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Report No: L061500904

Date: 6/10/2015



NVLAP LAB CODE 200927-0

Report No: L061500904

Report Prepared For: Revolution Lighting Technologies
 4139 Guardian Street, Simi Valley, CA, 93063

Model Number: 204222-013

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 204222-013 . Received in working and undamaged condition. No modifications were necessary.

Testing Condition: SYLVANIA (SYLVANIA QUICKTRONIC QHE 2X32T8/UNV ISN-SC) driver was connected to two led tubes from the driver output. Photometric measurements were measured from a single LED tube while the other lamp was powered and covered with black velvet to prevent any light pollution. Input power of single measured module is calculated from the total power divided by two.

Sample Arrival Date: 6/4/15

Date of Tests: 6/9/15 - 6/9/15

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.

Test Summary

Manufacturer:	Revolution Lighting Technologies	
Model Number:	204222-013	
Driver Model Number:	SYLVANIA QUICKTRONIC QHE 2X32T8/UNV ISN-SC	
Total Lumens:	2110.06	
Input Voltage (VAC/60Hz):	120.00	
Input Current (Amp):	0.15	
Input Power (W):	17.60	
Input Power Factor:	1.00	
Current ATHD @ 120V(%):	5%	
Current ATHD @ 277V(%):	9% (0.07A, 17.52W, 0.97PF)	
Efficacy:	120	
Color Rendering Index (CRI):	86	
Correlated Color Temperature (K):	4009	
Chromaticity Coordinate x:	0.3805	
Chromaticity Coordinate y:	0.3782	
Ambient Temperature (°C):	25.0	
Stabilization Time (Hours):	0:30	
Total Operating Time (Hours):	1:35	
Off State Power(W):	0.00	

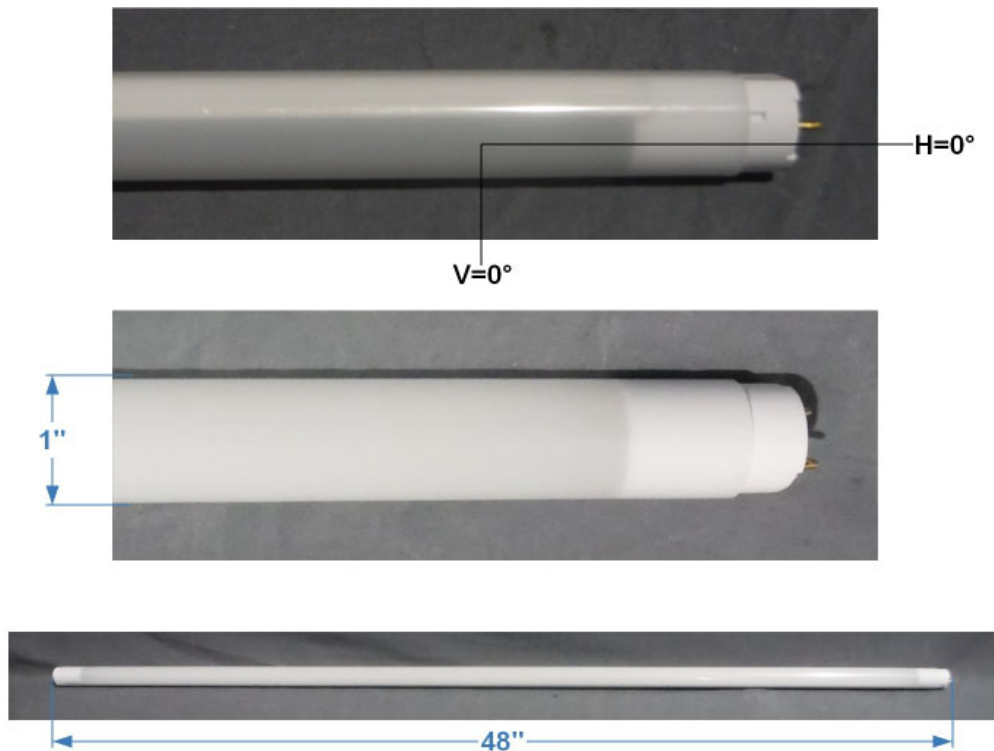
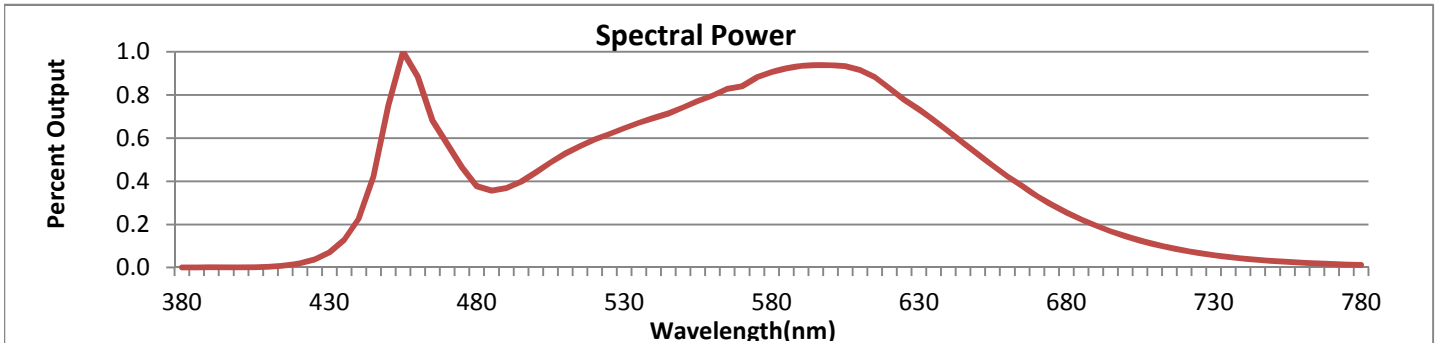


FIG. 1 LUMINAIRE

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



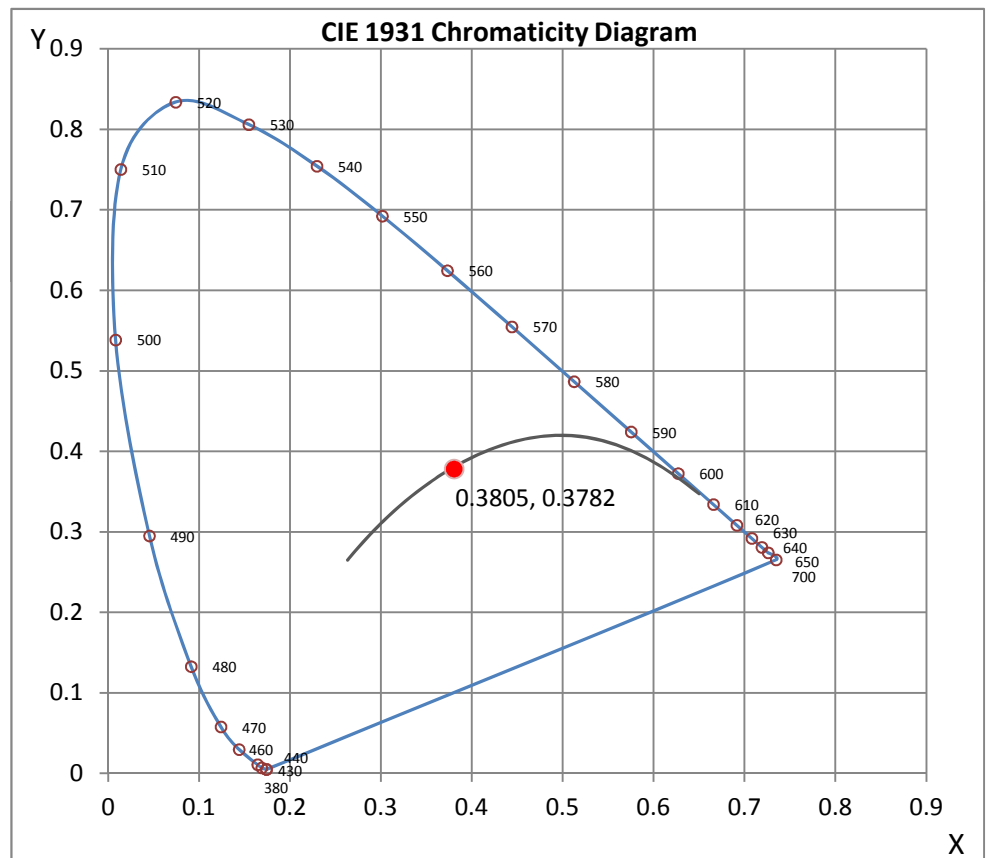
Wavelength	W/m ² nm	440	0.2281	510	0.5291	580	0.9055	650	0.5257	720	0.0783
380	0.0010	450	0.7514	520	0.5935	590	0.9358	660	0.4234	730	0.0576
390	0.0011	460	0.8853	530	0.6464	600	0.9380	670	0.3319	740	0.0420
400	0.0015	470	0.5738	540	0.6940	610	0.9162	680	0.2559	750	0.0308
410	0.0040	480	0.3778	550	0.7429	620	0.8311	690	0.1947	760	0.0223
420	0.0193	490	0.3690	560	0.7975	630	0.7334	700	0.1459	770	0.0165
430	0.0699	500	0.4406	570	0.8402	640	0.6310	710	0.1083	780	0.0122

CRI & CCT

x	0.3805
y	0.3782
u'	0.2246
v'	0.5022
CRI	85.80
CCT	4009
Duv	0.00066

R Values

R1	85.29
R2	94.06
R3	96.15
R4	81.96
R5	84.16
R6	90.20
R7	85.94
R8	68.35
R9	23.45
R10	84.37
R11	81.08
R12	63.25
R13	88.08
R14	98.49



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

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.

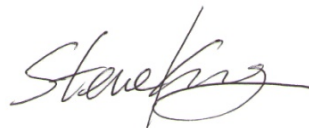
Report Prepared by : Randy Chau

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 : L061500904.IES

DESCRIPTION INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L061500904
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 6/10/2015
 [MANUFAC] REVOLUTION LIGHTING TECHNOLOGIES
 [LUMCAT] 204222-013
 [LUMINAIRE] 1"DIA. X 48"L. LED T8 TUBE
 [MORE] DIFFUSED LENS
 [BALLASTCAT] SYLVANIA QUICKTRONIC QHE 2X32T8/UNV ISN-SC
 [BALLAST] INPUT: 120-277VAC, 50/60Hz
 [LAMPPOSITION] 0,0
 [LAMP] N/A
 [TEST CONDITION] SYLVANIA (SYLVANIA QUICKTRONIC QHE 2X32T8/UNV ISN-SC) DRIVER WAS
 [MORE] CONNECTED TO TWO LED TUBES FROM THE DRIVER OUTPUT. PHOTOMETRIC MEASUREMENTS
 [MORE] FROM A SINGLE LED TUBE WHILE THE OTHER LAMP WAS POWERED AND COVERED WITH
 [MORE] BLACK VELVET TO PREVENT ANY LIGHT POLLUTION. INPUT POWER OF A SINGLE
 [MORE] MEASURED MODULE IS CALCULATED FROM THE TOTAL POWER DIVIDED BY TWO.
 [OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
 [MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
 [_INPUT] 120VAC, 17.60W
 [_TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2110
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	120
Total Luminaire Watts	17.6
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	1.22
Spacing Criterion (90-270)	1.38
Spacing Criterion (Diagonal)	1.44
Basic Luminous Shape	Rectangular w/Sides
Luminous Length (0-180)	3.67 ft
Luminous Width (90-270)	0.08 ft
Luminous Height	0.06 ft

IES INDOOR REPORT
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LUMINANCE DATA (cd/sq.m)

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	14773	11539	11455
55	13597	10630	10787
65	12324	9984	10352
75	9733	9007	10024
85	7110	9318	9957

IES INDOOR REPORT
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CANDELA TABULATION

	<u>0.0</u>	<u>22.5</u>	<u>45.0</u>	<u>67.5</u>	<u>90.0</u>
0	469.69	469.69	469.69	469.69	469.69
5	466.84	466.96	468.60	467.90	469.24
10	458.95	459.76	463.18	464.35	466.78
15	445.98	447.97	454.20	458.27	461.19
20	428.54	432.25	441.97	449.79	453.06
25	406.87	412.73	426.61	438.71	443.00
30	382.00	390.20	408.90	425.50	431.87
35	354.04	364.81	388.94	410.54	419.25
40	323.17	337.33	367.05	393.61	404.19
45	289.87	307.50	343.47	374.95	387.01
50	254.67	276.85	319.41	355.16	368.91
55	217.90	245.50	295.28	334.50	349.85
60	189.08	217.86	273.95	316.34	332.36
65	147.18	178.30	249.06	294.53	311.56
70	109.46	147.27	224.78	273.20	290.34
75	72.97	128.99	192.36	251.55	269.10
80	40.16	104.24	174.53	230.16	247.71
85	20.08	83.75	159.50	209.73	226.81
90	0.00	72.58	140.75	189.55	206.63
95	0.00	59.81	124.37	171.70	187.73
100	0.00	50.33	110.13	154.45	170.70
105	0.00	42.44	96.98	138.72	153.63
110	0.00	40.54	85.09	123.18	137.43
115	0.00	29.05	77.76	109.15	122.19
120	0.00	16.37	70.37	95.84	107.77
125	0.00	15.01	61.37	83.71	94.05
130	0.00	13.97	52.53	72.32	80.87
135	0.00	12.96	32.74	63.04	69.40
140	0.00	12.11	22.87	49.02	56.73
145	0.00	9.58	20.11	25.99	33.20
150	0.00	8.73	17.35	21.64	23.56
155	0.00	8.27	14.20	18.58	19.70
160	0.00	7.88	11.96	14.84	16.18
165	0.00	8.00	10.04	11.99	12.70
170	0.00	7.32	8.59	9.53	10.07
175	0.00	0.00	7.61	7.96	7.89
180	0.00	0.00	0.00	0.00	0.00

IES INDOOR REPORT
PHOTOMETRIC FILENAME : L061500904.IES

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-20	172.57	N.A.	8.20
0-30	368.99	N.A.	17.50
0-40	611.81	N.A.	29.00
0-60	1135.79	N.A.	53.80
0-80	1569.55	N.A.	74.40
0-90	1727.17	N.A.	81.90
10-90	1682.67	N.A.	79.70
20-40	439.24	N.A.	20.80
20-50	702.79	N.A.	33.30
40-70	760.47	N.A.	36.00
60-80	433.77	N.A.	20.60
70-80	197.28	N.A.	9.30
80-90	157.61	N.A.	7.50
90-110	217.64	N.A.	10.30
90-120	286.49	N.A.	13.60
90-130	333.12	N.A.	15.80
90-150	373.82	N.A.	17.70
90-180	382.89	N.A.	18.10
110-180	165.25	N.A.	7.80
0-180	2110.06	N.A.	100.00

Total Luminaire Efficiency = N.A.%

ZONAL LUMEN SUMMARY

Zone	Lumens
0-10	44.49
10-20	128.08
20-30	196.42
30-40	242.82
40-50	263.55
50-60	260.43
60-70	236.49
70-80	197.28
80-90	157.61
90-100	123.18
100-110	94.46
110-120	68.85
120-130	46.64
130-140	28.14
140-150	12.55
150-160	5.95
160-170	2.62
170-180	0.51

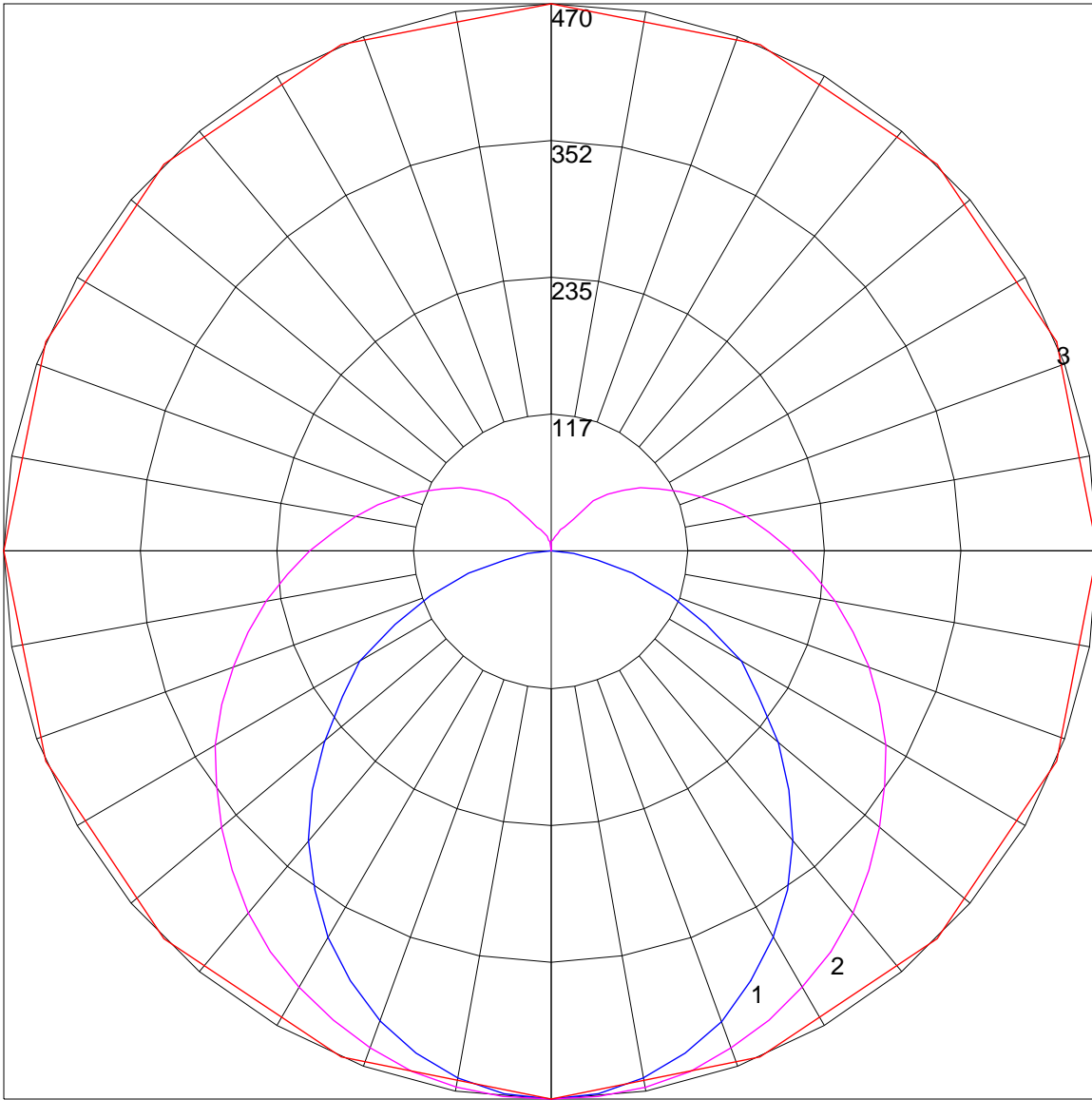
IES INDOOR REPORT
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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

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	115	115	115	115	110	110	110	110	101	101	101	93	93	93	85	85	85	82
1	102	96	90	86	97	92	87	82	84	80	76	77	74	71	70	68	66	62
2	91	82	74	67	87	78	71	65	72	66	61	66	61	57	60	56	53	50
3	83	71	62	55	79	68	60	53	62	56	50	57	52	47	52	48	44	41
4	75	62	53	46	71	60	51	44	55	48	42	50	44	39	46	41	37	34
5	69	55	46	39	66	53	44	38	49	41	36	45	39	34	41	36	32	29
6	64	50	40	34	60	48	39	33	44	37	31	41	34	29	37	32	28	25
7	59	45	36	29	56	43	35	29	40	33	27	37	31	26	34	29	24	22
8	55	41	32	26	52	39	31	25	36	29	24	34	27	23	31	26	22	20
9	51	37	29	23	49	36	28	23	33	26	22	31	25	21	29	23	20	17
10	48	34	26	21	45	33	25	20	31	24	19	29	23	19	27	21	18	16

POLAR GRAPH



Maximum Candela = 469.69 Located At Horizontal Angle = 0, Vertical Angle = 0
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 (0) (Through Max. Cd.)