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

Report No: L111603207R02
Date: 11/30/2016

NVLAP LAB CODE 200927-0

Report No: **L111603207R02**

Report Prepared For: Vode Lighting
1206 E. MacArthur St. #3 Sonoma, CA 95476

Model Number: **707-Z3-48-Z-SO-35-U1**

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 707-Z3-48-Z-SO-35-U1 . Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 11/15/16

Date of Tests: 11/16/16 - 11/17/16

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	11/18/16
Xitron Power Analyzer	2503AH	MT-EL01	11/30/16
ITECH DC Power Supply	IT6122	PSDC-03-S1	11/17/16
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/24/16
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:	Vode Lighting
Model Number:	707-Z3-48-Z-SO-35-U1
Driver Model Number:	MEAN WELL HLG-40H-36A
Total Lumens:	3618.20
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.23
Input Power (W):	27.64
Input Power Factor:	0.99
Current ATHD @ 120V(%):	9%
Current ATHD @ 277V(%):	N/A
Efficacy:	131
Color Rendering Index (CRI):	84
Correlated Color Temperature (K):	3449
Chromaticity Coordinate x:	0.4092
Chromaticity Coordinate y:	0.3948
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:20
Off State Power(W):	0.00

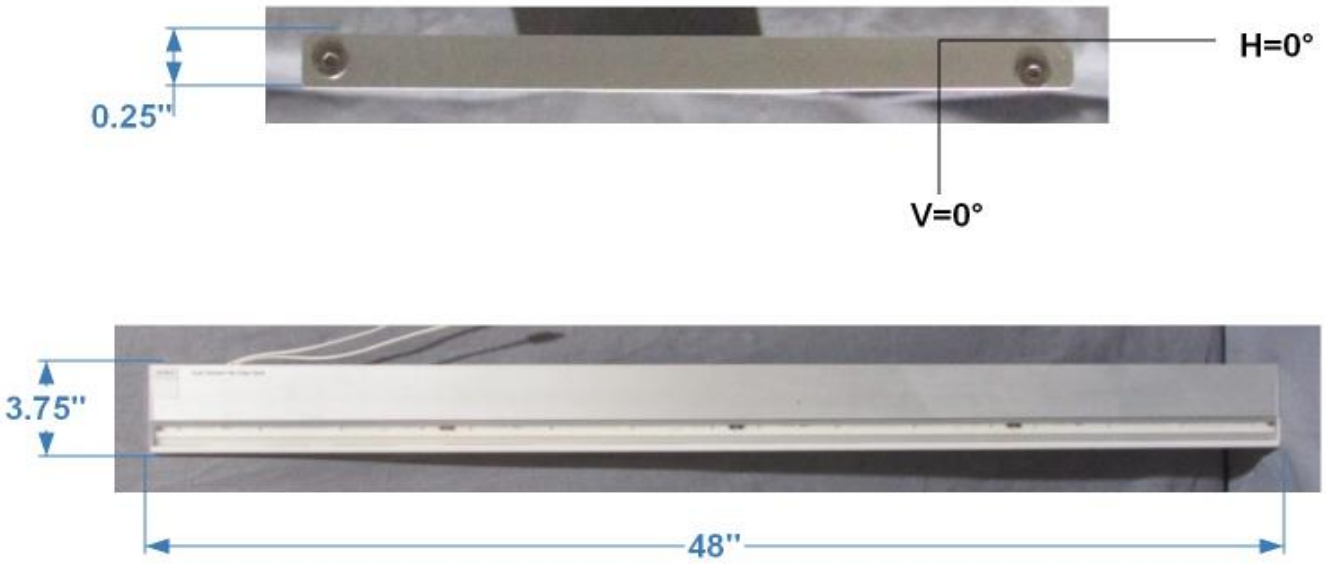

FIG. 1 LUMINAIRE

*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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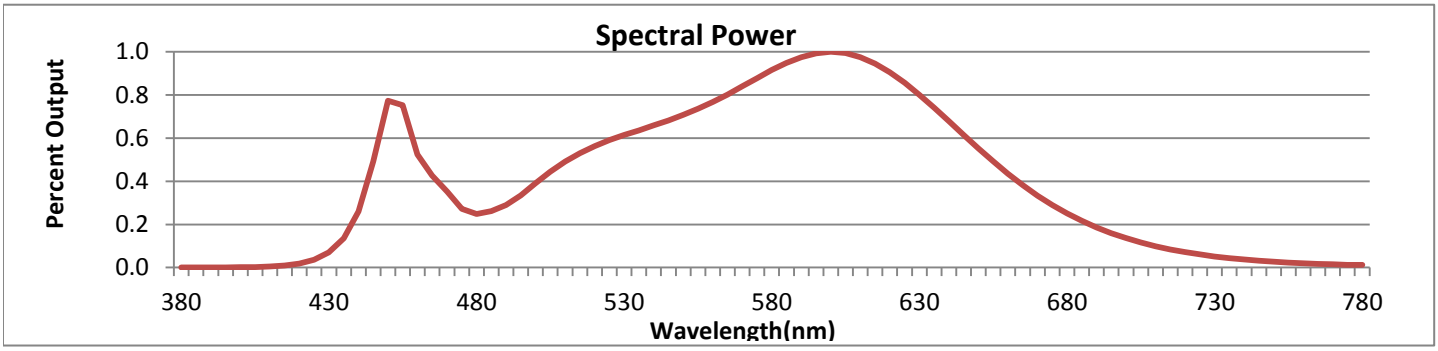


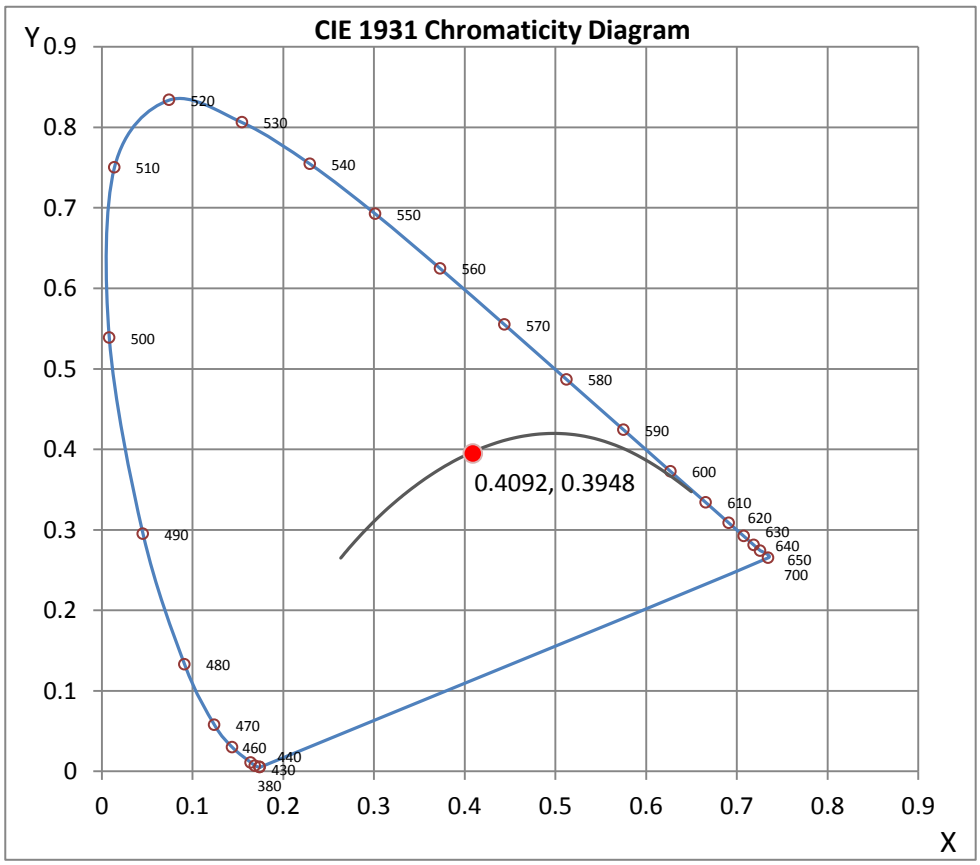
Wavelength	W/m²nm	440	0.2599	510	0.4918	580	0.9157	650	0.5529	720	0.0714
380	0.0009	450	0.7732	520	0.5634	590	0.9756	660	0.4357	730	0.0516
390	0.0009	460	0.5245	530	0.6145	600	1.0000	670	0.3335	740	0.0373
400	0.0015	470	0.3525	540	0.6590	610	0.9752	680	0.2511	750	0.0272
410	0.0045	480	0.2483	550	0.7080	620	0.9063	690	0.1860	760	0.0199
420	0.0185	490	0.2903	560	0.7677	630	0.8005	700	0.1365	770	0.0146
430	0.0701	500	0.3902	570	0.8407	640	0.6783	710	0.0990	780	0.0126

CRI & CCT

x	0.4092
y	0.3948
u'	0.2366
v'	0.5135
CRI	83.50
CCT	3449
Duv	0.00093

R Values

R1	82.01
R2	90.77
R3	96.63
R4	81.74
R5	81.70
R6	87.55
R7	84.96
R8	62.68
R9	10.35
R10	78.02
R11	80.85
R12	64.68
R13	84.23
R14	98.33



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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: 10*

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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111603207R02.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L111603207R02
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 11/30/2016
[MANUFAC] VODE LIGHTING
[LUMCAT] 707-Z3-48-Z-SO-35-U1
[LUMINAIRE] ZIPTHREE, 48", 3500K, ZIPPER BOARD,
[MORE] CEILING WASH UPLIGHT ONLY, STANDARD OUTPUT
[BALLASTCAT] MEAN WELL HLG-40H-36A
[LAMPPOSITION] 0,0
[LAMPCAT] N/A
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 120VAC, 27.64W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	3620
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	131
Total Luminaire Watts	27.64
Ballast Factor	1.00
CIE Type	Indirect
Spacing Criterion (0-180)	N.A.
Spacing Criterion (90-270)	N.A.
Spacing Criterion (Diagonal)	N.A.
Basic Luminous Shape	Rectangular
Luminous Length (0-180)	0.06 ft
Luminous Width (90-270)	3.98 ft
Luminous Height	0.00 ft

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	0	0	0
55	0	0	0
65	0	0	0
75	0	0	0
85	0	0	0

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111603207R02.IES

CANDELA TABULATION

	0	5	10	15	20	25	30	35	40	45
0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0
90	7	7	7	7	7	7	7	7	7	6
95	47	47	47	47	47	47	47	47	47	47
100	107	107	107	107	108	108	108	109	109	110
105	183	183	184	184	185	186	187	188	189	190
110	275	275	276	277	278	279	280	282	283	285
115	382	382	383	384	385	386	388	390	391	393
120	501	501	501	502	504	505	507	509	511	513
125	626	626	627	628	629	631	632	634	636	638
130	752	752	752	753	754	755	757	759	761	762
135	870	870	870	871	872	873	874	875	877	878
140	976	976	976	976	977	977	978	979	981	982
145	1066	1066	1067	1067	1067	1068	1068	1069	1070	1071
150	1143	1143	1143	1144	1144	1144	1145	1145	1146	1147
155	1206	1206	1207	1207	1207	1207	1208	1208	1208	1209
160	1257	1257	1257	1257	1257	1257	1257	1258	1258	1258
165	1294	1295	1295	1295	1295	1295	1295	1295	1295	1295
170	1320	1320	1320	1320	1320	1320	1320	1320	1320	1320
175	1334	1334	1334	1334	1334	1334	1334	1334	1334	1334
180	1336	1336	1336	1336	1336	1336	1336	1336	1336	1336

Vert. Angles **Horizontal Angles**

	50	55	60	65	70	75	80	85	90
0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111603207R02.IES

CANDELA TABULATION - (Cont.)

65	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0
90	6	6	6	5	5	5	5	5	5
95	47	47	47	47	47	47	46	46	46
100	110	111	111	112	112	112	112	112	112
105	191	192	193	194	194	195	195	195	195
110	286	288	289	290	291	292	293	293	293
115	395	397	399	400	401	403	403	404	404
120	515	517	519	521	522	524	525	525	525
125	640	642	644	646	647	649	650	651	651
130	764	765	767	769	770	772	773	773	774
135	880	881	882	884	885	886	887	887	888
140	983	984	986	987	988	989	989	990	990
145	1072	1073	1074	1075	1076	1077	1077	1077	1078
150	1147	1148	1149	1150	1150	1151	1151	1151	1151
155	1209	1210	1210	1210	1211	1211	1211	1211	1211
160	1258	1259	1259	1259	1259	1259	1259	1259	1259
165	1295	1295	1295	1295	1295	1295	1295	1295	1295
170	1320	1320	1320	1320	1320	1320	1320	1320	1320
175	1334	1334	1334	1334	1334	1334	1334	1334	1334
180	1336	1336	1336	1336	1336	1336	1336	1336	1336

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111603207R02.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	0.00	N.A.	0.00
0-30	0.00	N.A.	0.00
0-40	0.00	N.A.	0.00
0-60	0.00	N.A.	0.00
0-80	0.00	N.A.	0.00
0-90	1.69	N.A.	0.00
10-90	1.69	N.A.	0.00
20-40	0.00	N.A.	0.00
20-50	0.00	N.A.	0.00
40-70	0.00	N.A.	0.00
60-80	0.00	N.A.	0.00
70-80	0.00	N.A.	0.00
80-90	1.69	N.A.	0.00
90-110	261.10	N.A.	7.20
90-120	652.98	N.A.	18.00
90-130	1223.61	N.A.	33.80
90-150	2568.97	N.A.	71.00
90-180	3618.2	N.A.	100.00
110-180	3357.1	N.A.	92.70
0-180	3619.89	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	0.00
10-20	0.00
20-30	0.00
30-40	0.00
40-50	0.00
50-60	0.00
60-70	0.00
70-80	0.00
80-90	1.69
90-100	57.06
100-110	204.04
110-120	391.88
120-130	570.63
130-140	676.04
140-150	669.32
150-160	556.85
160-170	365.52
170-180	126.86

IES INDOOR REPORT
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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	95	95	95	95	81	81	81	81	56	56	56	32	32	32	10	10	10	0
1	87	83	79	76	74	71	68	65	48	47	45	28	27	26	9	9	8	0
2	79	72	66	62	67	62	57	53	42	40	37	24	23	22	8	7	7	0
3	72	63	56	51	61	54	49	44	37	34	31	21	20	18	7	6	6	0
4	65	56	48	43	56	48	42	37	33	29	26	19	17	16	6	6	5	0
5	60	49	42	36	51	42	36	32	29	25	22	17	15	13	5	5	4	0
6	55	44	36	31	47	38	32	27	26	22	19	15	13	11	5	4	4	0
7	50	39	32	27	43	34	28	23	23	19	17	14	11	10	4	4	3	0
8	47	35	28	23	40	30	24	20	21	17	14	12	10	9	4	3	3	0
9	43	32	25	20	37	27	22	18	19	15	13	11	9	8	4	3	3	0
10	40	29	22	18	34	25	19	16	17	14	11	10	8	7	3	3	2	0

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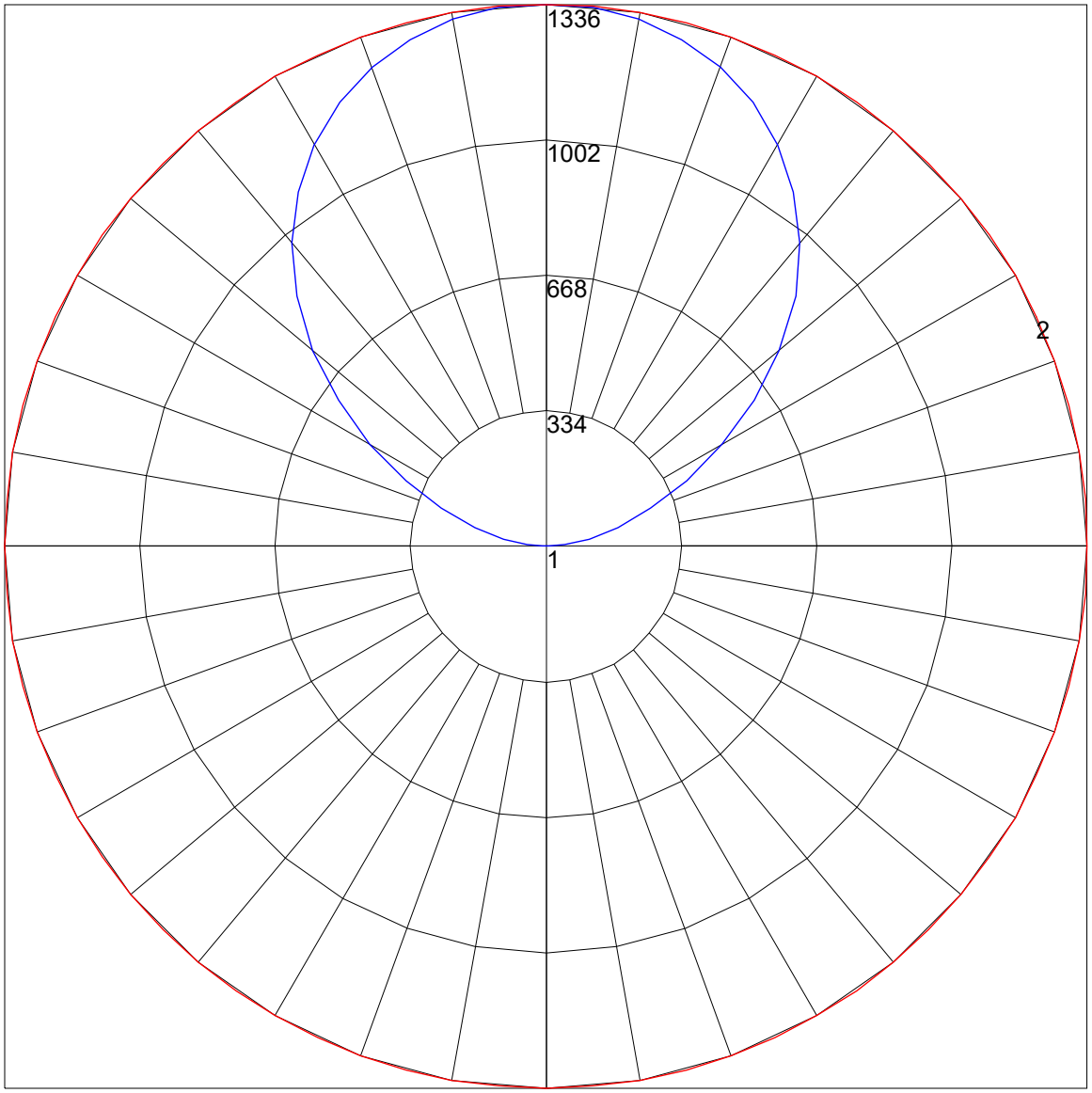
POLAR GRAPH



Maximum Candela = 1336 Located At Horizontal Angle = 0, Vertical Angle = 180
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (180) (Through Max. Cd.)