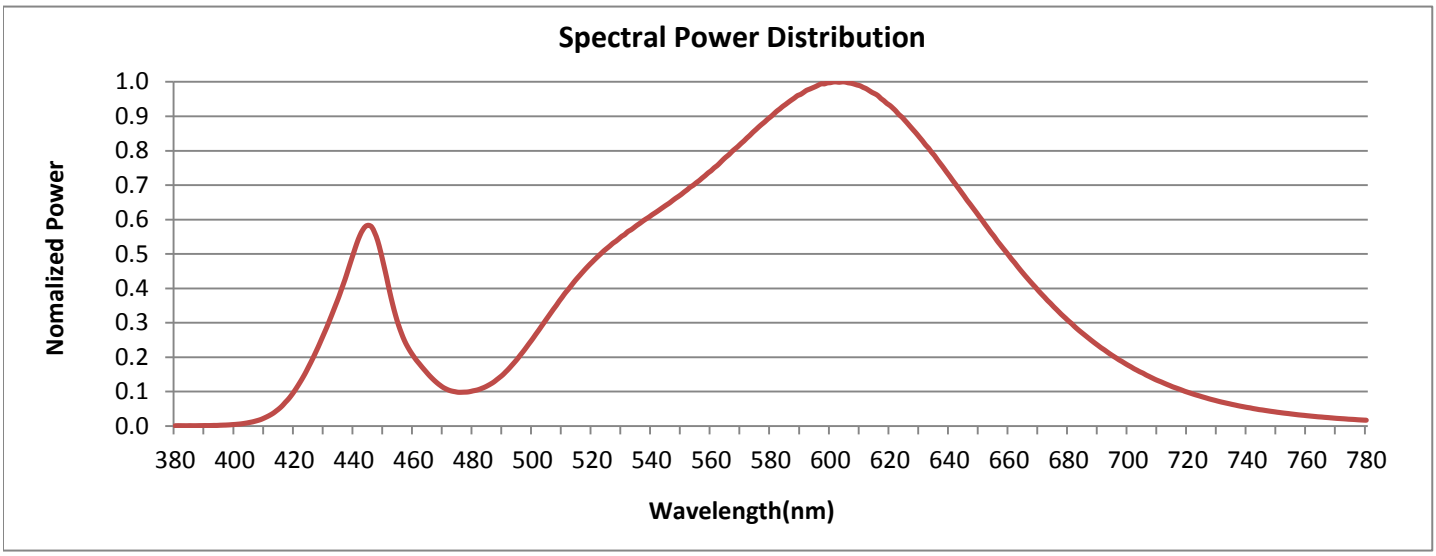
FIG. 1 LUMINAIRE

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Report No: L111807404

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Colorimetry Test Results

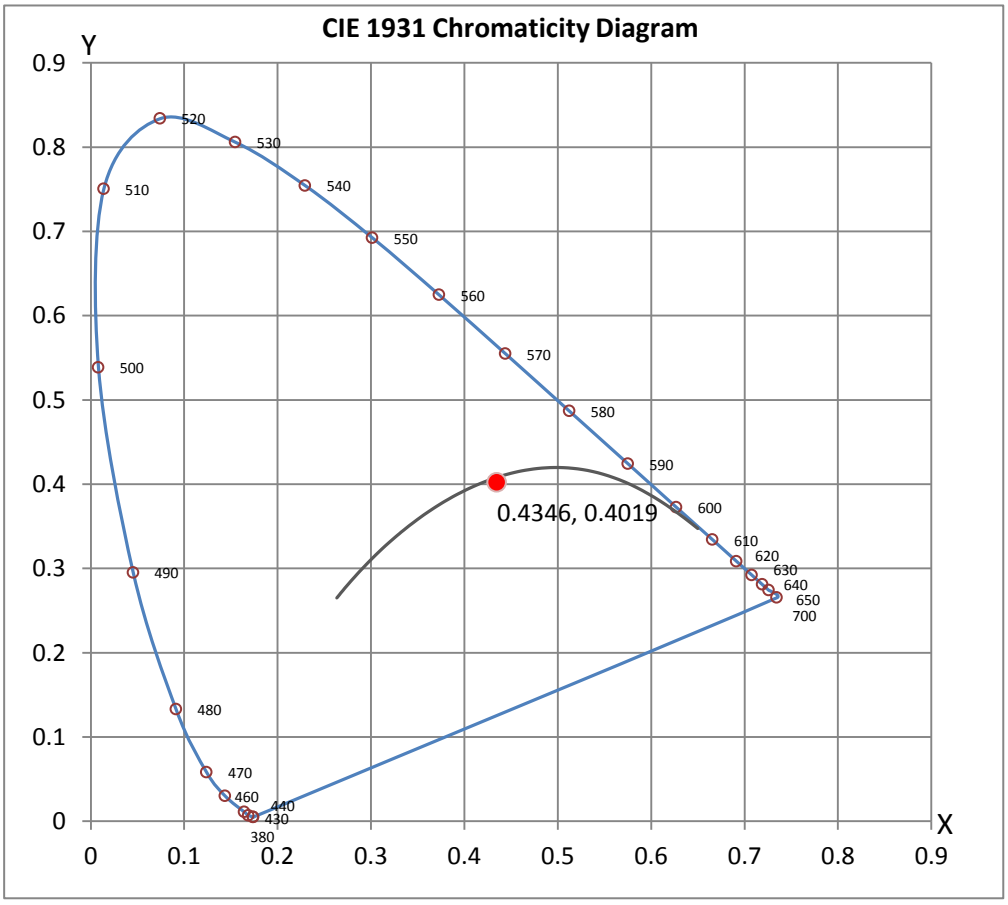


CRI & CCT

x	0.4346
y	0.4019
u'	0.2500
v'	0.5202
CRI	78.60
CCT	3022
Duv	-0.00055

R Values

R1	77.00
R2	84.56
R3	91.15
R4	78.47
R5	76.17
R6	79.43
R7	83.15
R8	59.11
R9	3.00
R10	64.13
R11	76.50
R12	60.49
R13	77.94
R14	94.41
R15	71.03



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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 : L111807404.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L111807404
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 12/10/2018
[MANUFAC] Hunter Industries
[LUMCAT] CL-LED-20-N-NF-CU
[LUMINAIRE] CL LED20 NL Copper
[BALLASTCAT] N/A
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 12.0VAC, 2.32W
[TEST PROCEDURE] IESNA:LM-79-08

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

CHARACTERISTICS

NEMA Type	4 H x 4 V
Maximum Candela	312.53
Maximum Candela Angle	-1H 0V
Horizontal Beam Angle (50%)	33.2
Vertical Beam Angle (50%)	33.2
Horizontal Field Angle (10%)	64.3
Vertical Field Angle (10%)	64.3
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	61
Beam Efficiency	N.A.
Field Lumens	113
Field Efficiency	N.A.
Spill Lumens	21
Luminaire Lumens	133
Total Efficiency	N.A.
Total Luminaire Watts	2.32
Ballast Factor	1.00

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PHOTOMETRIC FILENAME : L111807404.IES

AXIAL CANDELA

DEG.	HOR.	DEG.	VERT.
90	0	90	0
85	0	85	0
75	0	75	0
65	0	65	0
55	3.63	55	3.63
47.5	6.21	47.5	6.21
42.5	9.91	42.5	9.91
37.5	16.71	37.5	16.71
33	27.83	33	27.83
29	44.03	29	44.03
25.5	65.11	25.5	65.11
22.5	89.83	22.5	89.83
19.5	120.81	19.5	120.81
17	150.97	17	150.97
15	178.29	15	178.29
13	207.31	13	207.31
11	235.9	11	235.9
9	261.42	9	261.42
7	282.74	7	282.74
5	298.56	5	298.56
3	308.59	3	308.59
1	312.53	1	312.53
0	312.48	0	312.48
-1	312.53	-1	312.53
-3	308.59	-3	308.59
-5	298.56	-5	298.56
-7	282.74	-7	282.74
-9	261.42	-9	261.42
-11	235.9	-11	235.9
-13	207.31	-13	207.31
-15	178.29	-15	178.29
-17	150.97	-17	150.97
-19.5	120.81	-19.5	120.81
-22.5	89.83	-22.5	89.83
-25.5	65.11	-25.5	65.11
-29	44.03	-29	44.03
-33	27.83	-33	27.83
-37.5	16.71	-37.5	16.71
-42.5	9.91	-42.5	9.91
-47.5	6.21	-47.5	6.21
-55	3.63	-55	3.63
-65	0	-65	0
-75	0	-75	0
-85	0	-85	0
-90	0	-90	0

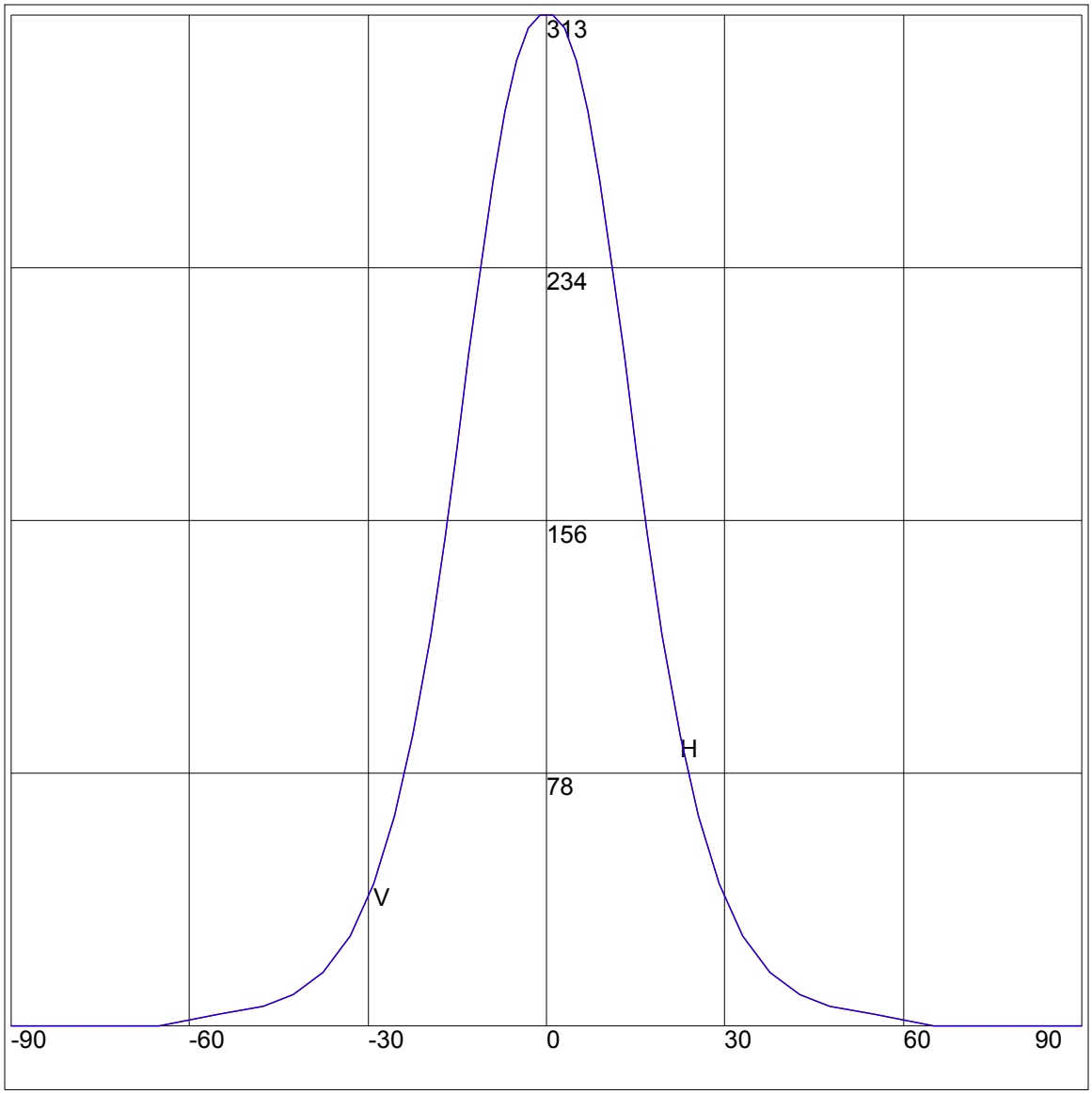
ZONAL LUMEN SUMMARY

Zone	%
0-20	55.3
0-30	79.6
0-40	90.5
0-60	98.7
0-80	100
0-90	100
10-90	83.3
20-40	35.2
20-50	41
40-70	9.5
60-80	1.3
70-80	0
80-90	0
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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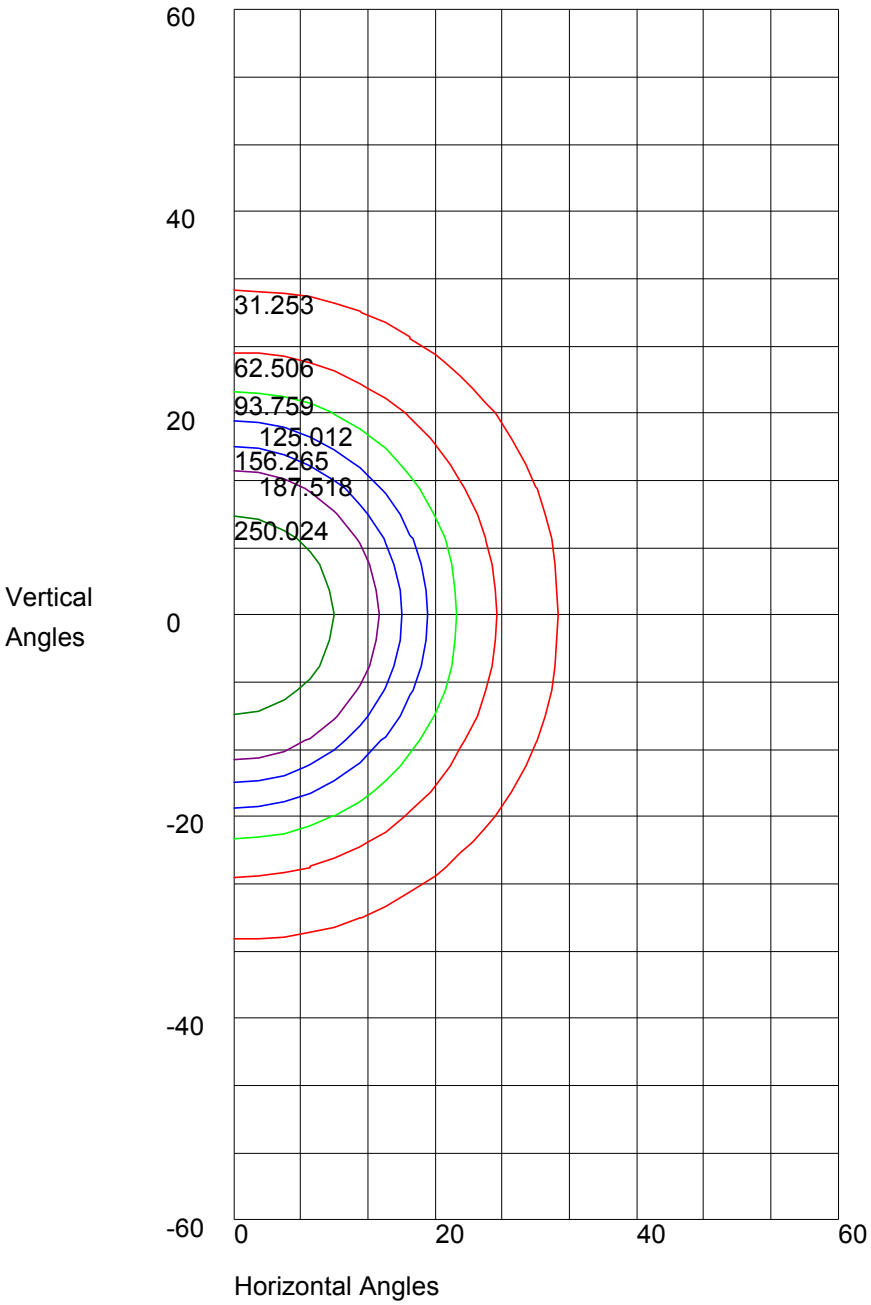
AXIAL CANDELA DISPLAY



Maximum Candela = 312.53 Located At Horizontal Angle =-1, Vertical Angle = 0
H - Horizontal Axial Candela
V - Vertical Axial Candela

IES FLOOD REPORT
PHOTOMETRIC FILENAME : L111807404.IES

ISOCANDELA CURVES



Maximum Candela = 312.53 Located At Horizontal Angle =-1, Vertical Angle = 0
50% Maximum Candela = 156.265
10% Maximum Candela = 31.253

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Results derived from content of manufacturers photometric file.