IES File

Performance Summary

The performance data in black text is confirmed through third party testing (see the following Light Laboratory report for details). The performance data in grey text is calculated by Vode. For reference only.

ZipTwo LED - Zipper board™ with 85° Asymmetric Lens, Standard Output

ZipTwo LED, 48", 3500K, Zipper board with 85° asymmetric lens, standard output
707-Z2-4-48-X-X-X-X-Z-SO-35-A1-X-X

	2700K	3000K	3500K	4000K
Efficacy - Lumens per Watt	74	78	81	84
Total Lumens, 4' rail length (1219mm)	2029	2117	2206	2294
Lumens per foot (305mm)	507	529	551	573
Input Power (W), 4' rail length (1219mm)	27.4	27.4	27.4	27.4
Watts per foot (305mm)	6.9	6.9	6.9	6.9
CRI (>80min., 85 avg.)	-	-	83	-

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

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: **L031700423** **Issue Date: 3/22/2017**

Report Prepared For: Vode Lighting
1206 E MacArthur Suite 3 Sonoma, CA 95476

Model Number: **707-Z2-48-Z-SO-35-A1-AL**

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

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 3/15/17

Date of Tests: 3/21/17 - 3/22/17

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	11/28/17
ITECH	IT6122	PS-DC03-S1	11/28/17
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/28/17
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-Z2-48-Z-SO-35-A1-AL
Driver Model Number:	MEAN WELL HLG-40H-36A(700MA)
Total Lumens:	2205.52
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.23
Input Power (W):	27.44
Input Power Factor:	0.99
Current ATHD @ 120V(%):	9%
Current ATHD @ 277V(%):	N/A
Efficacy:	80
Color Rendering Index (CRI):	83
Correlated Color Temperature (K):	3429
Chromaticity Coordinate x:	0.4105
Chromaticity Coordinate y:	0.3956
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:35

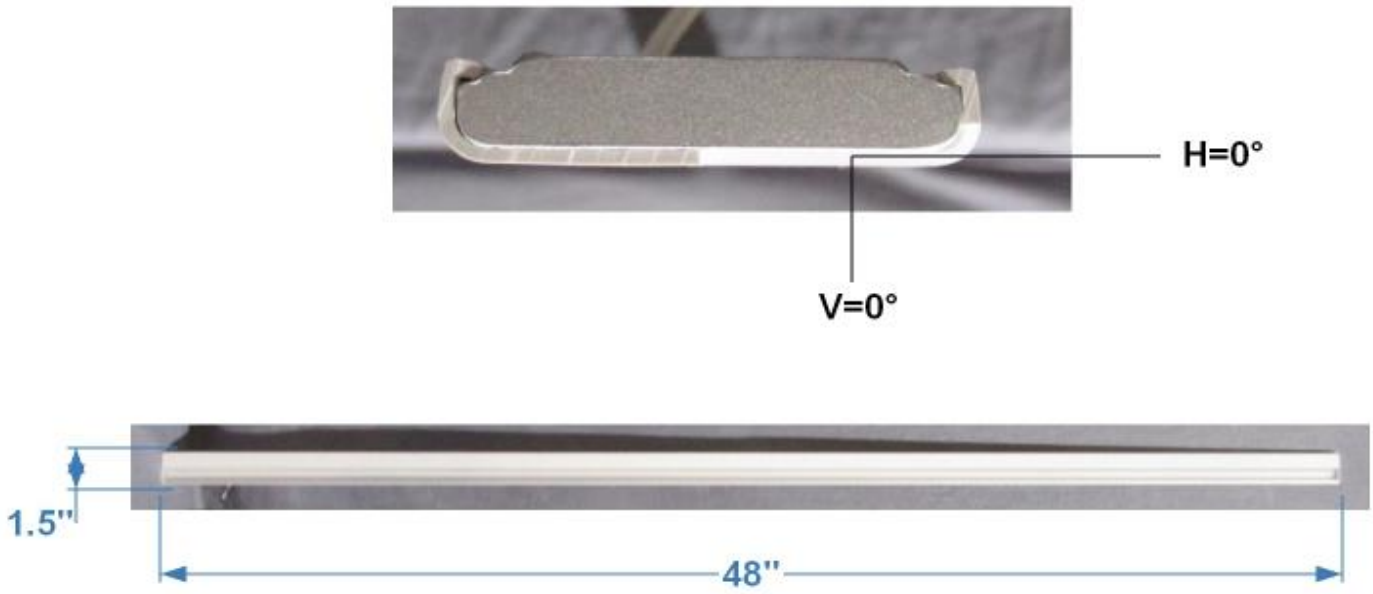

FIG. 1 LUMINAIRE

*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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Report No: L031700423

NVLAP TESTING
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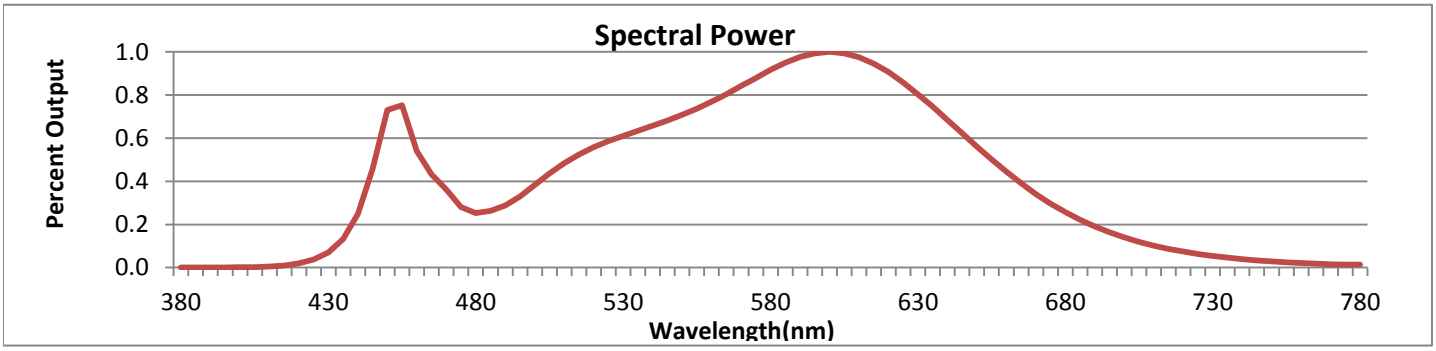


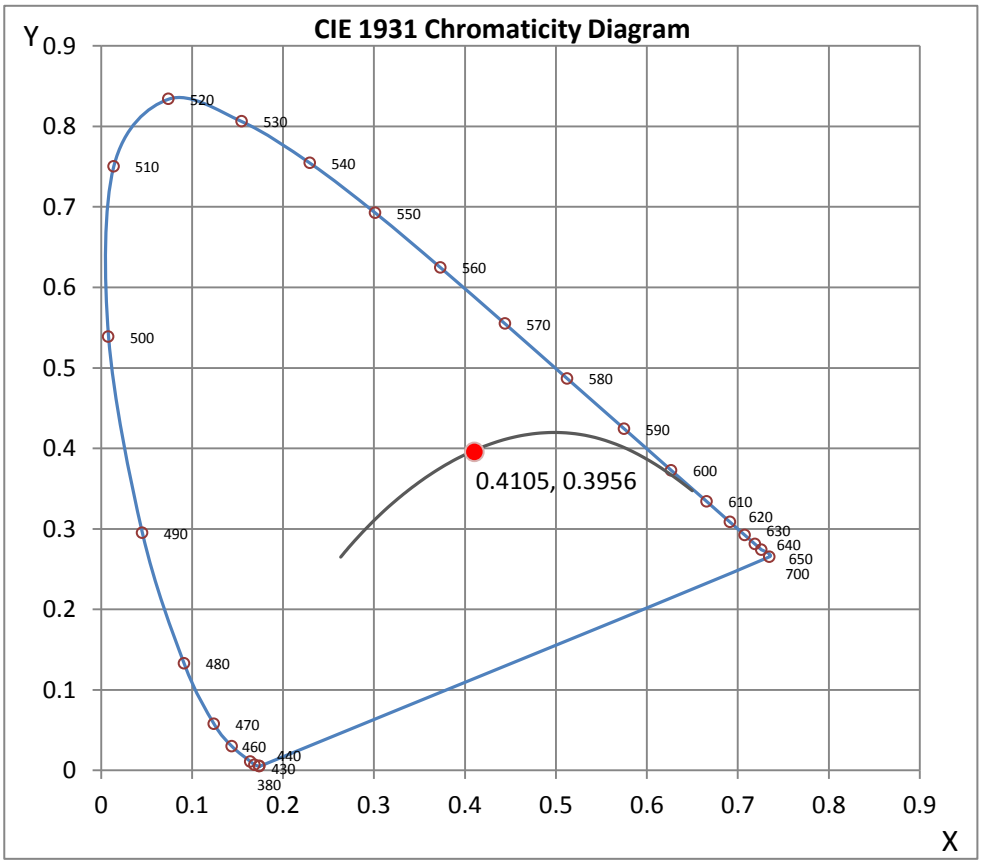
Wavelength	W/m²nm	440	0.2478	510	0.4841	580	0.9174	650	0.5617	720	0.0746
380	0.0009	450	0.7308	520	0.5585	590	0.9776	660	0.4452	730	0.0542
390	0.0009	460	0.5408	530	0.6109	600	1.0000	670	0.3409	740	0.0396
400	0.0016	470	0.3619	540	0.6579	610	0.9754	680	0.2568	750	0.0289
410	0.0046	480	0.2523	550	0.7082	620	0.9068	690	0.1903	760	0.0214
420	0.0192	490	0.2889	560	0.7690	630	0.8037	700	0.1399	770	0.0158
430	0.0704	500	0.3833	570	0.8416	640	0.6851	710	0.1021	780	0.0136

CRI & CCT

x	0.4105
y	0.3956
u'	0.2371
v'	0.5140
CRI	83.40
CCT	3429
Duv	0.00101

R Values

R1	81.91
R2	90.81
R3	96.66
R4	81.43
R5	81.52
R6	87.55
R7	84.95
R8	62.70
R9	10.73
R10	78.03
R11	80.34
R12	64.51
R13	84.17
R14	98.36



*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 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.

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Photometric Test Report

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L031700423.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L031700423
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 3/22/2017
[MANUFAC] VODE LIGHTING
[LUMCAT] 707-Z2-48-Z-SO-35-A1-AL
[LUMINAIRE] ZIPTWO LED, 48", 3500K, ZIPPER BOARD,
[MORE] 85 DEG ASYMMETRIC LENS,STANDARD OUTPUT (700MA)
[BALLASTCAT] MEAN WELL HLG-40H-36A(700MA)
[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, 27.44W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2206
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	80
Total Luminaire Watts	27.44
Ballast Factor	1.00
CIE Type	Direct
Spacing Criterion (0-180)	1.66
Spacing Criterion (90-270)	1.24
Spacing Criterion (Diagonal)	1.22
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	63177	56681	33754
55	59669	49463	25202
65	53172	40172	18328
75	45412	32885	14093
85	45469	30485	10334

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L031700423.IES

CANDELA TABULATION

	0	5	10	15	20	25	30	35	40	45
0	991	991	991	991	991	991	991	991	991	991
5	1103	1102	1101	1099	1097	1093	1089	1084	1079	1072
10	1214	1214	1212	1209	1205	1199	1192	1183	1174	1162
15	1264	1263	1262	1259	1255	1250	1243	1234	1224	1211
20	1270	1269	1268	1266	1262	1258	1252	1244	1235	1223
25	1249	1248	1247	1245	1242	1237	1232	1224	1215	1203
30	1209	1209	1208	1205	1202	1197	1190	1181	1170	1157
35	1155	1155	1153	1150	1146	1139	1131	1119	1105	1088
40	1083	1083	1081	1078	1073	1065	1053	1038	1020	999
45	992	992	991	987	981	971	957	939	916	890
50	883	882	881	877	871	859	842	821	794	764
55	760	760	758	754	747	734	715	691	662	630
60	630	630	629	625	617	603	584	559	529	497
65	499	499	497	494	486	473	456	432	406	377
70	373	373	372	369	363	352	338	319	298	276
75	261	261	260	258	253	245	234	221	205	189
80	165	164	164	162	158	153	146	137	127	117
85	88	87	87	85	83	80	75	70	65	59
90	0	0	0	0	0	0	0	0	0	0

Vert. Angles	**Horizontal Angles**									
	50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**	**95**
0	991	991	991	991	991	991	991	991	991	991
5	1065	1058	1049	1040	1031	1022	1012	1001	991	980
10	1148	1133	1116	1097	1077	1055	1031	1007	981	953
15	1196	1178	1157	1133	1105	1074	1039	1002	961	917
20	1208	1190	1168	1143	1112	1074	1030	983	929	870
25	1189	1171	1150	1124	1090	1050	1002	947	883	813
30	1142	1124	1101	1074	1042	1001	951	892	820	741
35	1070	1048	1025	996	964	924	874	814	739	656
40	976	949	921	891	858	819	772	712	641	560
45	861	829	797	763	730	692	649	595	530	458
50	731	695	660	625	592	557	518	474	419	361
55	594	559	525	491	460	429	396	362	321	273
60	464	433	402	375	348	323	297	269	237	202
65	351	325	301	278	257	237	217	196	172	147
70	254	234	216	200	184	169	154	139	121	104
75	175	160	147	136	125	114	103	92	81	69
80	108	98	90	82	75	68	61	54	47	40
85	54	49	44	40	36	32	28	24	20	17
90	0	0	0	0	0	0	0	0	0	0

Vert. Angles	**Horizontal Angles**									
	100	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**
0	991	991	991	991	991	991	991	991	991	991
5	969	958	947	937	926	916	907	898	890	883
10	926	897	869	841	813	786	762	738	716	697
15	873	827	780	735	690	649	609	574	543	516
20	810	748	685	625	568	516	469	430	397	368
25	739	662	586	518	453	400	355	317	288	263
30	658	571	489	418	355	306	268	237	213	196
35	568	479	398	332	276	235	205	181	165	153

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L031700423.IES

CANDELA TABULATION - (Cont.)

40	475	390	317	260	214	183	161	144	133	125
45	382	308	247	202	167	145	129	117	109	104
50	298	239	191	158	133	116	105	97	91	87
55	224	180	147	123	105	93	85	80	75	72
60	167	136	112	95	82	74	68	63	60	58
65	122	101	84	72	63	57	52	49	47	45
70	87	75	61	53	46	42	38	36	34	33
75	58	49	41	36	31	28	26	24	23	22
80	34	28	24	21	18	16	15	14	13	13
85	14	12	10	9	7	7	6	6	5	5
90	0	0	0	0	0	0	0	0	0	0

Vert. Angles	**Horizontal Angles**						
	150	**155**	**160**	**165**	**170**	**175**	**180**
0	991	991	991	991	991	991	991
5	876	870	866	862	859	858	857
10	680	665	653	644	637	633	631
15	492	473	457	445	436	431	429
20	345	326	312	301	293	289	287
25	244	230	219	211	206	202	201
30	182	172	165	160	156	154	153
35	144	137	133	129	127	125	125
40	119	114	111	109	107	107	106
45	100	97	94	93	92	91	91
50	84	82	80	79	79	78	78
55	70	68	67	66	66	65	65
60	56	55	54	53	53	52	52
65	43	42	42	41	41	41	40
70	32	31	30	30	30	29	29
75	21	21	20	20	20	19	19
80	12	12	11	11	11	11	11
85	5	5	4	4	4	4	4
90	0	0	0	0	0	0	0

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L031700423.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	345.84	N.A.	15.70
0-30	706.15	N.A.	32.00
0-40	1117.93	N.A.	50.70
0-60	1835.42	N.A.	83.20
0-80	2169.38	N.A.	98.40
0-90	2205.52	N.A.	100.00
10-90	2112.64	N.A.	95.80
20-40	772.09	N.A.	35.00
20-50	1169.01	N.A.	53.00
40-70	934.34	N.A.	42.40
60-80	333.96	N.A.	15.10
70-80	117.11	N.A.	5.30
80-90	36.14	N.A.	1.60
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	2205.52	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	92.88
10-20	252.96
20-30	360.31
30-40	411.78
40-50	396.92
50-60	320.57
60-70	216.85
70-80	117.11
80-90	36.14
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 : L031700423.IES

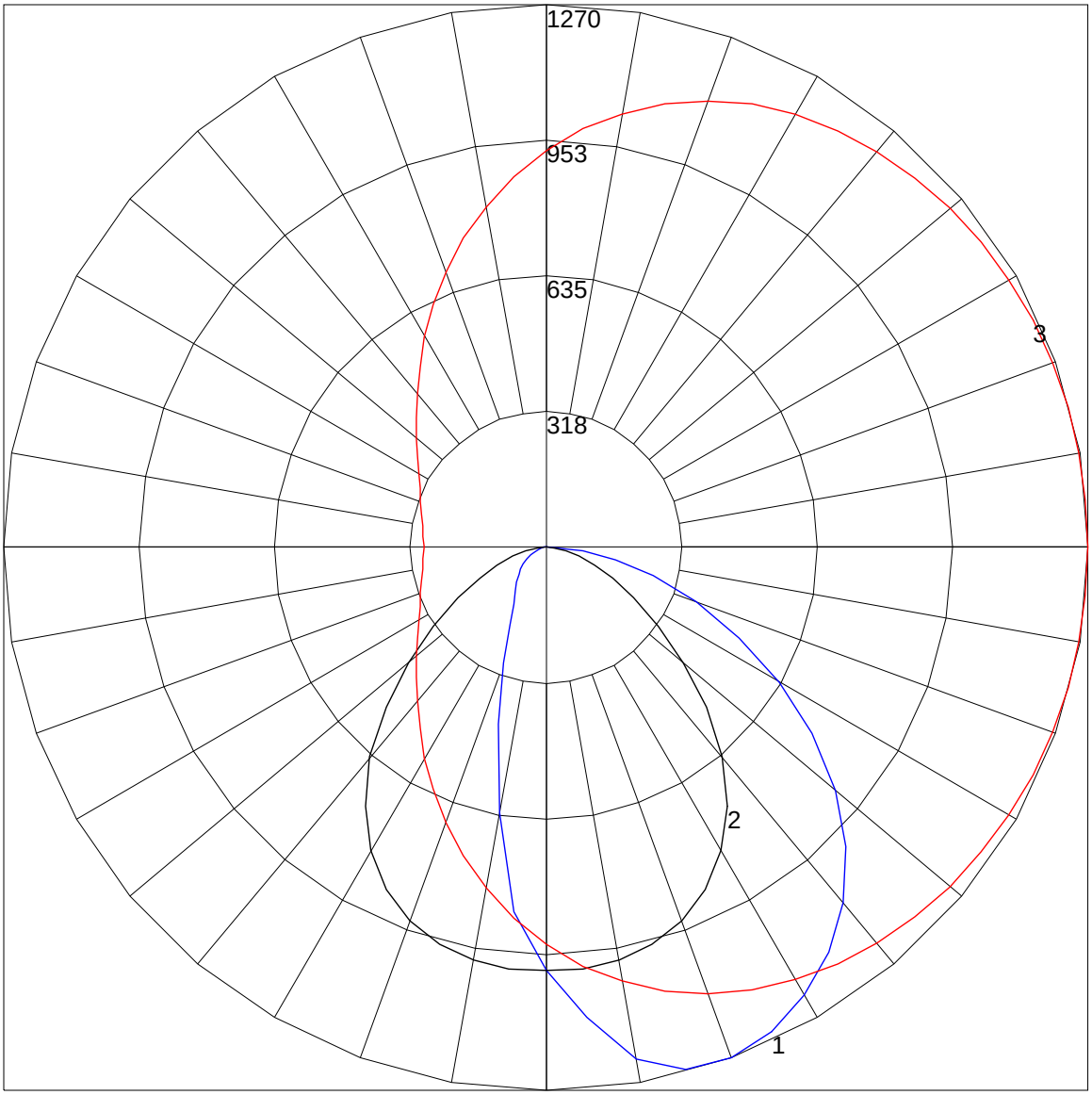
COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	105	101	97	107	103	99	96	99	96	93	95	92	90	91	89	87	85
2	100	92	86	81	98	91	85	80	87	82	78	84	80	76	81	77	74	72
3	92	82	74	68	89	80	73	67	77	71	66	75	69	65	72	68	64	62
4	85	73	65	58	82	72	64	58	69	63	57	67	61	56	65	60	56	54
5	78	66	57	51	76	65	57	51	63	55	50	61	54	49	59	53	49	47
6	72	60	51	45	70	59	50	45	57	50	44	55	49	44	54	48	43	41
7	67	54	46	40	66	53	45	40	52	45	39	51	44	39	49	43	39	37
8	63	50	41	36	61	49	41	36	48	41	36	46	40	35	45	39	35	33
9	59	46	38	32	57	45	38	32	44	37	32	43	37	32	42	36	32	30
10	55	42	35	30	54	42	34	30	41	34	29	40	34	29	39	33	29	27

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L031700423.IES

POLAR GRAPH



Maximum Candela = 1270 Located At Horizontal Angle = 0, Vertical Angle = 20
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 (20) (Through Max. Cd.)