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

Report No: L111400401
Date: 11/4/2014

NVLAP LAB CODE 200927-0

Report No: **L111400401**

Report Prepared For: Bartco Lighting
5761 Research Dr. Huntington Beach, CA 92648

Model Number: **BSS500**

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 BSS500. Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 11/4/14

Date of Tests: 11/4/14 - 11/4/14

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	01/04/15
Xitron Power Analysis System	2503AH	MT-EL01	01/09/15
BK Precision DC Power Supply	1747	PSDC-04	01/08/15
Fluke Digital Thermometer	52k/J	MT-TP02-GC	01/04/15
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:	Bartco Lighting
Model Number:	BSS500
Driver Model Number:	HARVARD COOLLED CL33-700SA-UNI-B
Total Lumens:	2143.84
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.23
Input Power (W):	27.10
Input Power Factor:	0.99
Current ATHD @ 120V(%):	7%
Current ATHD @ 277V(%):	N/A
Efficacy:	79
Color Rendering Index (CRI):	85
Correlated Color Temperature (K):	3542
Chromaticity Coordinate x:	0.4027
Chromaticity Coordinate y:	0.3888
Ambient Temperature (°F):	77.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	2:00
Off State Power(W):	0.00

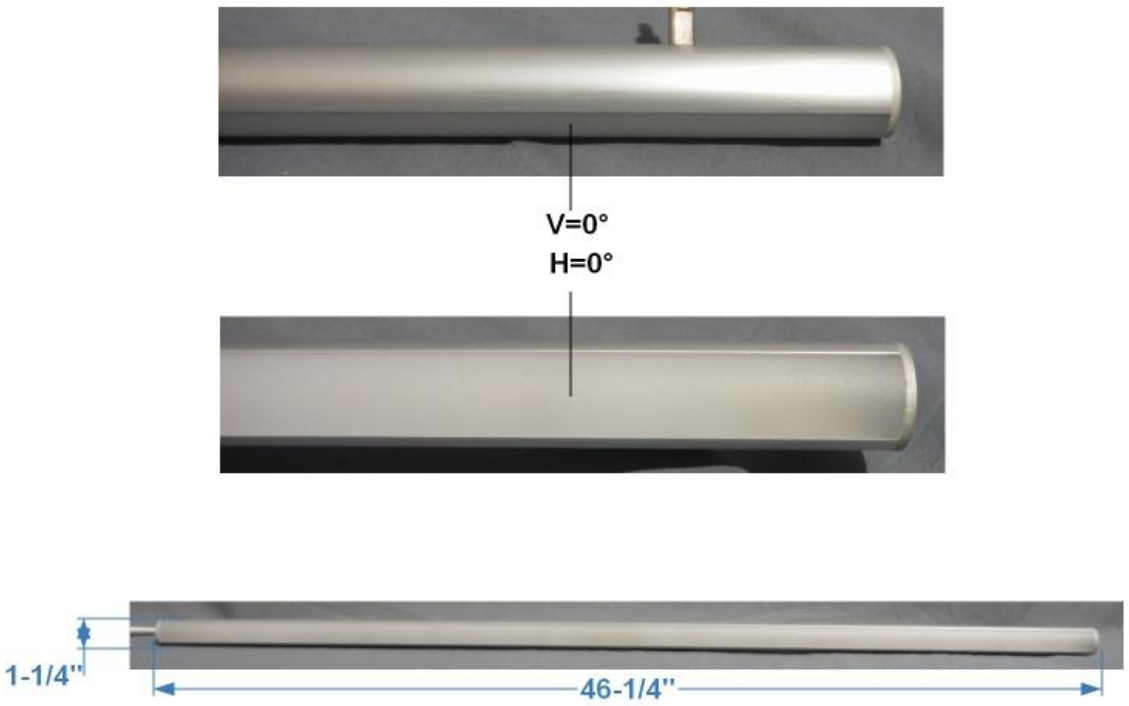

FIG. 1 LUMINAIRE

*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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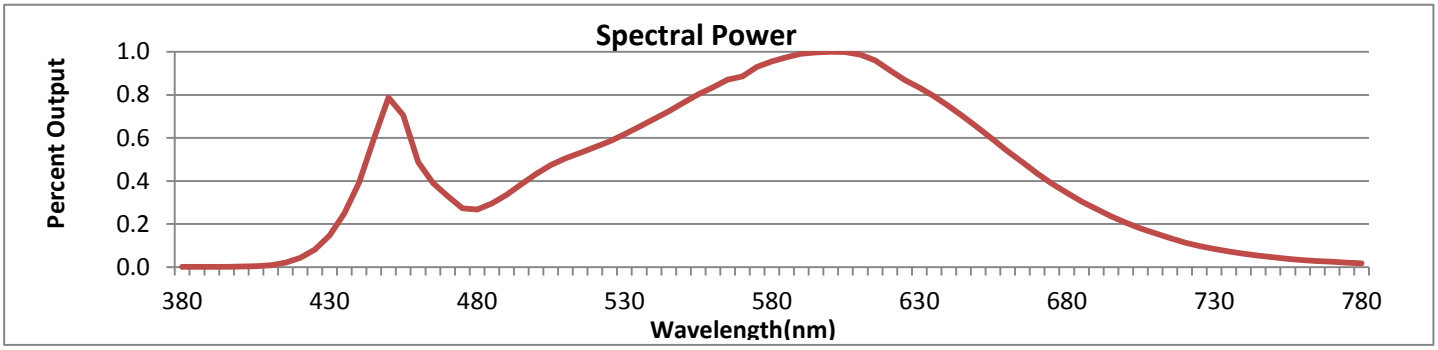


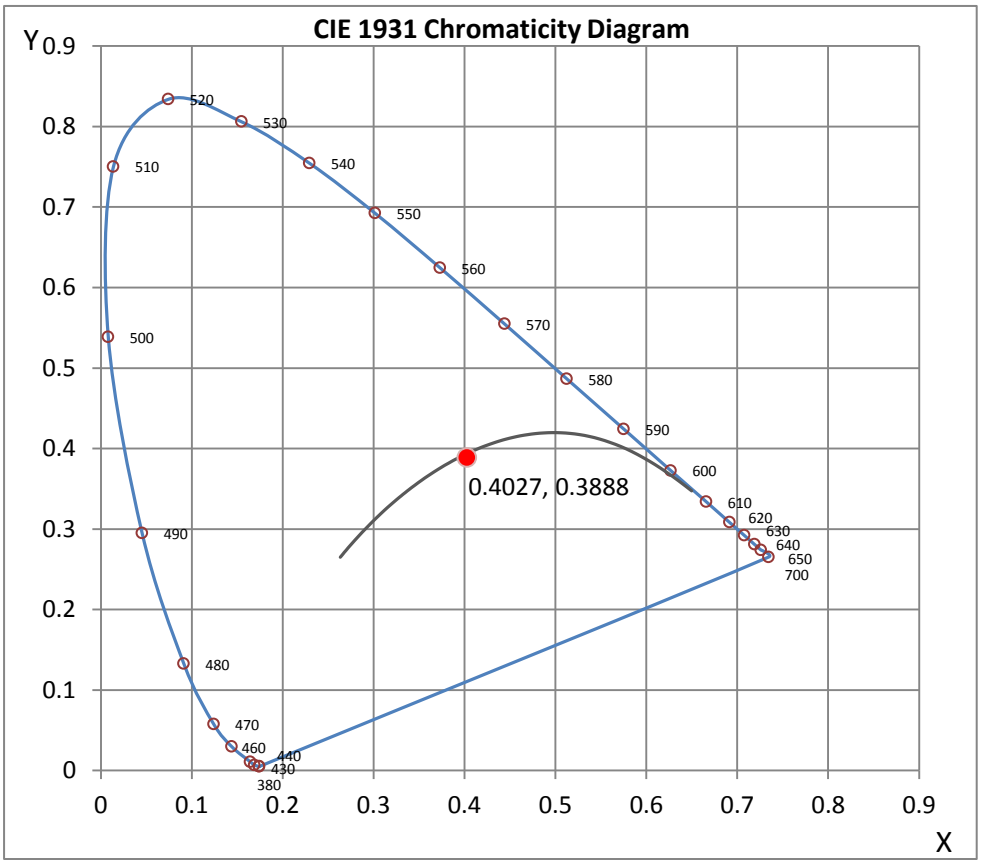
Wavelength	W/m²nm										
380	0.0010	450	0.7877	520	0.5570	590	0.9910	660	0.5379	730	0.0845
390	0.0012	460	0.4869	530	0.6168	600	1.0000	670	0.4348	740	0.0623
400	0.0022	470	0.3297	540	0.6886	610	0.9873	680	0.3455	750	0.0457
410	0.0091	480	0.2676	550	0.7634	620	0.9144	690	0.2697	760	0.0330
420	0.0421	490	0.3352	560	0.8357	630	0.8343	700	0.2069	770	0.0244
430	0.1465	500	0.4330	570	0.8857	640	0.7472	710	0.1567	780	0.0181

CRI & CCT

x	0.4027
y	0.3888
u'	0.2348
v'	0.5101
CRI	85.00
CCT	3542
Duv	-0.00027

R Values

R1	83.44
R2	90.87
R3	95.95
R4	83.38
R5	83.21
R6	87.02
R7	87.43
R8	68.91
R9	24.63
R10	78.10
R11	81.74
R12	68.78
R13	85.09
R14	97.61



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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: 11*

*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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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111400401.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L111400401
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 11/04/2014
[MANUFAC] BRTCO LIGHTING
[LUMCAT] BSS500
[LUMINAIRE] 1-1/4"DIA. X 46-1/4"W. LED FIXTURE
[MORE] DIFFUSED LENS
[BALLASTCAT] HARVARD COOLLED CL33-700SA-UNI-B
[BALLAST] INPUT: 120-277VAC, 0.4A, 50/60Hz OUTPUT: 700/350mA, 33W MAX, 48V MAX
[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, 27.10W
[_TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2144
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	79
Total Luminaire Watts	27.1
Ballast Factor	1.00
CIE Type	Direct
Spacing Criterion (0-180)	1.14
Spacing Criterion (90-270)	1.16
Spacing Criterion (Diagonal)	1.24
Basic Luminous Shape	Rectangular w/Sides
Luminous Length (0-180)	0.08 ft
Luminous Width (90-270)	3.83 ft
Luminous Height	0.02 ft

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111400401.IES

LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	16957	19001	22655
55	13591	15637	19646
65	11162	12840	16702
75	9790	10981	14111
85	9710	10624	12141

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111400401.IES

CANDELA TABULATION

	0	5	10	15	20	25	30	35	40	45
0	865.46	865.46	865.46	865.46	865.46	865.46	865.46	865.46	865.46	865.46
5	858.60	858.72	858.64	858.85	858.76	858.93	858.89	858.97	858.93	858.97
10	839.64	839.60	839.52	839.68	839.89	839.94	840.19	840.15	840.31	840.40
15	807.52	807.65	807.65	807.94	808.15	808.45	808.66	809.07	809.41	809.75
20	763.16	763.37	763.45	764.00	764.58	765.21	765.84	766.60	767.31	768.07
25	707.73	707.93	708.19	709.07	710.20	711.37	712.59	713.72	714.98	716.11
30	643.23	643.44	644.07	645.41	647.05	648.81	650.82	652.75	654.77	656.44
35	572.12	572.37	573.42	575.18	577.49	580.00	582.73	585.49	588.30	590.82
40	498.57	499.11	500.25	502.55	505.32	508.38	511.69	515.34	518.70	521.63
45	427.03	427.45	428.80	431.02	434.20	437.56	441.12	444.98	448.67	451.90
50	360.45	360.99	362.21	364.43	367.41	370.68	373.95	377.68	381.20	384.31
55	301.41	301.78	302.87	304.72	307.32	310.09	313.11	316.12	318.89	321.41
60	250.08	250.25	251.17	252.72	254.74	256.83	259.01	261.19	263.00	264.38
65	206.47	206.64	207.27	208.28	209.53	210.92	212.30	213.43	214.23	214.44
70	170.08	170.16	170.45	171.08	171.80	172.34	172.84	172.97	172.59	171.63
75	139.55	139.59	139.63	139.89	140.01	139.89	139.59	138.79	137.45	135.52
80	114.47	114.60	114.43	114.22	113.89	113.26	112.25	110.74	108.65	105.79
85	93.01	93.01	92.75	92.33	91.62	90.53	88.98	86.93	84.20	80.80
90	75.14	75.14	74.72	74.09	73.09	71.66	69.78	67.47	64.41	60.63
95	60.13	60.00	59.54	58.83	57.70	56.11	54.09	51.53	48.35	44.66
100	47.47	47.34	46.84	46.00	44.83	43.15	41.09	38.54	35.52	31.99
105	36.90	36.65	36.19	35.35	34.22	32.62	30.65	28.26	25.50	22.31
110	28.01	27.84	27.34	26.59	25.45	24.03	22.27	20.09	17.74	15.05
115	20.63	20.46	20.09	19.41	18.41	17.19	15.64	13.92	11.91	9.85
120	14.76	14.68	14.30	13.71	12.96	11.87	10.61	9.27	7.76	6.08
125	10.23	10.06	9.81	9.31	8.72	7.88	6.79	5.75	4.78	3.90
130	6.37	6.37	6.16	5.83	5.45	4.99	4.40	3.82	3.23	2.56
135	4.28	4.28	4.19	4.03	3.69	3.40	3.06	2.64	2.43	2.18
140	2.94	2.94	2.85	2.81	2.73	2.60	2.43	2.35	2.35	0.00
145	2.52	2.56	2.52	2.52	2.52	2.56	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	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	865.46	865.46	865.46	865.46	865.46	865.46	865.46	865.46	865.46
5	859.02	859.10	859.06	859.10	859.06	859.10	859.14	859.10	858.85
10	840.57	840.61	840.82	840.94	840.90	841.07	841.03	841.19	840.98
15	810.00	810.29	810.58	810.71	811.05	811.21	811.21	811.30	811.21
20	768.44	769.03	769.57	769.74	770.12	770.25	770.41	770.46	770.54
25	717.12	718.08	718.80	719.34	719.51	719.97	720.05	720.14	720.14
30	658.29	659.50	660.38	661.10	661.47	661.68	661.81	662.06	661.77
35	592.83	594.47	595.81	596.52	597.07	597.19	597.40	597.44	597.28
40	524.15	526.12	527.46	528.51	528.76	528.89	528.93	528.93	528.84
45	454.67	456.68	458.11	459.03	459.36	459.32	459.15	459.24	458.82
50	386.78	388.71	389.92	390.55	390.64	390.55	390.22	389.92	389.80
55	323.29	324.47	325.31	325.56	325.18	324.72	324.13	323.71	323.46
60	265.30	265.55	265.30	264.67	263.67	262.83	261.86	261.19	260.82

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111400401.IES

CANDELA TABULATION - (Cont.)

65	214.02	212.85	211.34	209.45	207.65	206.05	204.71	203.83	203.37
70	169.87	167.48	164.33	161.06	158.04	155.40	153.47	152.30	151.88
75	132.63	129.02	124.54	119.63	114.77	110.70	107.93	106.51	106.09
80	102.06	97.45	92.04	85.79	79.59	73.67	69.10	67.05	66.50
85	76.44	71.28	65.29	58.62	51.49	44.36	37.40	32.83	31.95
90	56.15	50.86	44.78	37.99	30.90	23.48	15.72	8.26	1.17
95	40.09	35.06	29.48	23.31	17.15	10.86	4.95	1.05	0.50
100	27.93	23.44	18.62	13.50	8.76	4.49	1.47	0.63	0.00
105	18.79	15.10	11.28	7.42	4.19	1.80	0.76	0.00	0.00
110	12.24	9.35	6.50	3.86	2.06	1.05	0.00	0.00	0.00
115	7.63	5.49	3.65	2.18	1.38	0.00	0.00	0.00	0.00
120	4.61	3.31	2.26	1.55	0.00	0.00	0.00	0.00	0.00
125	2.94	2.18	1.72	0.00	0.00	0.00	0.00	0.00	0.00
130	2.22	1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
135	2.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111400401.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	309.25	N.A.	14.40
0-30	638.06	N.A.	29.80
0-40	1005.43	N.A.	46.90
0-60	1636.11	N.A.	76.30
0-80	1983.14	N.A.	92.50
0-90	2063.48	N.A.	96.30
10-90	1982.07	N.A.	92.50
20-40	696.18	N.A.	32.50
20-50	1042.03	N.A.	48.60
40-70	839.92	N.A.	39.20
60-80	347.02	N.A.	16.20
70-80	137.78	N.A.	6.40
80-90	80.34	N.A.	3.70
90-110	64.15	N.A.	3.00
90-120	74.27	N.A.	3.50
90-130	78.39	N.A.	3.70
90-150	80.37	N.A.	3.70
90-180	80.37	N.A.	3.70
110-180	16.22	N.A.	0.80
0-180	2143.84	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	81.41
10-20	227.84
20-30	328.81
30-40	367.37
40-50	345.85
50-60	284.83
60-70	209.24
70-80	137.78
80-90	80.34
90-100	42.48
100-110	21.68
110-120	10.11
120-130	4.12
130-140	1.53
140-150	0.45
150-160	0.00
160-170	0.00
170-180	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111400401.IES

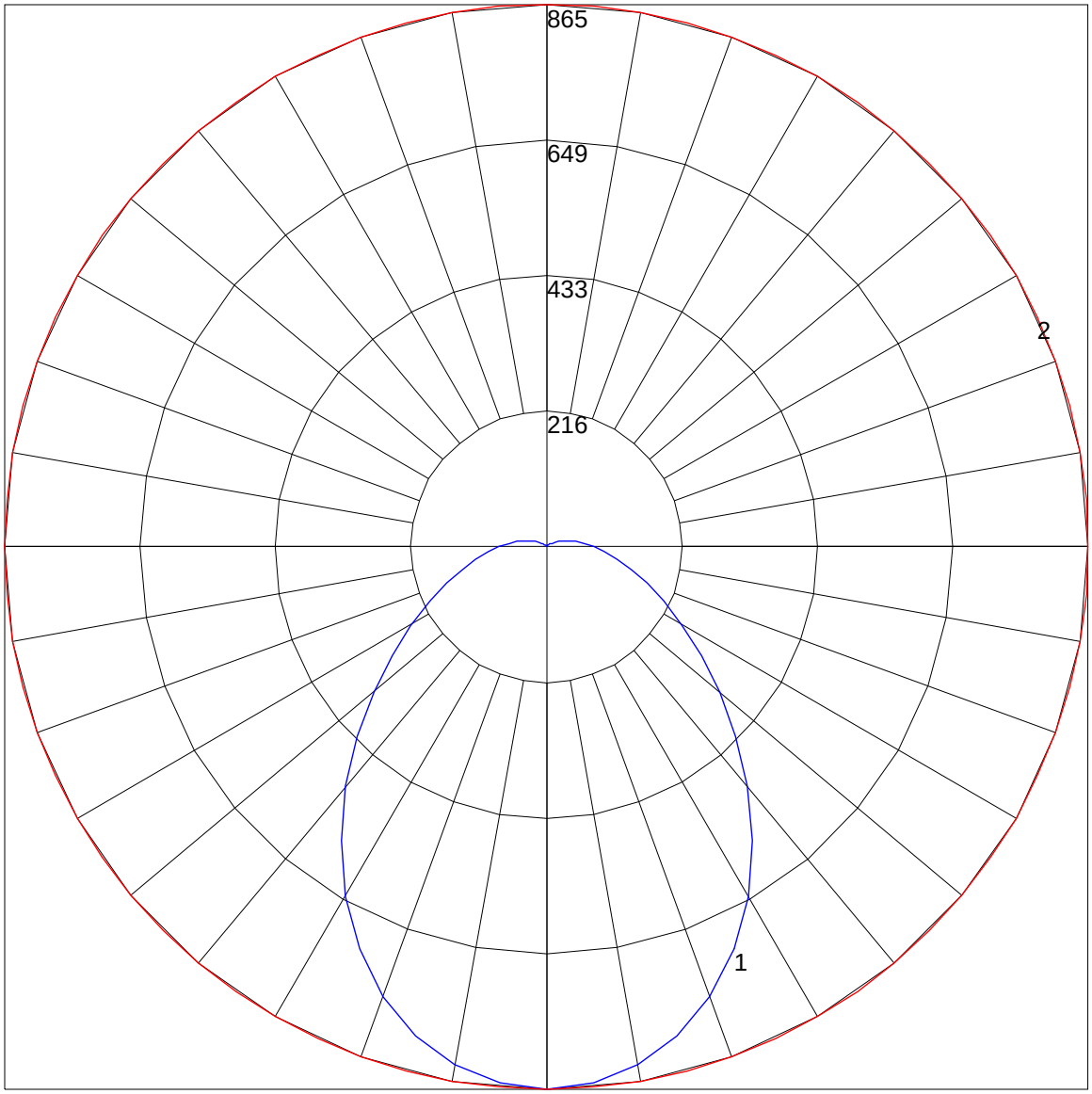
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	118	118	118	118	115	115	115	115	109	109	109	104	104	104	99	99	99	96
1	108	103	98	94	104	100	96	92	95	92	89	90	88	85	86	84	82	80
2	98	90	83	77	95	88	81	76	84	78	74	80	75	72	76	73	69	67
3	90	79	71	65	87	78	70	64	74	68	63	71	66	61	68	63	60	57
4	83	71	62	56	80	69	61	55	66	59	54	64	58	53	61	56	52	49
5	76	64	55	48	74	62	54	48	60	53	47	57	51	46	55	50	45	43
6	71	58	49	43	68	56	48	42	54	47	42	52	46	41	50	45	40	38
7	66	52	44	38	64	51	43	38	50	42	37	48	41	37	46	40	36	34
8	61	48	40	34	59	47	39	34	46	38	33	44	38	33	43	37	33	31
9	57	44	36	31	56	43	36	31	42	35	30	41	34	30	39	34	30	28
10	54	41	33	28	52	40	33	28	39	32	28	38	32	27	37	31	27	25

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L111400401.IES

POLAR GRAPH



Maximum Candela = 865.46 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.)