LIGHT LABORATORY INC.
8165 E Kaiser Blvd. Anaheim, CA 92808
p. 714.282.2270
f. 714.676.5558

Report No: L011504203
Date: 1/21/2015

NVLAP LAB CODE 200927-0

Report No: **L011504203**

Report Prepared For: AION LED
2325 3RD ST #330 SAN FRANCISCO, CA 94107

Model Number: **8924-24-x**

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. Catalog number is 8924-24-x . Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 1/14/15

Date of Tests: 1/16/15 - 1/21/15

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	11/10/15
Xitron Power Analysis System	2503AH	MT-EL01	10/20/15
BK Precision DC Power Supply	1747	PSDC-04	01/08/16
Fluke Digital Thermometer	52k/J	MT-TP02-GC	01/05/16
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:	AION LED
Model Number:	8924-24-x
Driver Model Number:	N/A
Total Lumens:	388.94
Input Voltage (VDC):	24.00
Input Current (Amp):	0.24
Input Power (W):	5.65
Input Power Factor:	1.00
Current ATHD @ 120V(%):	N/A
Current ATHD @ 277V(%):	N/A
Efficacy:	69
Color Rendering Index (CRI):	91
Correlated Color Temperature (K):	2268
Chromaticity Coordinate x:	0.4958
Chromaticity Coordinate y:	0.4107
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:45
Total Operating Time (Hours):	1:35
Off State Power(W):	0.00

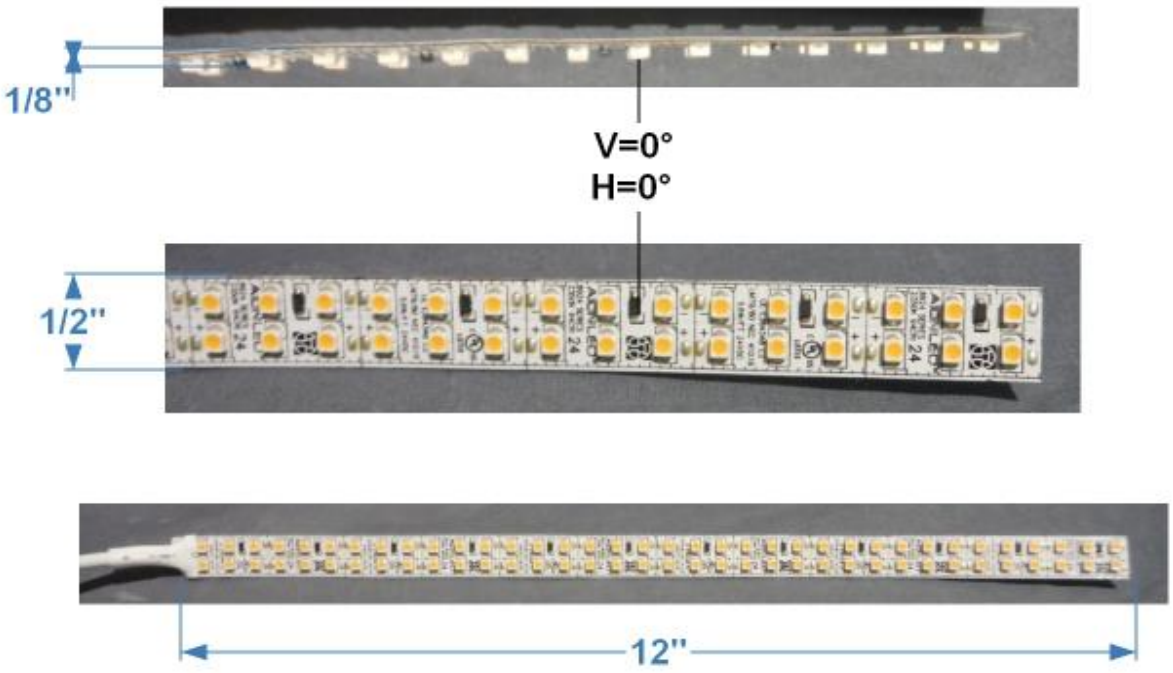

FIG. 1 LUMINAIRE

*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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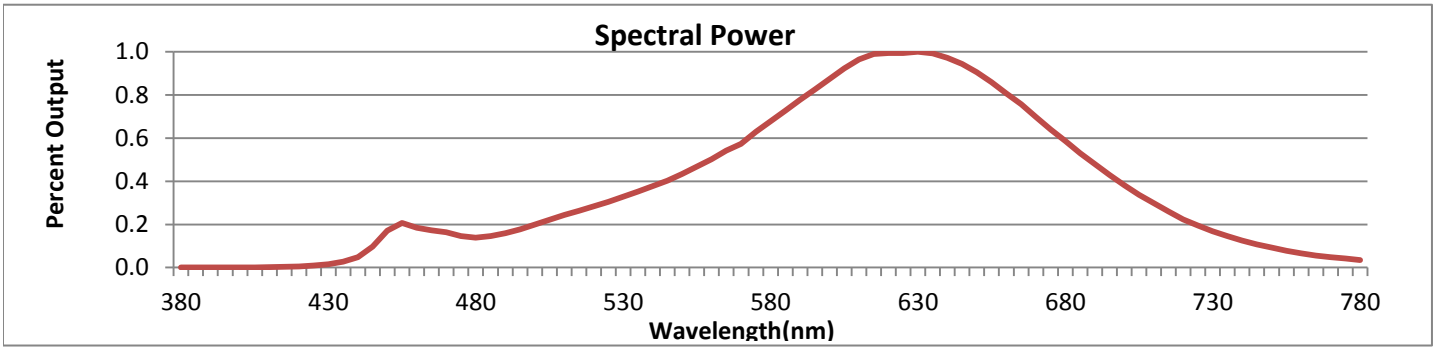


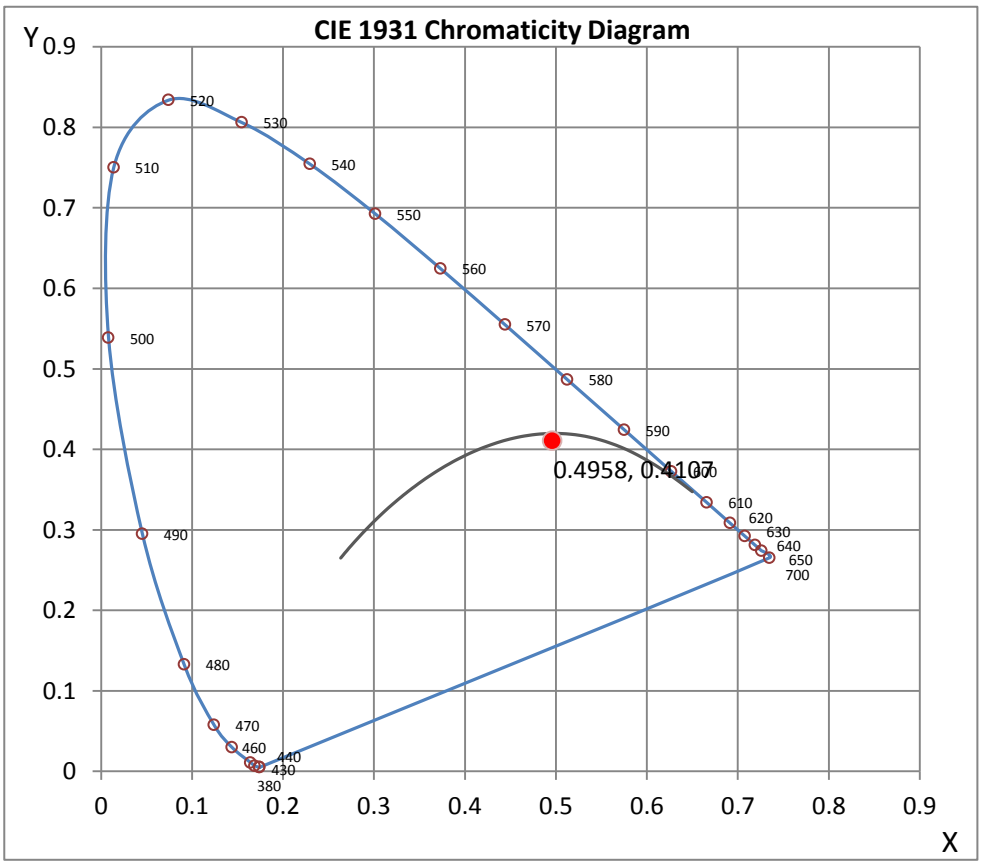
Wavelength	W/m²nm	440	0.0484	510	0.2431	580	0.6792	650	0.9056	720	0.2230
380	0.0006	450	0.1716	520	0.2832	590	0.7788	660	0.8083	730	0.1687
390	0.0006	460	0.1840	530	0.3279	600	0.8740	670	0.6975	740	0.1251
400	0.0008	470	0.1642	540	0.3776	610	0.9647	680	0.5860	750	0.0919
410	0.0019	480	0.1392	550	0.4341	620	0.9943	690	0.4793	760	0.0661
420	0.0056	490	0.1591	560	0.5015	630	1.0000	700	0.3821	770	0.0486
430	0.0156	500	0.1995	570	0.5730	640	0.9725	710	0.2992	780	0.0354

CRI & CCT

x	0.4958
y	0.4107
u'	0.2859
v'	0.5329
CRI	90.70
CCT	2268
Duv	-0.00148

R Values

R1	91.33
R2	98.01
R3	95.74
R4	89.43
R5	91.80
R6	97.14
R7	87.01
R8	75.02
R9	52.05
R10	95.03
R11	90.80
R12	88.68
R13	93.23
R14	98.80



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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: 9*

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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011504203.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L011504203
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 1/21/2015
[MANUFAC] AION LED
[LUMCAT] 8924-24-x
[LUMINAIRE] 1/2"L. X 12"W. X 1/8"H. LED STRIP
[BALLASTCAT] N.A.
[BALLAST] N.A.
[LAMPPOSITION] 0,0
[LAMPCAT] N/A
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 24VDC, 5.65W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	389
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	69
Total Luminaire Watts	5.65
Ballast Factor	1.00
CIE Type	Direct
Spacing Criterion (0-180)	1.26
Spacing Criterion (90-270)	1.26
Spacing Criterion (Diagonal)	1.38
Basic Luminous Shape	Rectangular
Luminous Length (0-180)	0.03 ft
Luminous Width (90-270)	0.96 ft
Luminous Height	0.00 ft

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	48122	48191	48122
55	46123	46156	46182
65	42507	42586	42507
75	35865	36111	35995
85	25106	25620	25448

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011504203.IES

CANDELA TABULATION

	0	5	10	15	20	25	30	35	40	45
0	136.66	136.66	136.66	136.66	136.66	136.66	136.66	136.66	136.66	136.66
5	135.94	136.06	136.02	136.02	136.02	135.94	135.98	135.94	135.85	135.98
10	134.24	134.24	134.28	134.24	134.24	134.24	134.24	134.28	134.32	134.32
15	131.01	131.18	131.06	131.10	131.18	131.18	131.18	131.18	131.14	131.14
20	127.11	127.03	127.07	127.07	127.07	127.03	127.11	127.11	127.15	127.11
25	121.77	121.72	121.68	121.72	121.72	121.72	121.81	121.89	121.81	121.81
30	115.49	115.53	115.57	115.57	115.57	115.57	115.61	115.61	115.70	115.70
35	108.27	108.36	108.27	108.27	108.36	108.36	108.36	108.36	108.32	108.36
40	100.04	100.04	100.09	100.09	100.17	100.13	100.13	100.21	100.17	100.21
45	91.13	91.09	91.13	91.09	91.09	91.22	91.18	91.13	91.09	91.26
50	81.29	81.25	81.29	81.29	81.33	81.33	81.37	81.33	81.37	81.42
55	70.85	70.85	70.81	70.81	70.90	70.90	70.85	70.90	70.90	70.90
60	59.65	59.61	59.65	59.65	59.69	59.69	59.74	59.78	59.69	59.78
65	48.11	48.03	48.03	48.07	48.03	48.11	48.11	48.20	48.15	48.20
70	36.15	36.23	36.23	36.23	36.23	36.28	36.32	36.28	36.32	36.32
75	24.86	24.95	24.90	24.90	24.90	24.99	24.99	25.03	24.95	25.03
80	14.60	14.55	14.64	14.64	14.68	14.64	14.68	14.68	14.72	14.68
85	5.86	5.86	5.86	5.86	5.98	5.98	5.98	6.03	5.98	5.98
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Vert. Angles	**Horizontal Angles**								
	50	55	60	65	70	75	80	85	90
0	136.66	136.66	136.66	136.66	136.66	136.66	136.66	136.66	136.66
5	135.94	135.94	136.02	135.85	135.94	136.02	135.89	135.98	135.94
10	134.32	134.32	134.32	134.32	134.32	134.32	134.37	134.37	134.24
15	131.14	131.14	131.14	131.23	131.18	131.10	131.14	131.23	131.18
20	127.11	127.15	127.15	127.11	127.15	127.20	127.15	127.11	127.20
25	121.81	121.85	121.93	121.89	121.81	121.77	121.81	121.68	121.93
30	115.66	115.70	115.70	115.66	115.70	115.74	115.74	115.70	115.66
35	108.36	108.32	108.32	108.44	108.53	108.40	108.40	108.40	108.36
40	100.25	100.25	100.25	100.25	100.25	100.25	100.21	100.25	100.30
45	91.22	91.26	91.26	91.13	91.22	91.18	91.13	91.22	91.13
50	81.37	81.37	81.37	81.37	81.42	81.46	81.46	81.42	81.46
55	70.90	70.90	70.90	70.90	70.94	70.81	70.98	70.94	70.94
60	59.74	59.78	59.78	59.82	59.74	59.78	59.78	59.78	59.82
65	48.20	48.15	48.15	48.15	48.15	48.11	48.11	48.11	48.11
70	36.32	36.32	36.36	36.32	36.36	36.40	36.36	36.32	36.32
75	24.95	25.03	25.03	25.03	25.03	25.03	25.07	24.99	24.95
80	14.68	14.76	14.76	14.72	14.72	14.72	14.68	14.72	14.68
85	5.98	5.94	5.98	5.98	5.98	5.90	5.86	5.90	5.94
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
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ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	49.96	N.A.	12.80
0-30	106.11	N.A.	27.30
0-40	173.89	N.A.	44.70
0-60	307.49	N.A.	79.10
0-80	381.71	N.A.	98.10
0-90	388.94	N.A.	100.00
10-90	376.02	N.A.	96.70
20-40	123.93	N.A.	31.90
20-50	194.23	N.A.	49.90
40-70	181.19	N.A.	46.60
60-80	74.23	N.A.	19.10
70-80	26.63	N.A.	6.80
80-90	7.23	N.A.	1.90
90-110	0.00	N.A.	0.00
90-120	0.00	N.A.	0.00
90-130	0.00	N.A.	0.00
90-150	0.00	N.A.	0.00
90-180	0.00	N.A.	0.00
110-180	0.00	N.A.	0.00
0-180	388.94	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	12.93
10-20	37.03
20-30	56.15
30-40	67.78
40-50	70.29
50-60	63.30
60-70	47.60
70-80	26.63
80-90	7.23
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011504203.IES

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

Effective Floor Cavity Reflectance 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	109	104	100	96	106	102	98	94	97	94	91	93	91	88	90	88	86	84
2	99	91	84	78	96	89	82	77	85	80	75	82	77	73	79	75	72	70
3	90	79	71	65	88	78	70	64	75	68	63	72	67	62	70	65	61	59
4	82	70	62	55	80	69	61	54	66	59	54	64	58	53	62	57	52	50
5	76	63	54	47	74	62	53	47	60	52	46	58	51	46	56	50	45	43
6	70	57	48	41	68	56	47	41	54	46	41	52	45	40	50	44	40	38
7	65	51	42	36	63	50	42	36	49	41	36	47	41	36	46	40	35	33
8	60	47	38	32	59	46	38	32	45	37	32	43	37	32	42	36	32	30
9	56	43	35	29	55	42	34	29	41	34	29	40	33	29	39	33	28	27
10	53	40	32	26	52	39	31	26	38	31	26	37	31	26	36	30	26	24

IES INDOOR REPORT
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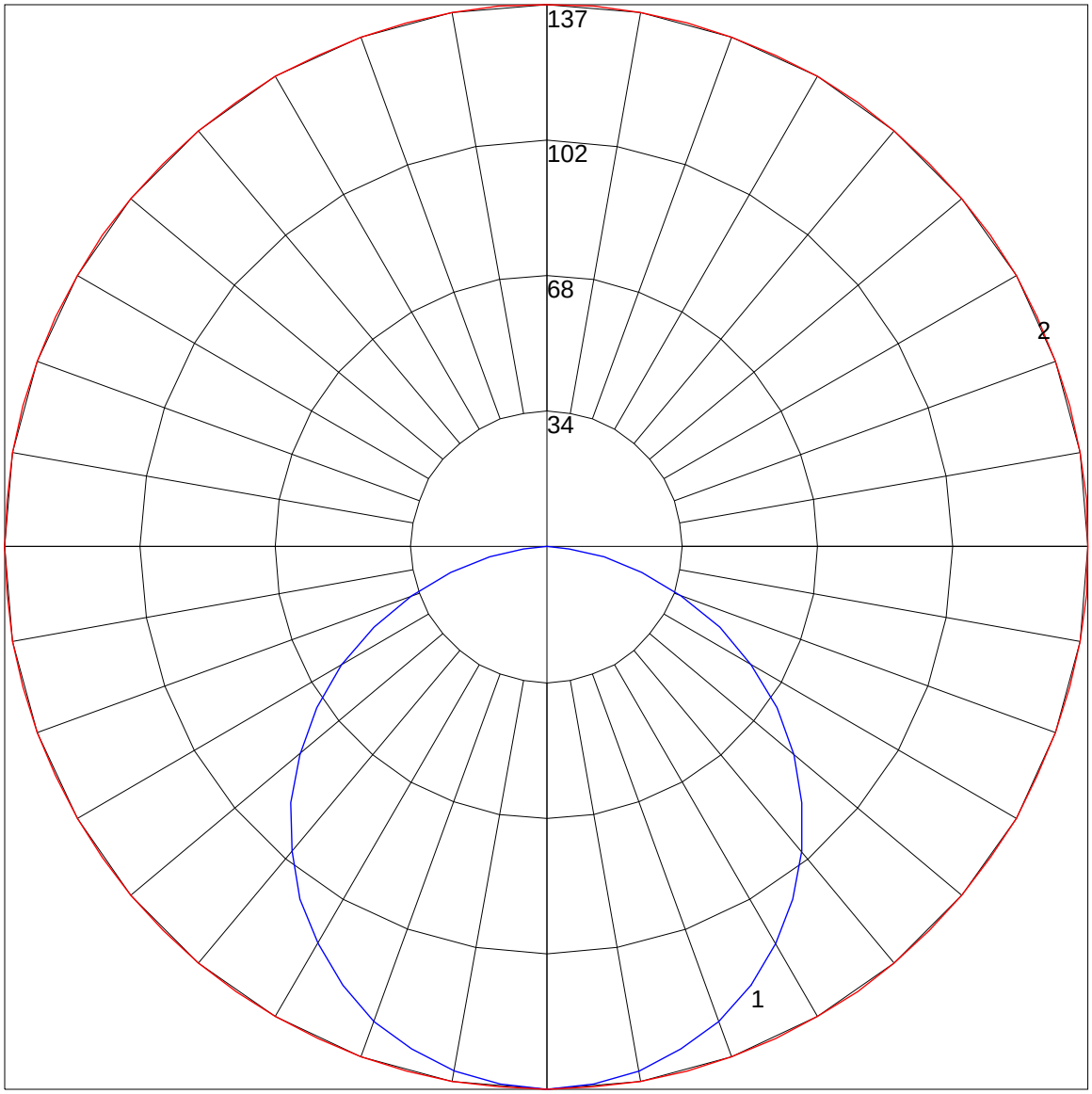
POLAR GRAPH



Maximum Candela = 136.66 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)