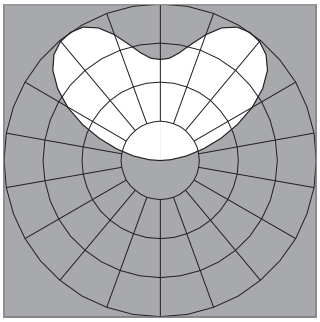
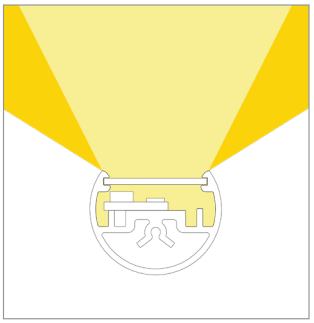




IES Report

RaceRail® | 107 | 120° Batwing Lens | 90 CRI | SO

107-RR-XX-4-48-XX-XX-XX-XX-X-X-Z-SO-359-G1-X-XX-X

	2700K	3000K	3500K	4000K
Efficacy - Lumens per Watt	95	98	100	102
Total Lumens, 4’ rail length (1219mm)	2264	2336	2384	2431
Lumens per foot (305mm)	566	584	596	608
Input Power (W), 4’ rail length (1219mm)	24.1	24.1	24.1	24.1
Watts per foot (305mm)	6.1	6.1	6.1	6.1
CRI	96	96	96	96

Due to the large number of options in Vode’s product offering, most Vode IES reports are factored reports prepared from source reports. Source reports are the IES test reports prepared for Vode by an NVLAP accredited photometric test laboratory. Factored reports are based on data from the Vode source reports.

If the data above is in black, it is directly from a Vode source report. If it is in grey, it is factored from Vode source reports. Reference details on Vode source reports can be found on the IES File Finder page on vode.com.

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

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: L011800113 **Issue Date: 1/12/2018**

Report Prepared For: Vode Lighting
21684 8th Street East, Suite 700, Sonoma, CA 95476

Model Number: 107-RR-48-Z-SO-359-G1

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 no special conditions.

Sample Arrival Date: 1/2/18

Date of Tests: 1/10/18 - 1/12/18

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.

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

NVLAP TESTING
NVLAP LAB CODE 200927-0

Test Summary	
Manufacturer:	Vode Lighting
Model Number:	107-RR-48-Z-SO-359-G1
Driver Model Number:	MEAN WELL HLG-40H-36A
Total Lumens:	2383.67
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.2
Input Power (W):	24.00
Input Power Factor:	0.99
Current ATHD @ 120V(%):	10%
Current ATHD @ 277V(%):	N/A
Efficacy:	99
Color Rendering Index (CRI):	96
Correlated Color Temperature (K):	3334
Chromaticity Coordinate x:	0.4140
Chromaticity Coordinate y:	0.3930
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:45
Total Operating Time (Hours):	1:40

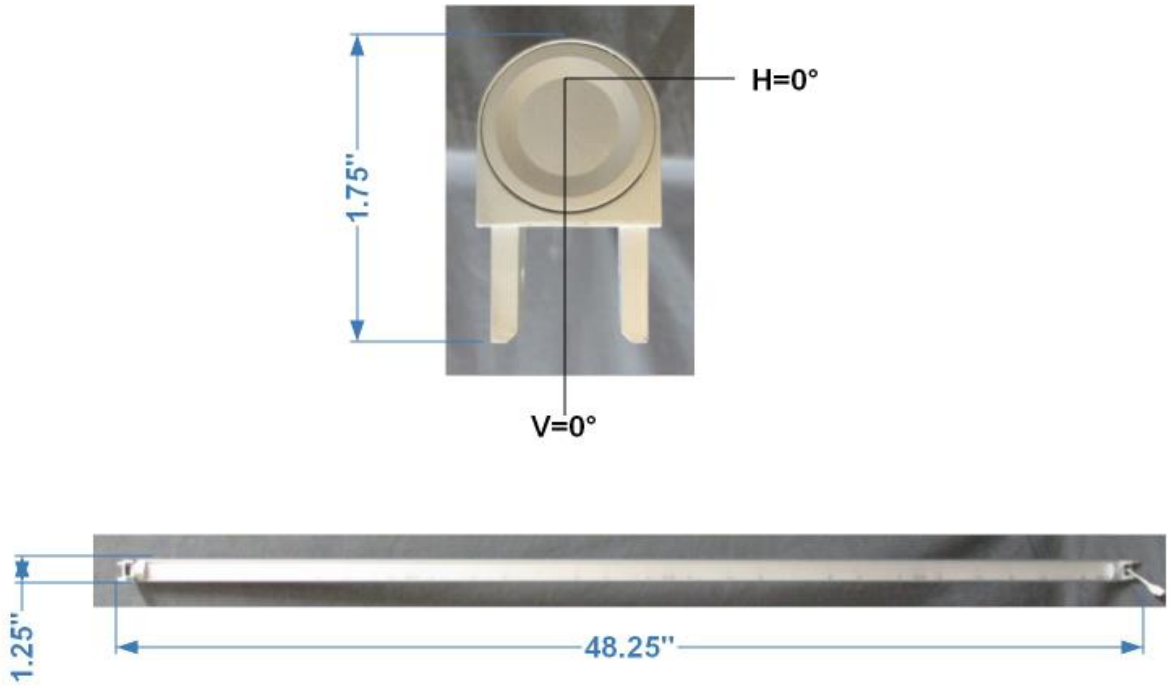


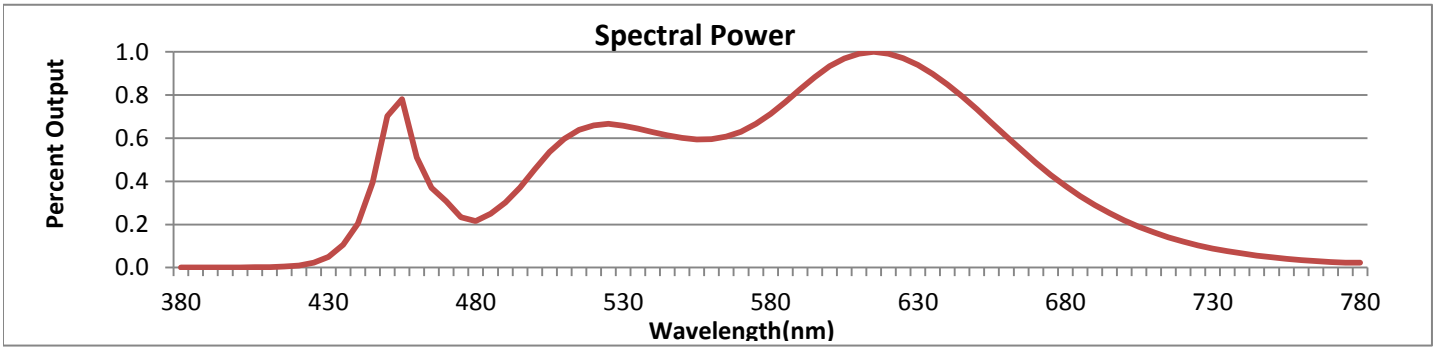
FIG. 1 LUMINAIRE

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

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

Report No: L011800113

NVLAP TESTING
NVLAP LAB CODE 200927-0



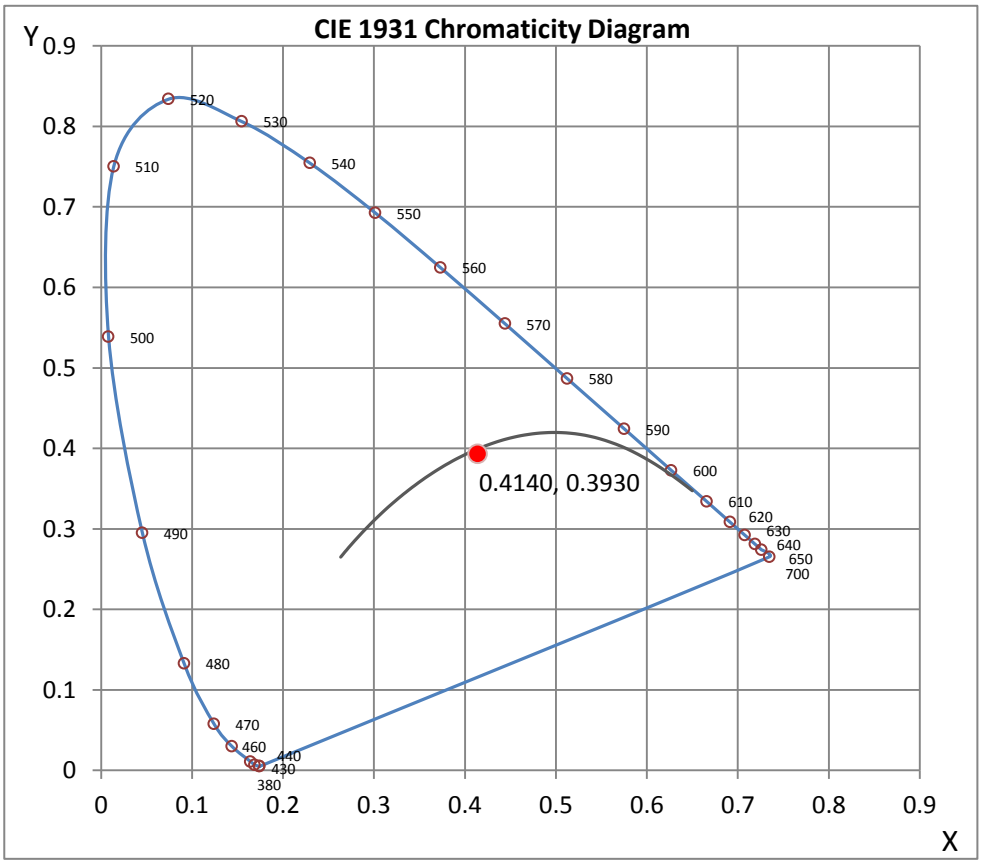
Wavelength	W/m²nm	440	0.2044	510	0.5978	580	0.7125	650	0.7345	720	0.1204
380	0.0009	450	0.7030	520	0.6600	590	0.8274	660	0.6087	730	0.0885
390	0.0009	460	0.5103	530	0.6586	600	0.9339	670	0.4850	740	0.0651
400	0.0011	470	0.3083	540	0.6279	610	0.9920	680	0.3786	750	0.0479
410	0.0023	480	0.2154	550	0.6011	620	0.9920	690	0.2892	760	0.0353
420	0.0097	490	0.3012	560	0.5956	630	0.9404	700	0.2185	770	0.0261
430	0.0498	500	0.4567	570	0.6302	640	0.8497	710	0.1632	780	0.0225

CRI & CCT

x	0.4140
y	0.3930
u'	0.2404
v'	0.5135
CRI	95.70
CCT	3334
Duv	-0.00081

R Values

R1	97.43
R2	98.83
R3	98.96
R4	95.35
R5	97.51
R6	94.27
R7	94.40
R8	88.81
R9	73.28
R10	98.15
R11	88.22
R12	83.01
R13	97.07
R14	98.44



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

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

NVLAP TESTING
NVLAP LAB CODE 200927-0

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*

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

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

Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011800113.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L011800113
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 1/12/2018
[MANUFAC] Vode Lighting
[LUMCAT] 107-RR-48-Z-SO-359-G1
[LUMINAIRE] RaceRail LED, 48", 3500K, 90 CRI, zipper board,
[MORE] 120° batwing lens, standard output
[BALLASTCAT] MEAN WELL HLG-40H-36A
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 120VAC, 24.00W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2384
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	99
Total Luminaire Watts	24
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)	0.08 ft
Luminous Width (90-270)	3.85 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 : L011800113.IES

CANDELA TABULATION

	0	5	10	15	20	25	30	35	40	45
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	56.22	56.47	57.21	58.29	59.58	60.91	61.57	61.45	59.83	56.34
100	141.66	141.91	142.53	143.24	143.99	144.28	143.65	141.45	136.93	129.37
105	236.07	236.24	236.90	237.82	238.40	238.44	236.86	233.13	225.86	213.86
110	340.04	340.24	340.91	341.41	341.66	340.82	338.04	332.31	321.81	304.04
115	448.90	449.02	449.35	449.48	448.81	446.57	441.51	432.33	416.60	392.39
120	558.34	558.26	557.76	556.47	553.69	548.37	539.61	525.04	502.95	472.06
125	657.24	656.78	654.74	651.59	645.86	636.89	623.73	603.84	575.53	538.29
130	735.87	734.83	731.64	726.07	717.31	704.57	686.96	661.80	628.09	586.82
135	786.86	785.69	781.25	773.74	762.61	746.79	725.70	697.55	661.89	619.37
140	813.76	812.14	807.08	798.48	785.82	768.34	746.09	716.57	680.28	638.10
145	821.40	819.32	813.84	804.67	791.34	772.91	749.57	719.47	683.27	643.04
150	808.61	806.83	800.76	790.88	776.35	756.84	732.92	703.86	669.98	634.15
155	768.42	766.51	760.74	750.74	736.66	718.35	696.84	671.06	642.75	614.18
160	703.57	701.95	696.72	688.83	677.37	662.97	646.90	628.46	608.78	589.31
165	630.75	629.88	626.84	621.95	615.39	607.12	597.91	587.24	576.32	565.27
170	573.29	572.91	571.46	569.38	566.56	563.03	559.09	554.60	549.91	545.26
175	539.32	539.45	539.12	538.70	538.20	537.54	536.67	535.84	534.96	533.88
180	530.00	530.00	530.00	530.00	530.00	530.00	530.00	530.00	530.00	530.00

Vert. Angles	**Horizontal Angles**								
	50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011800113.IES

CANDELA TABULATION - (Cont.)

65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95	50.98	44.51	38.07	33.13	30.10	28.44	27.49	26.86	26.16
100	117.87	104.17	90.68	80.38	73.99	70.50	68.51	67.34	66.68
105	195.30	173.13	151.63	134.60	124.02	118.04	114.80	113.14	112.43
110	277.59	246.58	215.56	191.48	175.75	167.07	162.54	160.47	159.76
115	357.52	317.41	278.30	247.16	226.77	214.77	208.42	205.56	204.85
120	429.22	382.38	336.51	299.47	274.64	259.53	251.64	247.99	246.87
125	490.58	438.02	387.24	346.22	317.95	300.47	290.92	286.39	285.15
130	535.42	482.15	429.38	387.37	356.73	337.38	326.50	321.35	319.86
135	567.81	515.37	465.17	423.07	392.02	371.59	359.47	353.61	351.74
140	589.06	539.03	491.83	453.30	423.82	403.48	390.65	384.21	382.14
145	597.95	553.36	511.84	478.13	451.55	432.33	420.00	413.48	411.03
150	596.12	558.46	524.96	496.85	474.89	458.03	446.99	440.72	438.60
155	584.58	557.18	532.47	510.80	493.61	480.49	471.57	466.25	464.18
160	569.96	551.49	534.72	520.10	508.02	498.76	492.62	488.51	487.34
165	553.69	543.31	533.72	525.62	518.98	513.29	509.35	506.73	505.86
170	540.69	536.42	532.43	528.82	525.66	523.05	521.14	519.93	519.73
175	532.76	531.89	531.02	530.23	529.53	528.74	528.40	527.99	528.03
180	530.00	530.00	530.00	530.00	530.00	530.00	530.00	530.00	530.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011800113.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	0.00	N.A.	0.00
10-90	0.00	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	0.00	N.A.	0.00
90-110	257.31	N.A.	10.80
90-120	603.43	N.A.	25.30
90-130	1043.87	N.A.	43.80
90-150	1886.95	N.A.	79.20
90-180	2383.67	N.A.	100.00
110-180	2126.36	N.A.	89.20
0-180	2383.67	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	0.00
90-100	56.70
100-110	200.61
110-120	346.12
120-130	440.43
130-140	451.79
140-150	391.29
150-160	283.86
160-170	161.52
170-180	51.34

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011800113.IES

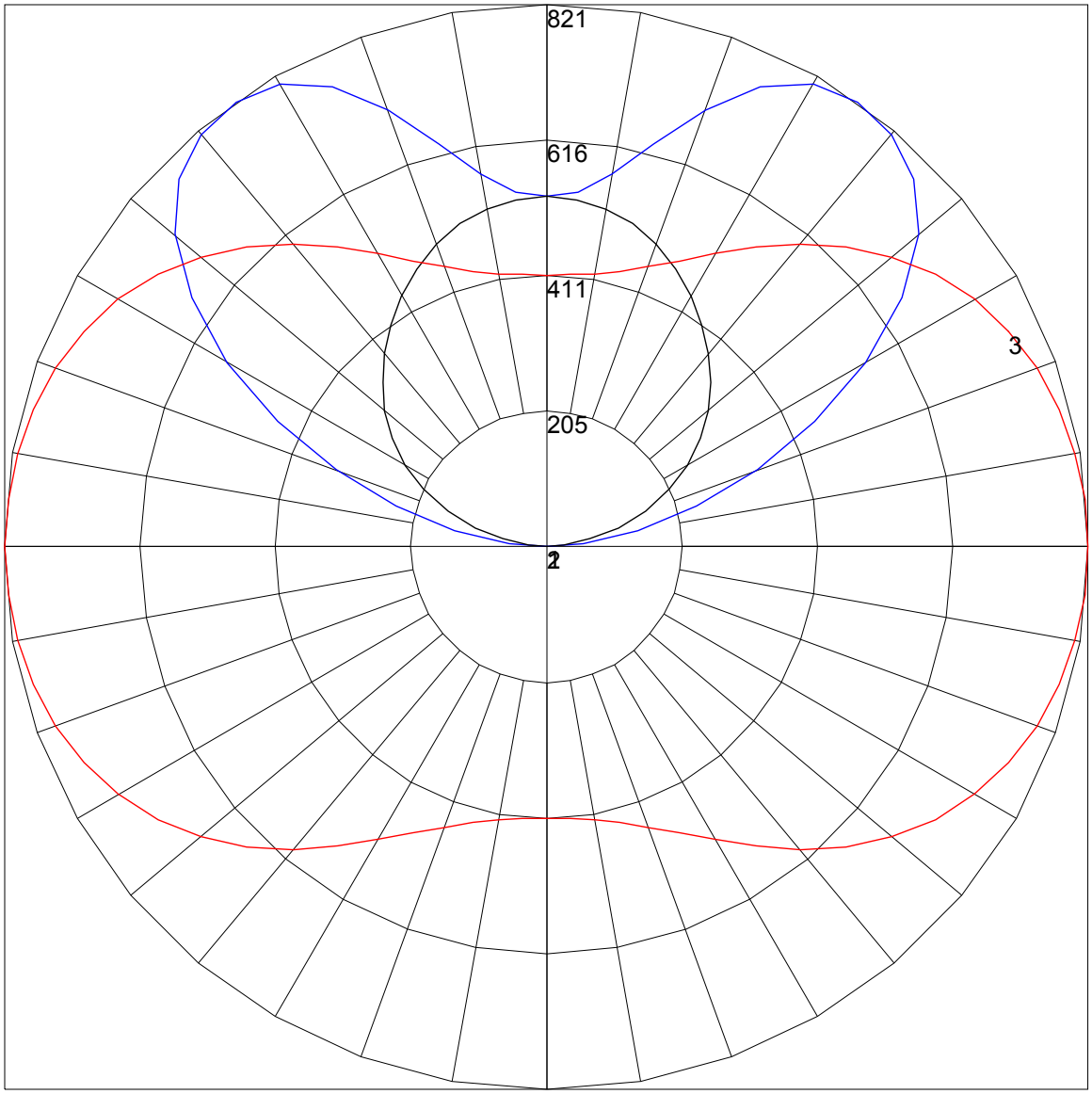
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	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

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L011800113.IES

POLAR GRAPH



Maximum Candela = 821.4 Located At Horizontal Angle = 0, Vertical Angle = 145
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Vertical Plane Through Horizontal Angles (90 - 270)
3 - Horizontal Cone Through Vertical Angle (145) (Through Max. Cd.)