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Report No: L011504201

Date: 1/21/2015



NVLAP LAB CODE 200927-0

**Report No:** L011504201

**Report Prepared For:** AION LED  
 2325 3RD ST #330 SAN FRANCISCO, CA 94107

**Model Number:** 3924-24-x

**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 3924-24-x. Received in working and undamaged condition. No modifications were necessary.

**Testing Condition:** Fixture is tested with no special conditions.

**Sample Arrival Date:** 1/14/15

**Date of Tests:** 1/15/15 - 1/21/15

**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**

<b>Manufacturer:</b>	AION LED
<b>Model Number:</b>	3924-24-x
<b>Driver Model Number:</b>	N/A
<b>Total Lumens:</b>	100.17
<b>Input Voltage (VDC):</b>	24.00
<b>Input Current (Amp):</b>	0.06
<b>Input Power (W):</b>	1.44
<b>Input Power Factor:</b>	1.00
<b>Current ATHD @ 120V(%):</b>	N/A
<b>Current ATHD @ 277V(%):</b>	N/A
<b>Efficacy:</b>	70
<b>Color Rendering Index (CRI):</b>	91
<b>Correlated Color Temperature (K):</b>	2267
<b>Chromaticity Coordinate x:</b>	0.4965
<b>Chromaticity Coordinate y:</b>	0.4117
<b>Ambient Temperature (°C):</b>	25.0
<b>Stabilization Time (Hours):</b>	0:30
<b>Total Operating Time (Hours):</b>	1:20
<b>Off State Power(W):</b>	0.00

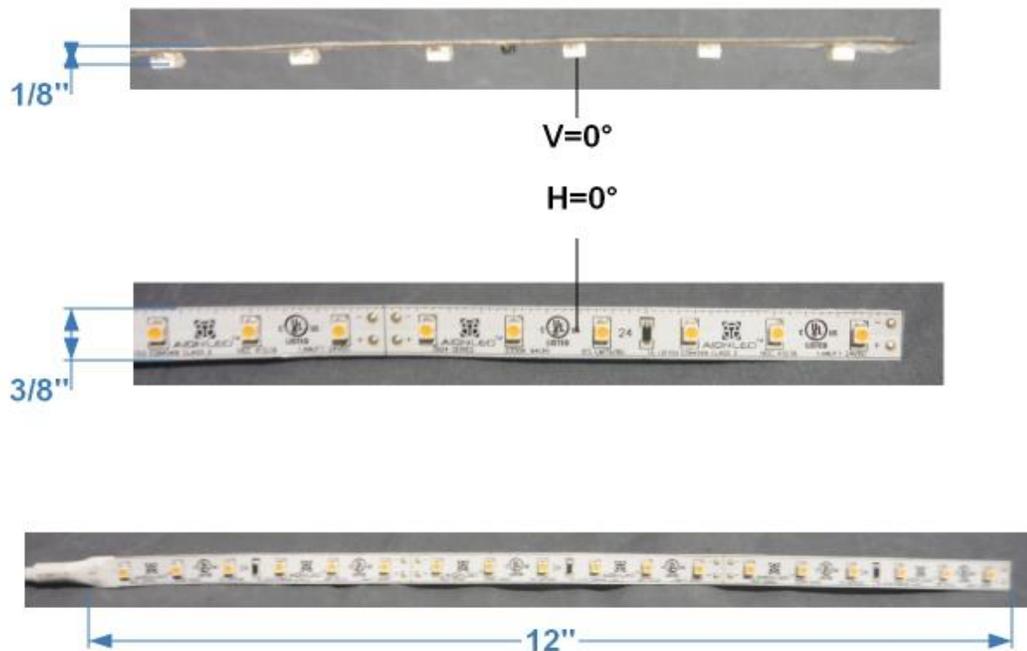
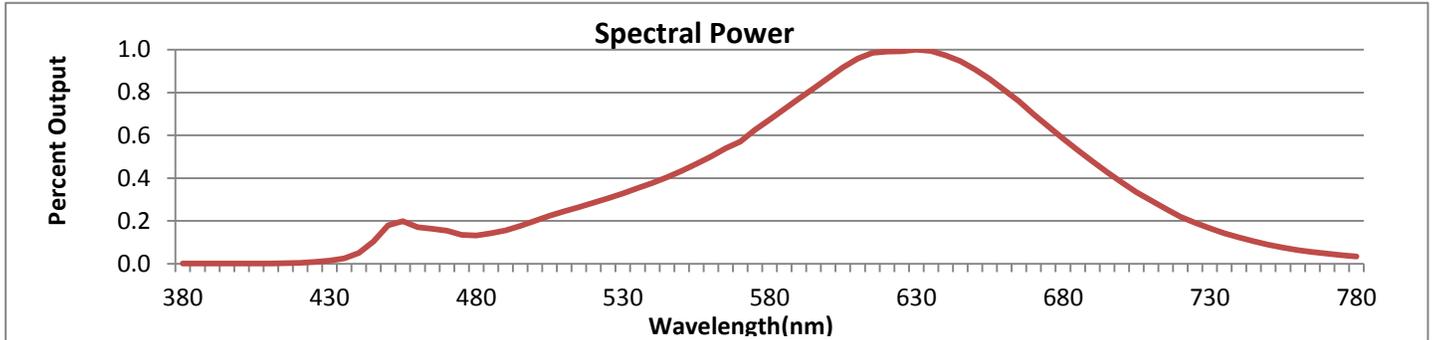


FIG. 1 LUMINAIRE

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



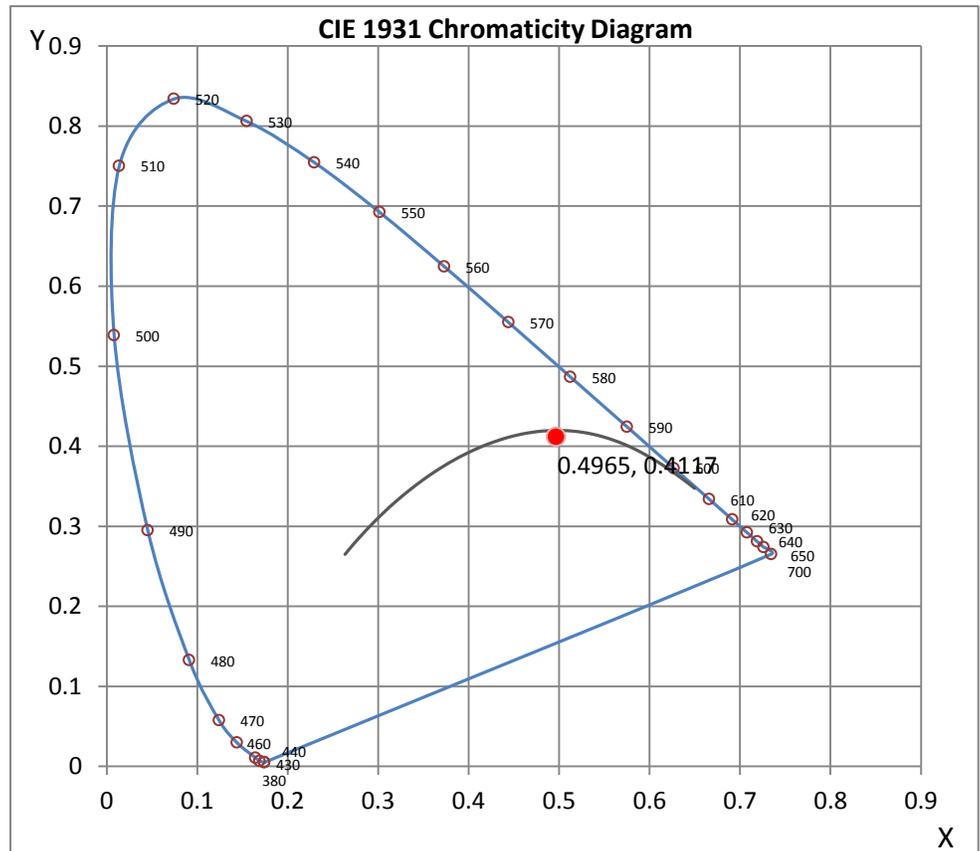
Wavelength	W/m <sup>2</sup> nm	440	0.0495	510	0.2449	580	0.6729	650	0.9084	720	0.2202
380	0.0007	450	0.1798	520	0.2852	590	0.7717	660	0.8114	730	0.1657
390	0.0006	460	0.1707	530	0.3282	600	0.8683	670	0.6979	740	0.1224
400	0.0008	470	0.1540	540	0.3778	610	0.9592	680	0.5859	750	0.0893
410	0.0017	480	0.1322	550	0.4338	620	0.9919	690	0.4784	760	0.0639
420	0.0048	490	0.1560	560	0.5001	630	1.0000	700	0.3800	770	0.0468
430	0.0142	500	0.2003	570	0.5705	640	0.9742	710	0.2958	780	0.0339

**CRI & CCT**

x	0.4965
y	0.4117
u'	0.2859
v'	0.5333
CRI	91.10
CCT	2267
Duv	-0.00115

**R Values**

R1	91.60
R2	97.88
R3	96.36
R4	90.08
R5	92.05
R6	97.33
R7	87.58
R8	75.79
R9	53.18
R10	94.72
R11	91.62
R12	88.98
R13	93.38
R14	99.12



\*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 : 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: 9*



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# Photometric Test Report

**IES INDOOR REPORT**  
**PHOTOMETRIC FILENAME : L011504201.IES**

**DESCRIPTION INFORMATION (From Photometric File)**

IESNA:LM-63-2002  
 [TEST] L011504201  
 [TESTLAB] LIGHT LABORATORY, INC.  
 [ISSUEDATE] 1/21/2015  
 [MANUFAC] AION LED  
 [LUMCAT] 3924-24-x  
 [LUMINAIRE] 3/8"L. X 12"W. X 1/8"H. LED STRIP  
 [BALLASTCAT] N.A.  
 [BALLAST] N.A.  
 [LAMPPOSITION] 0,0  
 [LAMPCAT] N/A  
 [OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND  
 [MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.  
 [INPUT] 24VDC, 1.44W  
 [TEST PROCEDURE] IESNA:LM-79-08

**CHARACTERISTICS**

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	100
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	70
Total Luminaire Watts	1.44
Ballast Factor	1.00
CIE Type	Direct
Spacing Criterion (0-180)	1.26
Spacing Criterion (90-270)	1.26
Spacing Criterion (Diagonal)	1.38
Basic Luminous Shape	Rectangular
Luminous Length (0-180)	0.01 ft
Luminous Width (90-270)	0.94 ft
Luminous Height	0.00 ft

**LUMINANCE DATA (cd/sq.m)**

Angle In Degrees	Average 0-Deg	Average 45-Deg	Average 90-Deg
45	37891	37891	38021
55	36221	36381	36381
65	33540	33648	33540
75	28510	28510	28510
85	21133	21133	18902

**IES INDOOR REPORT**  
**PHOTOMETRIC FILENAME : L011504201.IES**

**CANDELA TABULATION**

	<u>0</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>
<b>0</b>	35.13	35.13	35.13	35.13	35.13	35.13	35.13	35.13	35.13	35.13
<b>5</b>	34.88	34.88	34.88	34.88	34.88	34.92	34.88	34.92	34.92	34.92
<b>10</b>	34.45	34.45	34.45	34.49	34.49	34.49	34.49	34.49	34.49	34.49
<b>15</b>	33.77	33.73	33.73	33.73	33.73	33.73	33.73	33.69	33.69	33.73
<b>20</b>	32.67	32.67	32.67	32.67	32.67	32.67	32.67	32.67	32.67	32.67
<b>25</b>	31.31	31.35	31.35	31.31	31.31	31.35	31.35	31.40	31.40	31.31
<b>30</b>	29.70	29.70	29.70	29.74	29.74	29.78	29.78	29.74	29.74	29.70
<b>35</b>	27.92	27.92	27.83	27.83	27.83	27.83	27.87	27.92	27.87	27.87
<b>40</b>	25.71	25.75	25.75	25.75	25.80	25.80	25.80	25.75	25.80	25.80
<b>45</b>	23.42	23.42	23.46	23.46	23.42	23.42	23.42	23.46	23.46	23.42
<b>50</b>	20.87	20.87	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96
<b>55</b>	18.16	18.20	18.24	18.24	18.24	18.24	18.24	18.24	18.24	18.24
<b>60</b>	15.36	15.40	15.40	15.36	15.36	15.40	15.40	15.36	15.36	15.40
<b>65</b>	12.39	12.39	12.39	12.43	12.39	12.39	12.39	12.43	12.43	12.43
<b>70</b>	9.33	9.33	9.38	9.42	9.42	9.38	9.38	9.42	9.38	9.38
<b>75</b>	6.45	6.45	6.49	6.45	6.45	6.45	6.45	6.45	6.45	6.45
<b>80</b>	3.82	3.82	3.78	3.78	3.82	3.82	3.82	3.78	3.78	3.82
<b>85</b>	1.61	1.61	1.61	1.61	1.66	1.66	1.66	1.66	1.66	1.61
<b>90</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Vert. Horizontal Angles**  
**Angles**

	<u>50</u>	<u>55</u>	<u>60</u>	<u>65</u>	<u>70</u>	<u>75</u>	<u>80</u>	<u>85</u>	<u>90</u>
<b>0</b>	35.13	35.13	35.13	35.13	35.13	35.13	35.13	35.13	35.13
<b>5</b>	34.92	34.92	34.92	34.92	34.92	34.96	34.96	34.96	34.96
<b>10</b>	34.49	34.54	34.49	34.49	34.49	34.49	34.49	34.49	34.54
<b>15</b>	33.73	33.77	33.77	33.77	33.77	33.77	33.77	33.69	33.69
<b>20</b>	32.67	32.67	32.67	32.67	32.71	32.71	32.71	32.67	32.67
<b>25</b>	31.31	31.31	31.31	31.35	31.35	31.31	31.35	31.35	31.40
<b>30</b>	29.74	29.74	29.74	29.70	29.74	29.78	29.78	29.74	29.70
<b>35</b>	27.92	27.92	27.87	27.83	27.83	27.92	27.92	27.92	27.83
<b>40</b>	25.80	25.75	25.80	25.80	25.80	25.80	25.80	25.80	25.80
<b>45</b>	23.42	23.46	23.50	23.46	23.50	23.46	23.42	23.46	23.50
<b>50</b>	20.96	20.92	20.96	20.96	20.96	20.96	20.96	20.96	20.96
<b>55</b>	18.24	18.24	18.20	18.24	18.24	18.24	18.29	18.24	18.24
<b>60</b>	15.40	15.40	15.44	15.44	15.40	15.40	15.44	15.40	15.44
<b>65</b>	12.43	12.43	12.39	12.43	12.43	12.43	12.43	12.43	12.39
<b>70</b>	9.42	9.42	9.33	9.38	9.42	9.38	9.42	9.38	9.33
<b>75</b>	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45
<b>80</b>	3.82	3.78	3.78	3.82	3.82	3.78	3.73	3.82	3.82
<b>85</b>	1.57	1.53	1.53	1.57	1.57	1.53	1.53	1.53	1.44
<b>90</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**IES INDOOR REPORT**  
**PHOTOMETRIC FILENAME : L011504201.IES**

**ZONAL LUMEN SUMMARY**

Zone	Lumens	%Lamp	%Fixt
0-20	12.84	N.A.	12.80
0-30	27.28	N.A.	27.20
0-40	44.72	N.A.	44.60
0-60	79.10	N.A.	79.00
0-80	98.27	N.A.	98.10
0-90	100.17	N.A.	100.00
10-90	96.85	N.A.	96.70
20-40	31.88	N.A.	31.80
20-50	49.97	N.A.	49.90
40-70	46.66	N.A.	46.60
60-80	19.16	N.A.	19.10
70-80	6.88	N.A.	6.90
80-90	1.90	N.A.	1.90
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	100.17	N.A.	100.00

Total Luminaire Efficiency = N.A.%

**ZONAL LUMEN SUMMARY**

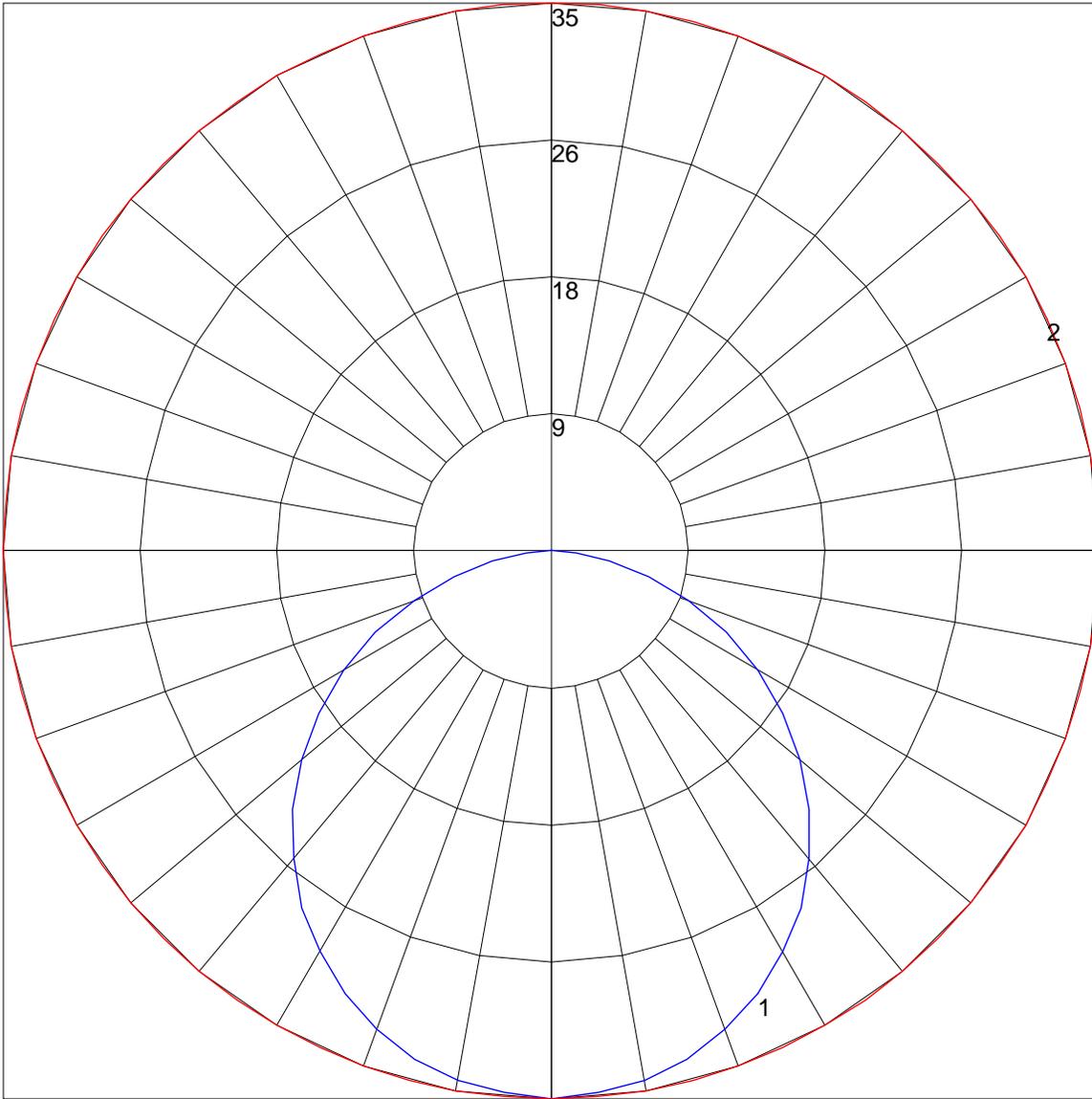
Zone	Lumens
0-10	3.32
10-20	9.52
20-30	14.44
30-40	17.44
40-50	18.09
50-60	16.29
60-70	12.28
70-80	6.88
80-90	1.90
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00

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	107	107	107	102	102	102	100
1	109	104	100	96	106	102	98	94	98	94	91	94	91	89	90	88	86	84
2	99	91	84	78	96	89	82	77	85	80	75	82	77	74	79	75	72	70
3	90	80	71	65	88	78	70	64	75	68	63	72	67	62	70	65	61	59
4	83	70	62	55	80	69	61	54	67	59	54	64	58	53	62	57	52	50
5	76	63	54	47	74	62	53	47	60	52	46	58	51	46	56	50	45	43
6	70	57	48	41	68	56	47	41	54	46	41	52	45	40	51	45	40	38
7	65	51	42	36	63	50	42	36	49	41	36	47	41	36	46	40	35	33
8	60	47	38	32	59	46	38	32	45	37	32	43	37	32	42	36	32	30
9	56	43	35	29	55	42	34	29	41	34	29	40	33	29	39	33	29	27
10	53	40	32	26	52	39	31	26	38	31	26	37	31	26	36	30	26	24

POLAR GRAPH



Maximum Candela = 35.13 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.)