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Report No: L031601202

Date: 3/14/2016



NVLAP LAB CODE 200927-0

Report No: L031601202

Report Prepared For: VIVA Railings
1454 Halsey Way

Model Number: 3000K LED High/Clear

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 3000K LED High/Clear. Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 2/29/16

Date of Tests: 3/9/16 - 3/14/16

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	11/18/16
Xitron Power Analyzer	2503AH	MT-EL01	11/30/16
ITECH DC Power Supply	IT6122	PSDC-03-S1	11/17/16
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/24/16
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:	VIVA Railings
Model Number:	3000K LED High/Clear
Driver Model Number:	N/A
Total Lumens:	840.80
Input Voltage (VDC):	12.00
Input Current (Amp):	1.24
Input Power (W):	14.91
Input Power Factor:	1.00
Current ATHD @ 120V(%):	N/A
Current ATHD @ 277V(%):	N/A
Efficacy:	56
Color Rendering Index (CRI):	91
Correlated Color Temperature (K):	2733
Chromaticity Coordinate x:	0.4541
Chromaticity Coordinate y:	0.4043
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:30
Off State Power(W):	0.00

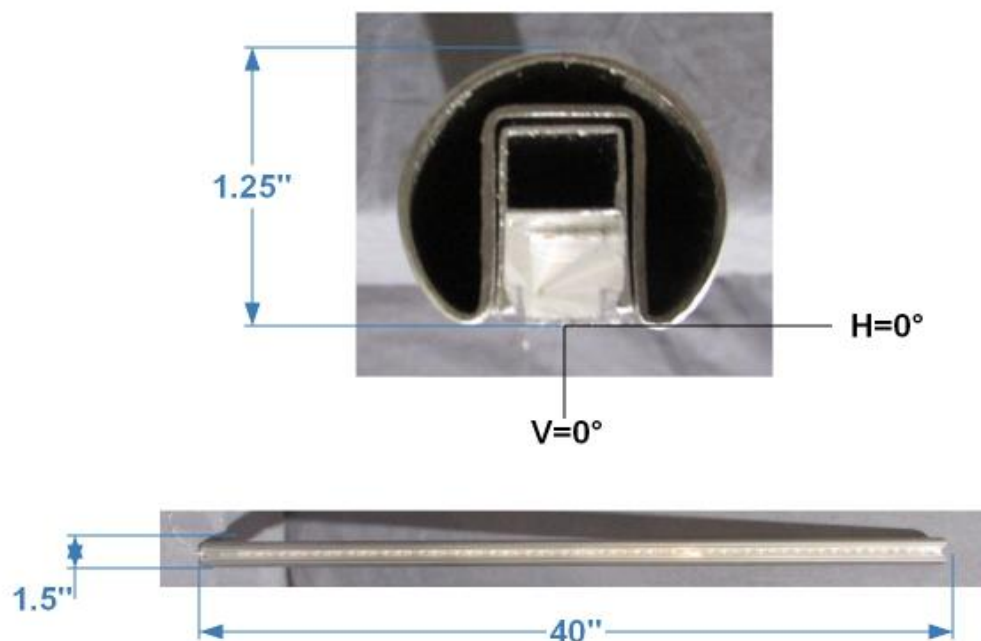
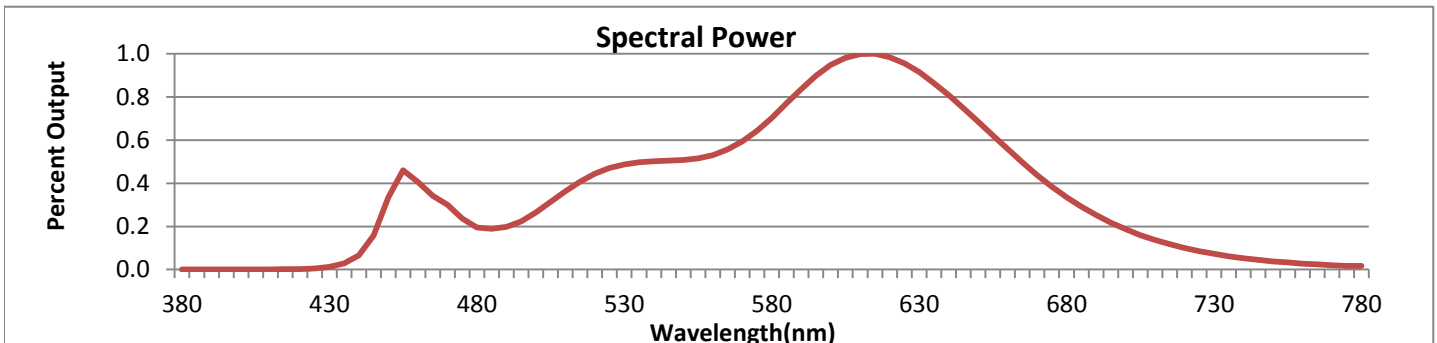


FIG. 1 LUMINAIRE



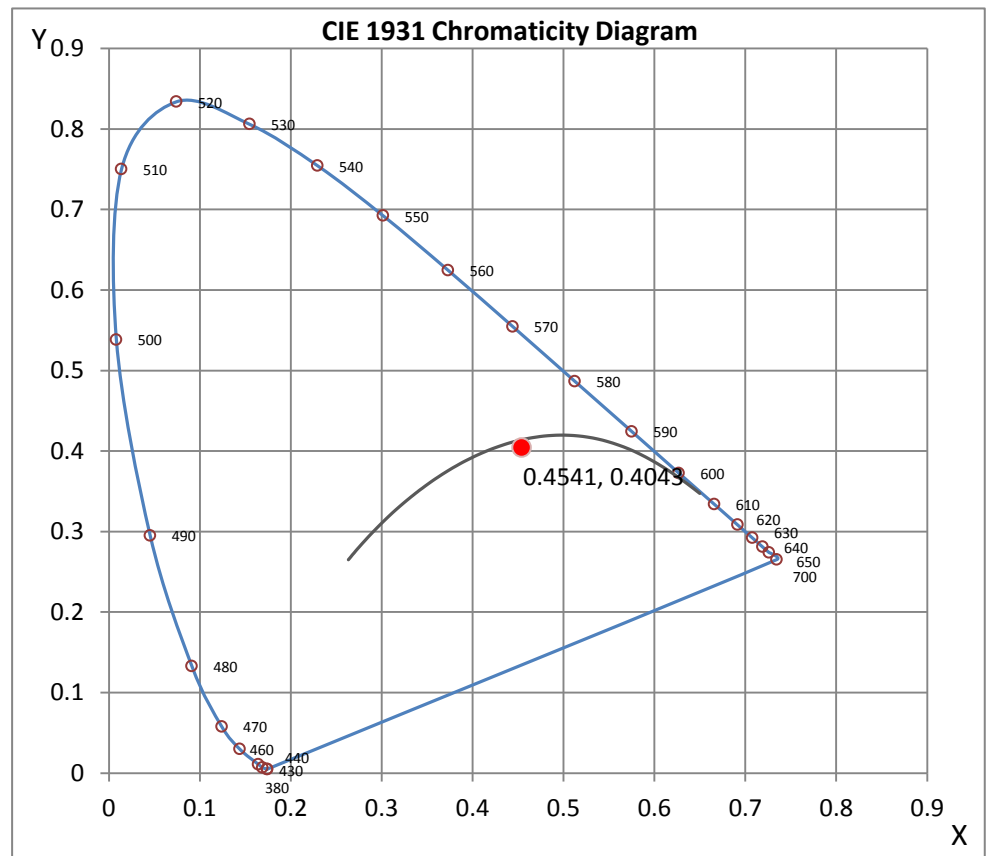
Wavelength	W/m ² nm	440	0.0007	510	0.0039	580	0.0076	650	0.0075	720	0.0011
380	0.0000	450	0.0036	520	0.0048	590	0.0091	660	0.0061	730	0.0008
390	0.0000	460	0.0044	530	0.0053	600	0.0103	670	0.0048	740	0.0006
400	0.0000	470	0.0033	540	0.0055	610	0.0109	680	0.0037	750	0.0004
410	0.0000	480	0.0021	550	0.0055	620	0.0107	690	0.0027	760	0.0003
420	0.0000	490	0.0022	560	0.0058	630	0.0100	700	0.0020	770	0.0002
430	0.0001	500	0.0029	570	0.0065	640	0.0088	710	0.0015	780	0.0002

CRI & CCT

x	0.4541
y	0.4043
u'	0.2616
v'	0.5241
CRI	90.90
CCT	2733
Duv	-0.00185

R Values

R1	93.60
R2	98.87
R3	95.73
R4	92.61
R5	93.87
R6	94.92
R7	85.68
R8	71.78
R9	40.93
R10	96.52
R11	96.11
R12	81.23
R13	96.03
R14	98.98





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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 ROAD REPORT

PHOTOMETRIC FILENAME : L031601202.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L031601202
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 3/14/2016
[MANUFAC] VIVA RAILINGS
[LUMCAT] 3000K LED High/Clear
[LUMINAIRE] 1.5"L. X 40"W. X 1.25"H. RAIL LIGHT
[MORE] 3000K LED High Power Clear
[BALLASTCAT] 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.
[POWER SUPPLY] 12VDC CONSTANT VOLTAGE SOURCE
[INPUT] 12VDC, 14.91W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

IES Classification	Type I
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	841
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	56
Total Luminaire Watts	14.91
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	429.33
Maximum Candela Angle	0H 0V
Maximum Candela (<90 Degrees Vertical)	429.33
Maximum Candela Angle (<90 Degrees Vertical)	0H 0V
Maximum Candela At 90 Degrees Vertical	0 (0.0% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	39.43 (4.7% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601202.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	149.1	N.A.	17.7
FM - Front-Medium (30-60)	209.2	N.A.	24.9
FH - Front-High (60-80)	56.0	N.A.	6.7
FVH - Front-Very High (80-90)	6.1	N.A.	0.7
BL - Back-Low (0-30)	149.1	N.A.	17.7
BM - Back-Medium (30-60)	209.2	N.A.	24.9
BH - Back-High (60-80)	56.0	N.A.	6.7
BVH - Back-Very High (80-90)	6.1	N.A.	0.7
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	840.8	N.A.	100.0
BUG Rating	B1-U0-G0		

ZONAL LUMEN SUMMARY

Zone	%
0-20	17.7
0-30	35.5
0-40	54.3
0-60	85.2
0-80	98.5
0-90	100
10-90	95.2
20-40	36.6
20-50	53.9
40-70	39.8
60-80	13.3
70-80	4.5
80-90	1.5
90-110	0
90-120	0
90-130	0
90-150	0
90-180	0
110-180	0
0-180	100

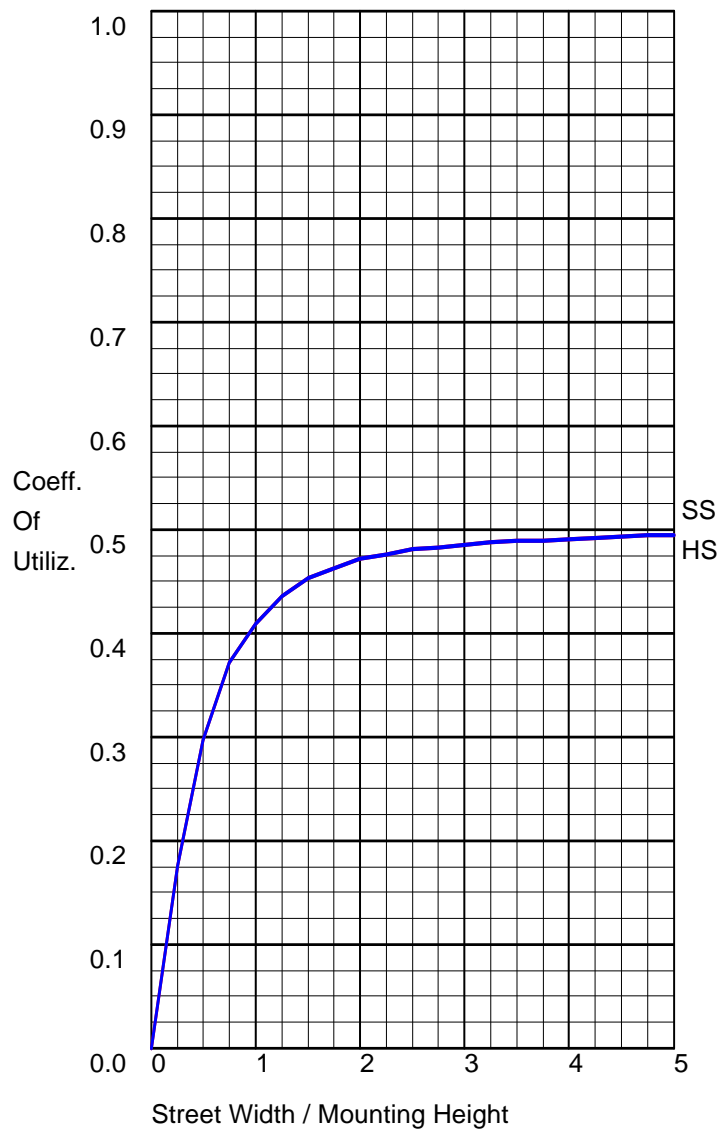
IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601202.IES

CANDELA TABULATION

Vert. Angles	Horizontal Angles									
	<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>
0	429.33	429.33	429.33	429.33	429.33	429.33	429.33	429.33	429.33	429.33
5	421.36	421.40	421.57	421.87	422.33	422.79	423.38	423.96	424.59	425.22
10	396.19	396.40	396.99	397.83	398.96	400.43	402.15	403.99	406.09	408.44
15	362.88	363.22	364.14	365.52	367.45	369.80	372.70	376.05	379.87	384.11
20	323.78	324.03	325.21	327.05	329.78	333.01	337.42	342.62	348.20	354.11
25	281.41	281.83	283.17	285.44	288.63	292.95	298.11	304.23	310.99	318.20
30	245.17	245.58	246.76	248.52	251.25	254.60	258.55	263.50	270.29	278.22
35	200.61	201.28	203.51	207.28	212.11	218.02	224.02	228.80	233.04	238.66
40	164.79	164.95	165.67	167.35	170.66	175.74	183.04	191.55	199.86	204.98
45	147.75	147.96	148.34	148.34	148.13	147.88	148.72	153.04	161.39	171.75
50	121.41	121.79	122.83	124.85	127.03	129.59	130.68	130.43	131.85	137.98
55	99.34	99.51	100.14	101.10	102.57	105.05	107.90	109.96	110.84	112.72
60	82.23	82.23	82.18	82.18	82.27	83.40	85.20	88.01	91.08	92.55
65	68.05	67.88	67.42	66.66	65.99	65.15	65.15	66.58	69.43	72.24
70	52.94	52.65	51.89	50.80	49.59	48.71	48.29	48.50	49.88	51.52
75	44.80	43.88	41.66	38.55	36.16	34.74	33.86	33.14	32.97	33.90
80	39.43	38.76	36.29	31.84	26.81	22.78	20.81	20.01	19.68	19.84
85	24.33	24.37	24.25	23.28	20.22	15.10	11.12	9.36	8.98	8.94
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Vert. Angles	Horizontal 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>	
0	429.33	429.33	429.33	429.33	429.33	429.33	429.33	429.33	429.33	
5	425.85	426.35	426.90	427.19	427.40	427.61	427.70	427.74	427.74	
10	410.92	413.39	416.08	418.34	420.27	421.57	422.33	422.54	422.70	
15	388.81	393.30	397.83	402.53	406.97	410.62	413.35	414.15	414.15	
20	360.41	366.82	374.00	381.00	387.42	393.67	399.09	401.18	401.31	
25	326.72	335.36	343.88	353.11	362.04	370.77	378.78	382.93	383.44	
30	287.79	297.56	308.89	320.09	331.08	342.79	353.61	360.32	361.37	
35	246.34	257.46	270.25	283.68	297.44	311.62	326.09	336.07	337.79	
40	209.67	217.48	229.94	246.17	262.37	279.31	296.98	310.65	313.29	
45	179.26	183.54	191.47	206.86	226.16	245.29	265.55	282.92	286.70	
50	146.83	154.34	157.78	166.34	185.38	206.91	228.59	248.94	253.47	
55	118.72	124.97	128.12	130.97	141.59	163.95	185.59	207.37	212.44	
60	93.89	98.08	101.90	101.06	103.96	118.09	139.41	159.37	165.21	
65	74.21	75.93	76.73	75.18	71.95	75.51	90.91	106.39	111.84	
70	52.99	55.54	55.12	51.35	46.57	44.68	50.80	62.93	68.55	
75	34.57	34.40	34.44	31.76	27.98	25.72	25.55	31.72	35.74	
80	20.14	19.21	18.29	16.70	14.60	13.01	12.25	13.55	15.77	
85	8.85	8.14	7.01	6.29	5.29	4.66	4.32	4.20	4.62	
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

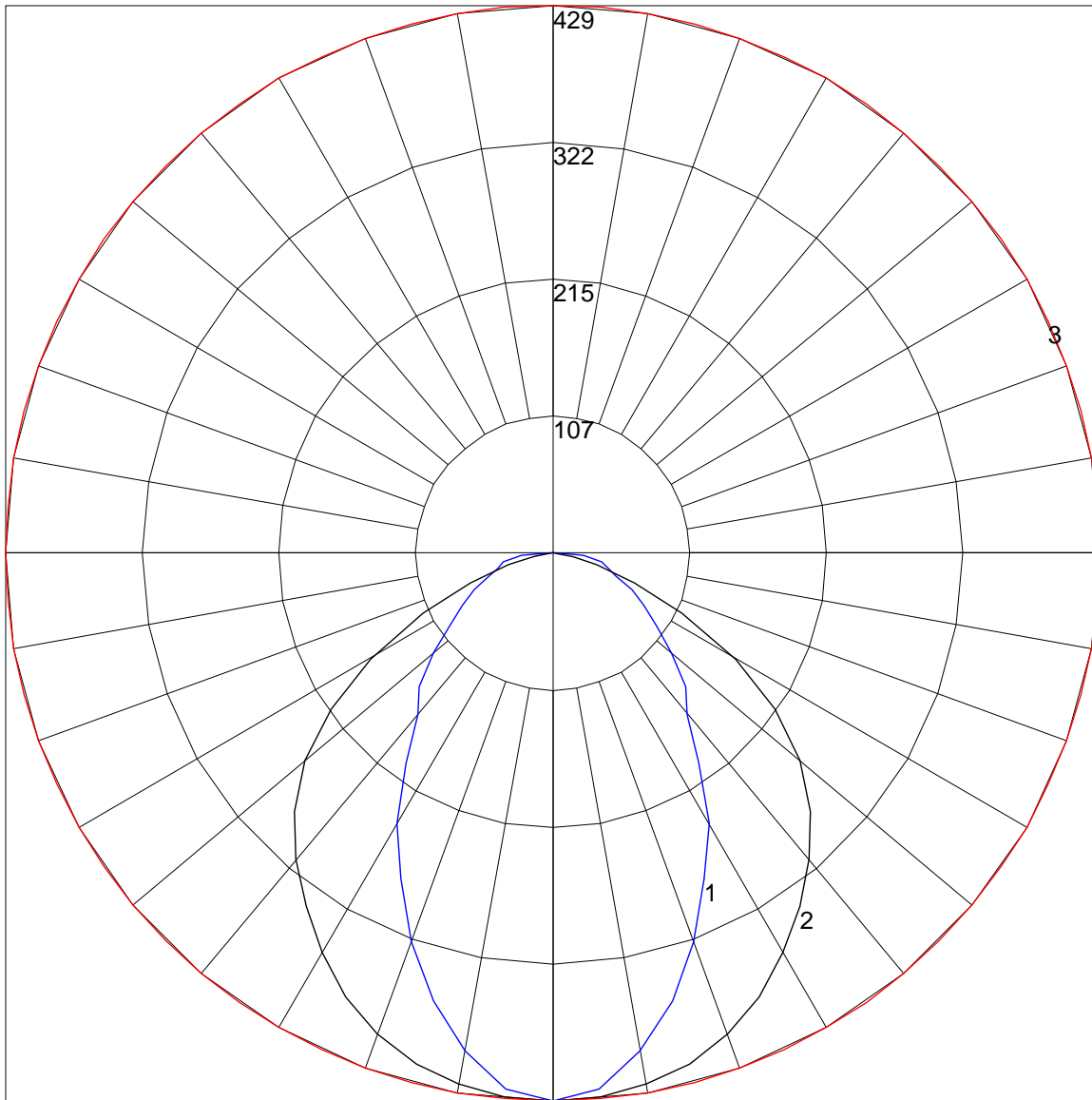
COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

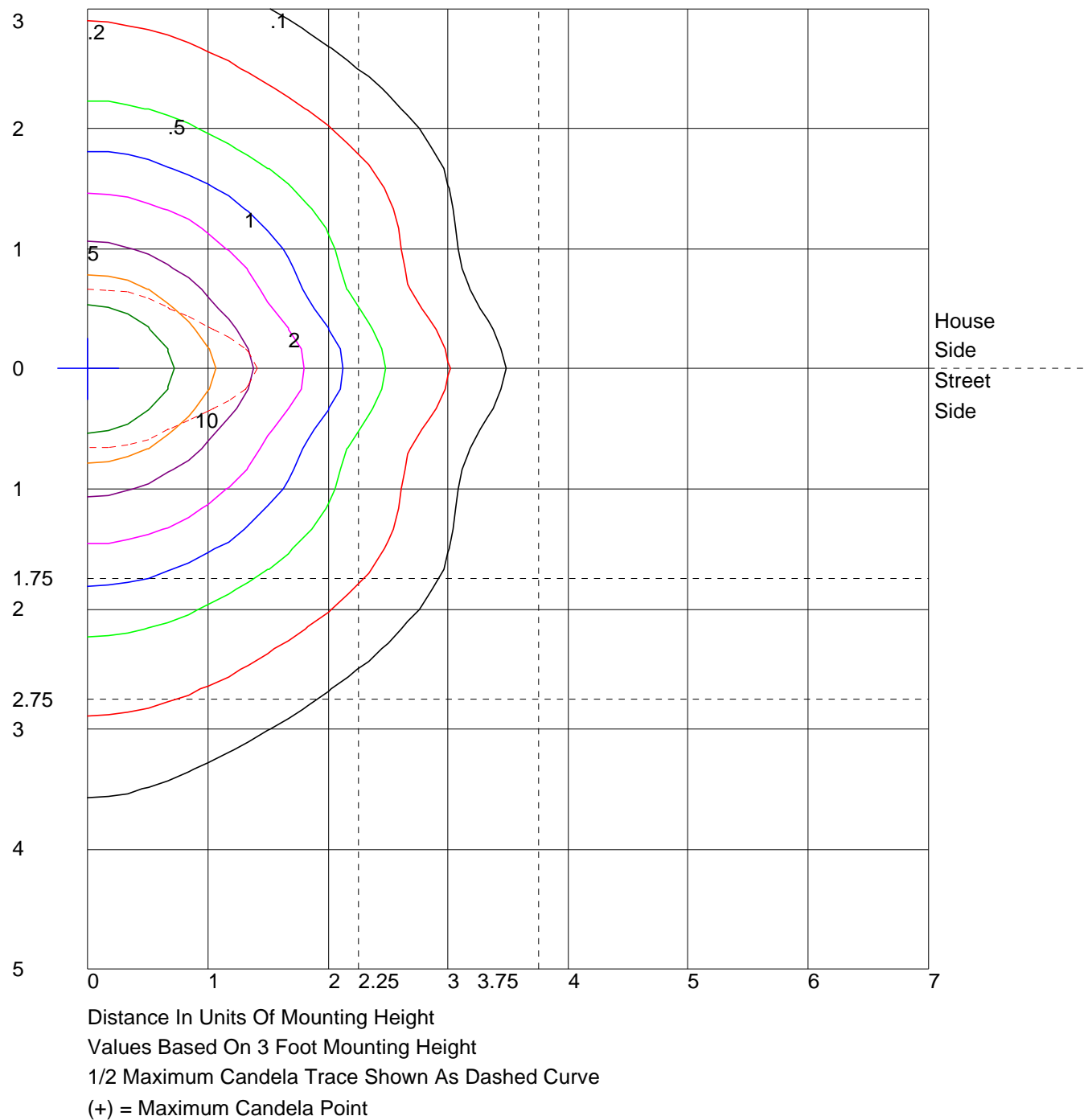
	Lumens	Percent Of Luminaire
Downward Street Side	420.4	50.0
Downward House Side	420.4	50.0
Downward Total	840.8	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	840.8	100.0

POLAR GRAPH

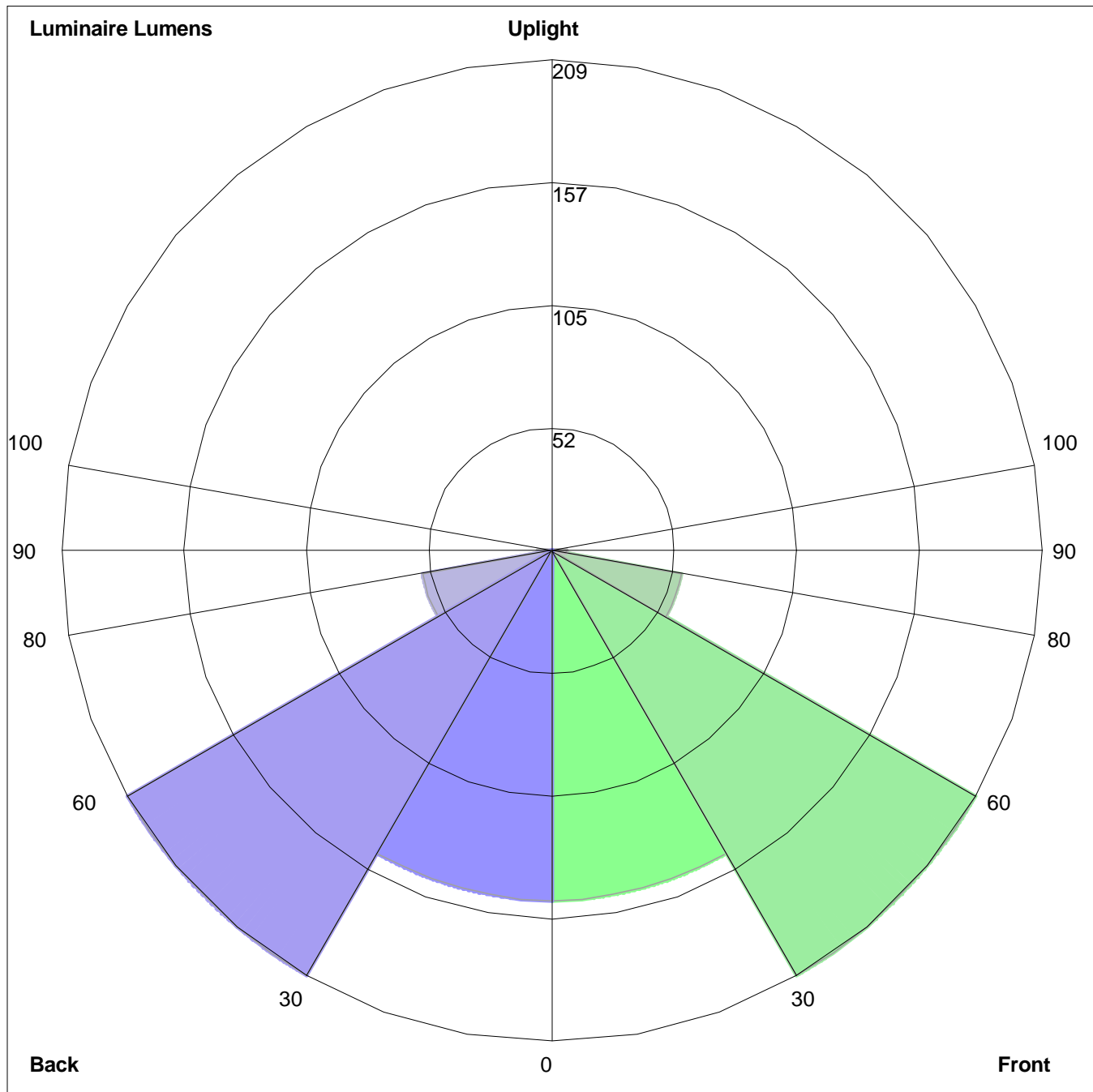


Maximum Candela = 429.33 Located At Horizontal Angle = 0, Vertical Angle = 0
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Vertical Plane Through Horizontal Angles (90 - 270)
3 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=149.1, Medium=209.2, High=56.0, Very High=6.1
Back: Low=149.1, Medium=209.2, High=56.0, Very High=6.1
Uplight: Low=0.0, High=0.0

BUG Rating : B1-U0-G0