



8165 E Kaiser Blvd. Anaheim, CA 92808  
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Report No: L031601204

Date: 3/14/2016



NVLAP LAB CODE 200927-0

**Report No:** L031601204

**Report Prepared For:** VIVA Railings  
1454 Halsey Way

**Model Number:** 4000K 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 4000K 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:** 3/10/16 - 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

<b>Manufacturer:</b>	VIVA Railings
<b>Model Number:</b>	4000K LED High/Clear
<b>Driver Model Number:</b>	N/A
<b>Total Lumens:</b>	886.40
<b>Input Voltage (VDC):</b>	12.00
<b>Input Current (Amp):</b>	1.28
<b>Input Power (W):</b>	15.40
<b>Input Power Factor:</b>	1.00
<b>Current ATHD @ 120V(%):</b>	N/A
<b>Current ATHD @ 277V(%):</b>	N/A
<b>Efficacy:</b>	58
<b>Color Rendering Index (CRI):</b>	95
<b>Correlated Color Temperature (K):</b>	3743
<b>Chromaticity Coordinate x:</b>	0.3940
<b>Chromaticity Coordinate y:</b>	0.3886
<b>Ambient Temperature (°C):</b>	25.0
<b>Stabilization Time (Hours):</b>	1:45
<b>Total Operating Time (Hours):</b>	2:35
<b>Off State Power(W):</b>	0.00

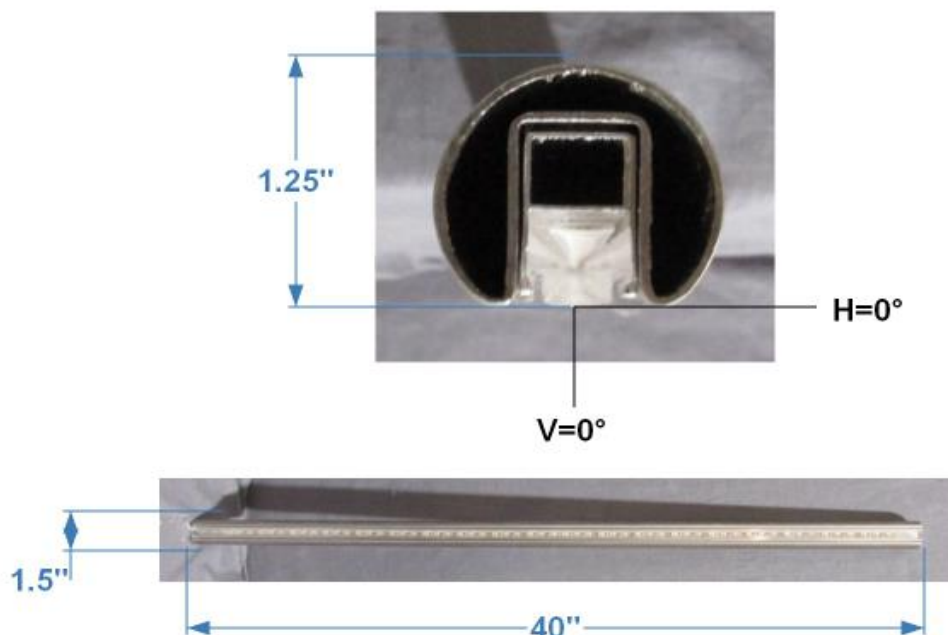
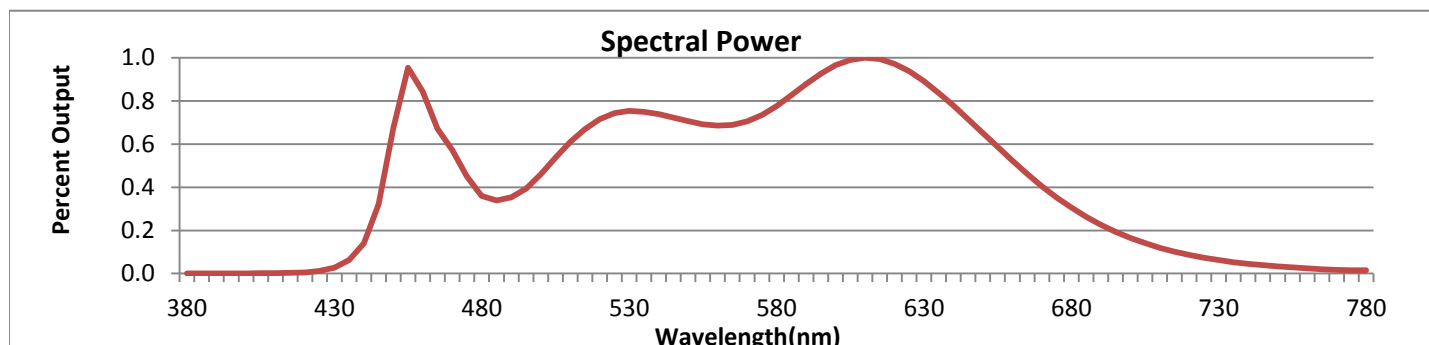


FIG. 1 LUMINAIRE



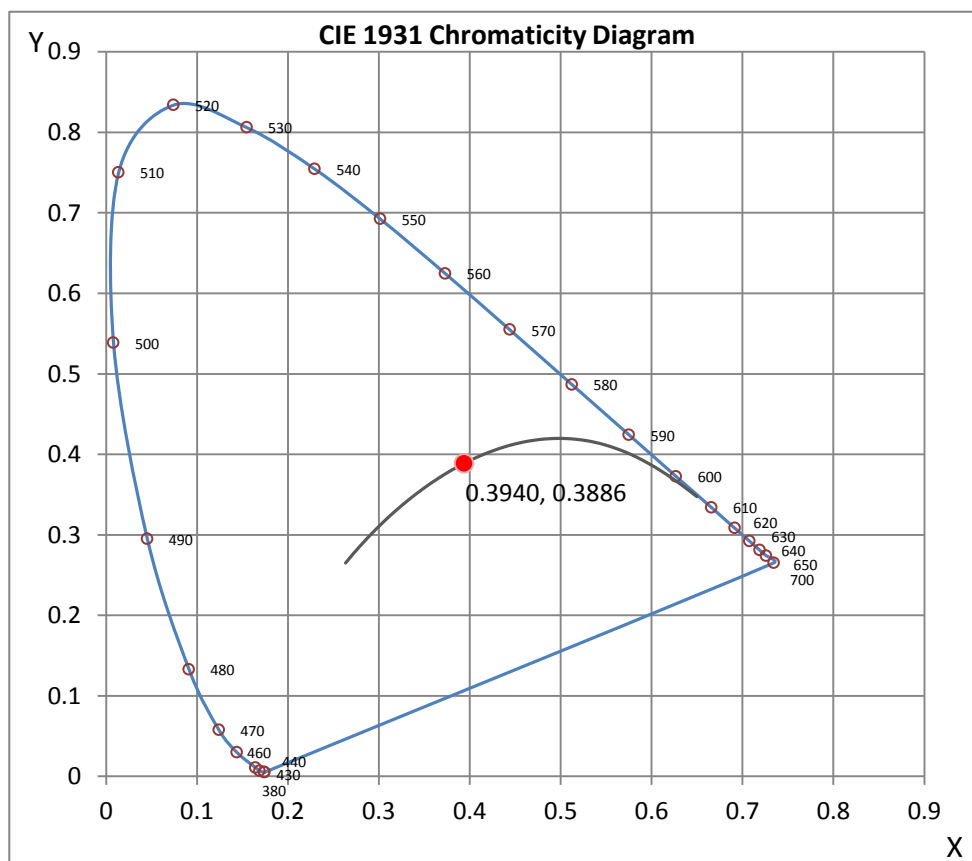
Wavelength	W/m <sup>2</sup> nm	440	0.0015	510	0.0064	580	0.0081	650	0.0068	720	0.0009
380	0.0000	450	0.0071	520	0.0075	590	0.0092	660	0.0055	730	0.0007
390	0.0000	460	0.0088	530	0.0079	600	0.0101	670	0.0042	740	0.0005
400	0.0000	470	0.0060	540	0.0077	610	0.0105	680	0.0032	750	0.0003
410	0.0000	480	0.0038	550	0.0074	620	0.0102	690	0.0024	760	0.0002
420	0.0001	490	0.0037	560	0.0072	630	0.0093	700	0.0017	770	0.0002
430	0.0003	500	0.0048	570	0.0074	640	0.0082	710	0.0013	780	0.0002

**CRI & CCT**

x	0.3940
y	0.3886
u'	0.2292
v'	0.5087
CRI	94.60
CCT	3743
Duv	0.00174

**R Values**

R1	97.29
R2	99.41
R3	99.40
R4	95.41
R5	95.03
R6	96.21
R7	91.27
R8	82.99
R9	60.18
R10	96.14
R11	99.10
R12	70.54
R13	99.12
R14	98.61





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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 ROAD REPORT

PHOTOMETRIC FILENAME : L031601204.IES

### DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002  
[TEST] L031601204  
[TESTLAB] LIGHT LABORATORY, INC.  
[ISSUEDATE] 3/14/2016  
[MANUFAC] VIVA RAILINGS  
[LUMCAT] 4000K LED High/Clear  
[LUMINAIRE] 1.5"L. X 40"W. X 1.25"H. RAIL LIGHT  
[MORE] 4000K 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, 15.40W  
[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	886
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	58
Total Luminaire Watts	15.4
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	445
Maximum Candela Angle	0H 0V
Maximum Candela (<90 Degrees Vertical)	445
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	35.41 (4.0% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L031601204.IES**

**LUMINAIRE CLASSIFICATION SYSTEM (LCS)**

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	157.0	N.A.	17.7
FM - Front-Medium (30-60)	218.5	N.A.	24.6
FH - Front-High (60-80)	61.6	N.A.	6.9
FVH - Front-Very High (80-90)	6.2	N.A.	0.7
BL - Back-Low (0-30)	157.0	N.A.	17.7
BM - Back-Medium (30-60)	218.5	N.A.	24.6
BH - Back-High (60-80)	61.6	N.A.	6.9
BVH - Back-Very High (80-90)	6.2	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	886.6	N.A.	100.0
BUG Rating	B1-U0-G0		

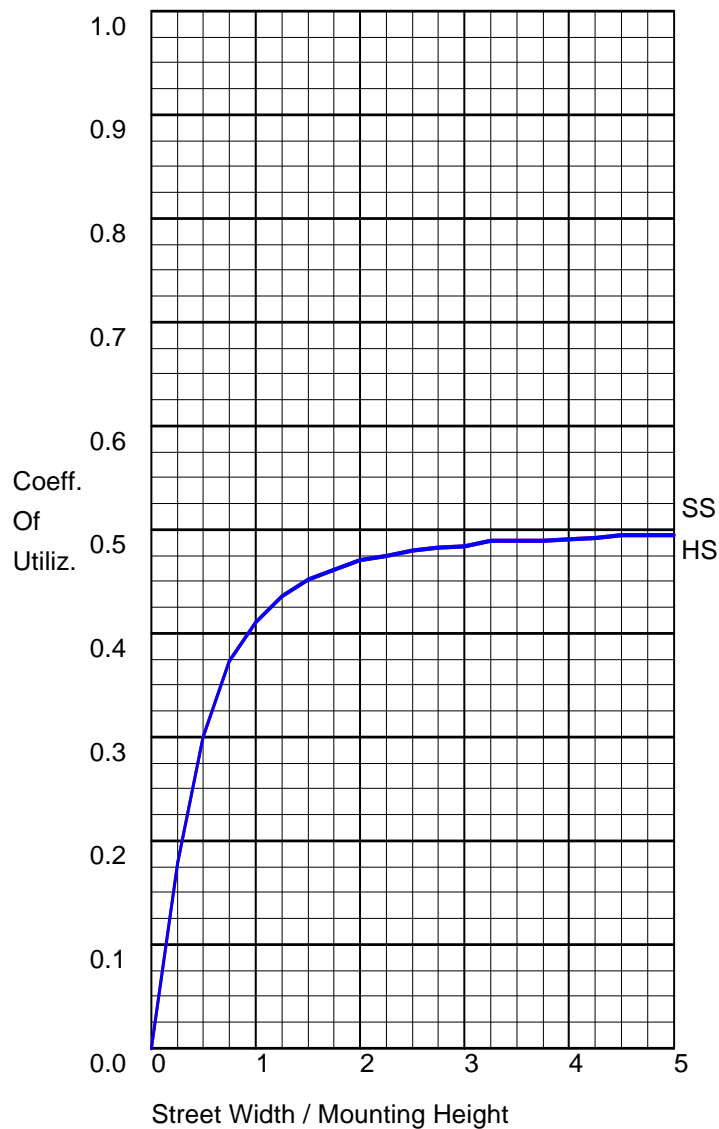
IES ROAD REPORT  
PHOTOMETRIC FILENAME : L031601204.IES

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>
<b>0</b>	445.00	445.00	445.00	445.00	445.00	445.00	445.00	445.00	445.00	445.00
<b>5</b>	439.07	438.52	438.90	439.32	439.32	439.40	439.69	438.90	440.11	439.65
<b>10</b>	423.96	424.68	425.31	425.05	426.10	426.98	428.54	429.58	430.63	431.64
<b>15</b>	388.39	388.05	389.81	391.41	394.51	397.03	400.43	404.08	408.61	412.30
<b>20</b>	340.90	341.23	342.87	345.60	349.29	353.74	359.06	365.48	372.78	380.50
<b>25</b>	289.80	290.31	292.28	294.75	297.77	303.14	310.19	318.16	327.85	337.25
<b>30</b>	251.46	251.88	252.97	254.65	257.42	260.56	264.50	269.79	278.01	288.92
<b>35</b>	210.18	210.68	212.95	216.22	220.12	224.53	228.64	233.17	238.03	244.58
<b>40</b>	171.67	172.09	173.68	176.28	179.97	184.88	191.43	197.97	204.56	208.29
<b>45</b>	138.69	139.41	141.29	143.98	148.09	152.62	157.57	162.86	170.16	176.53
<b>50</b>	113.61	114.02	114.74	116.33	119.56	123.84	128.75	135.13	140.92	147.75
<b>55</b>	98.59	98.59	98.33	98.13	97.54	98.54	101.48	107.94	115.41	120.74
<b>60</b>	89.02	88.48	87.64	86.59	85.12	84.24	84.78	85.75	90.45	97.54
<b>65</b>	78.79	78.11	76.02	72.66	69.56	67.37	67.21	68.34	69.81	74.42
<b>70</b>	71.74	70.73	67.63	62.72	57.81	53.91	51.22	50.30	50.51	51.27
<b>75</b>	55.71	55.54	55.17	53.61	49.25	42.20	37.21	34.74	33.94	34.32
<b>80</b>	32.81	33.18	34.19	35.24	35.41	33.44	27.31	22.23	20.47	20.01
<b>85</b>	15.86	15.82	15.98	16.53	18.38	19.42	18.08	12.84	9.73	8.98
<b>90</b>	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>	
<b>0</b>	445.00	445.00	445.00	445.00	445.00	445.00	445.00	445.00	445.00	
<b>5</b>	440.49	438.90	440.37	440.53	441.00	441.20	441.25	441.58	441.67	
<b>10</b>	432.65	433.53	433.86	434.66	435.63	436.21	436.34	436.88	437.14	
<b>15</b>	416.16	419.47	421.70	423.79	425.10	426.10	427.91	428.16	428.16	
<b>20</b>	388.64	396.32	402.57	407.27	410.96	412.76	413.98	414.36	415.32	
<b>25</b>	348.07	359.73	370.56	381.09	388.26	392.42	394.05	395.94	396.53	
<b>30</b>	301.21	316.15	329.87	345.01	358.94	367.16	371.10	373.12	373.54	
<b>35</b>	254.23	268.24	285.61	304.57	324.03	339.26	347.57	350.38	351.64	
<b>40</b>	214.50	224.61	239.71	260.65	285.02	309.06	322.06	327.81	329.91	
<b>45</b>	182.62	187.61	199.10	217.35	241.68	272.27	294.25	301.59	304.40	
<b>50</b>	154.09	158.28	164.16	175.95	196.75	226.79	256.70	267.53	270.50	
<b>55</b>	126.82	132.40	133.45	139.20	151.19	175.65	209.63	225.78	228.05	
<b>60</b>	102.24	105.84	107.82	108.07	113.86	127.37	156.52	176.99	180.81	
<b>65</b>	79.88	81.43	82.90	80.72	79.71	83.69	99.59	120.78	124.93	
<b>70</b>	54.96	58.19	58.94	56.51	52.52	50.93	55.38	72.37	76.69	
<b>75</b>	34.95	36.16	36.67	34.32	30.96	28.65	27.31	34.65	37.84	
<b>80</b>	20.14	20.05	19.72	18.12	15.86	13.89	13.09	14.18	15.77	
<b>85</b>	8.68	8.18	7.55	6.80	5.71	5.03	4.70	4.49	4.70	
<b>90</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

COEFFICIENTS OF UTILIZATION

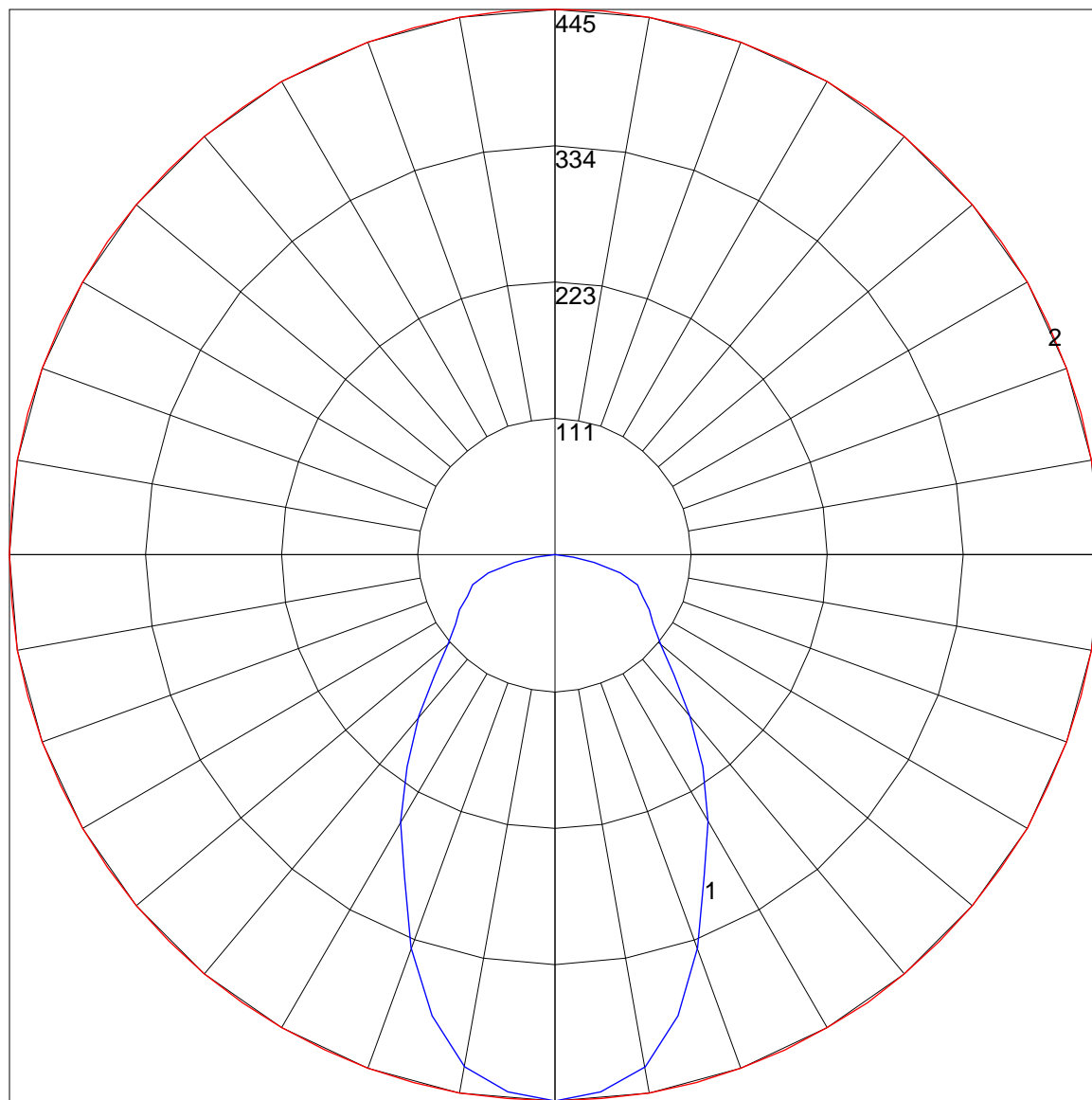


FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	443.2	50.0
Downward House Side	443.2	50.0
Downward Total	886.4	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	886.4	100.0

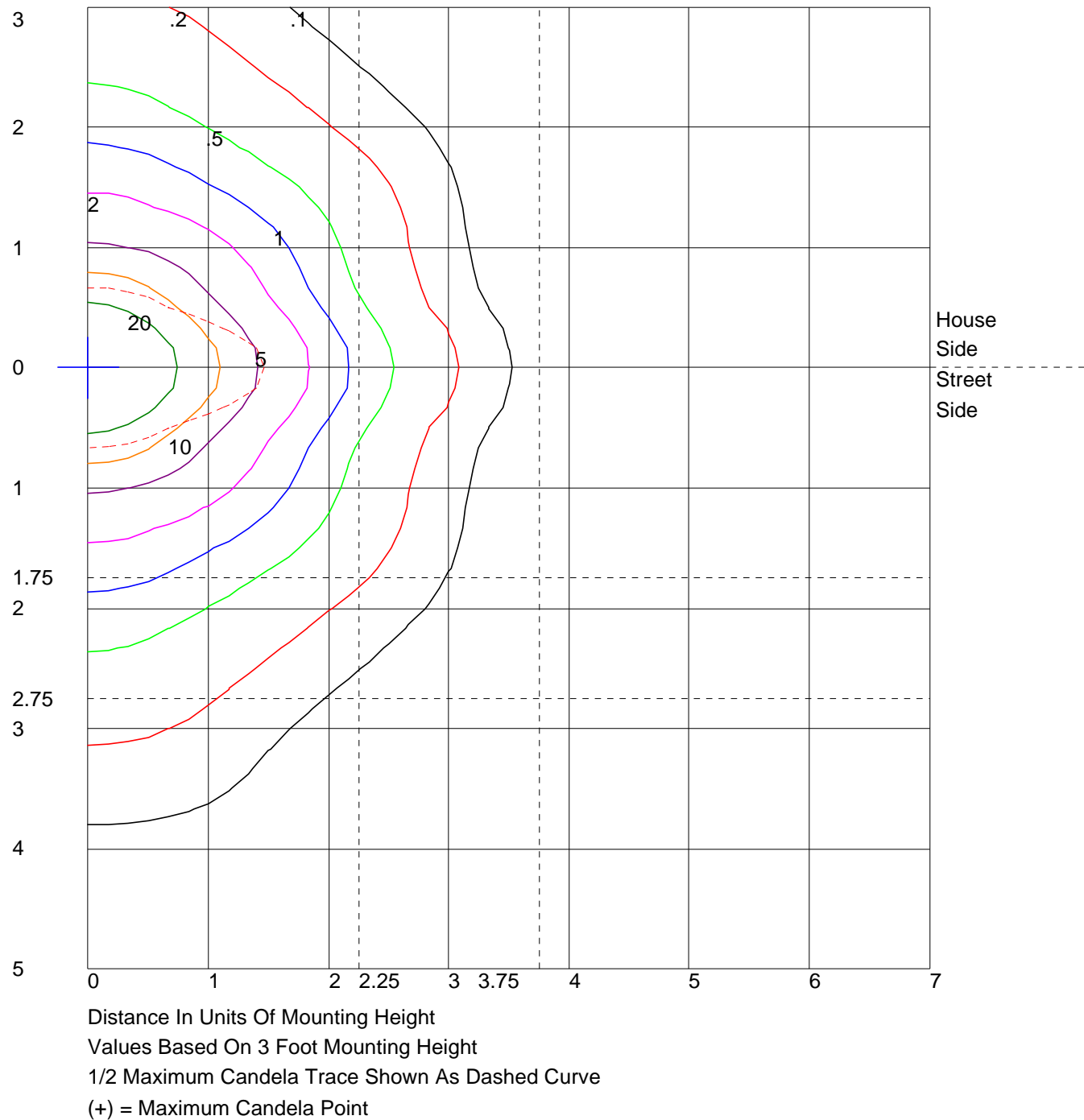


POLAR GRAPH

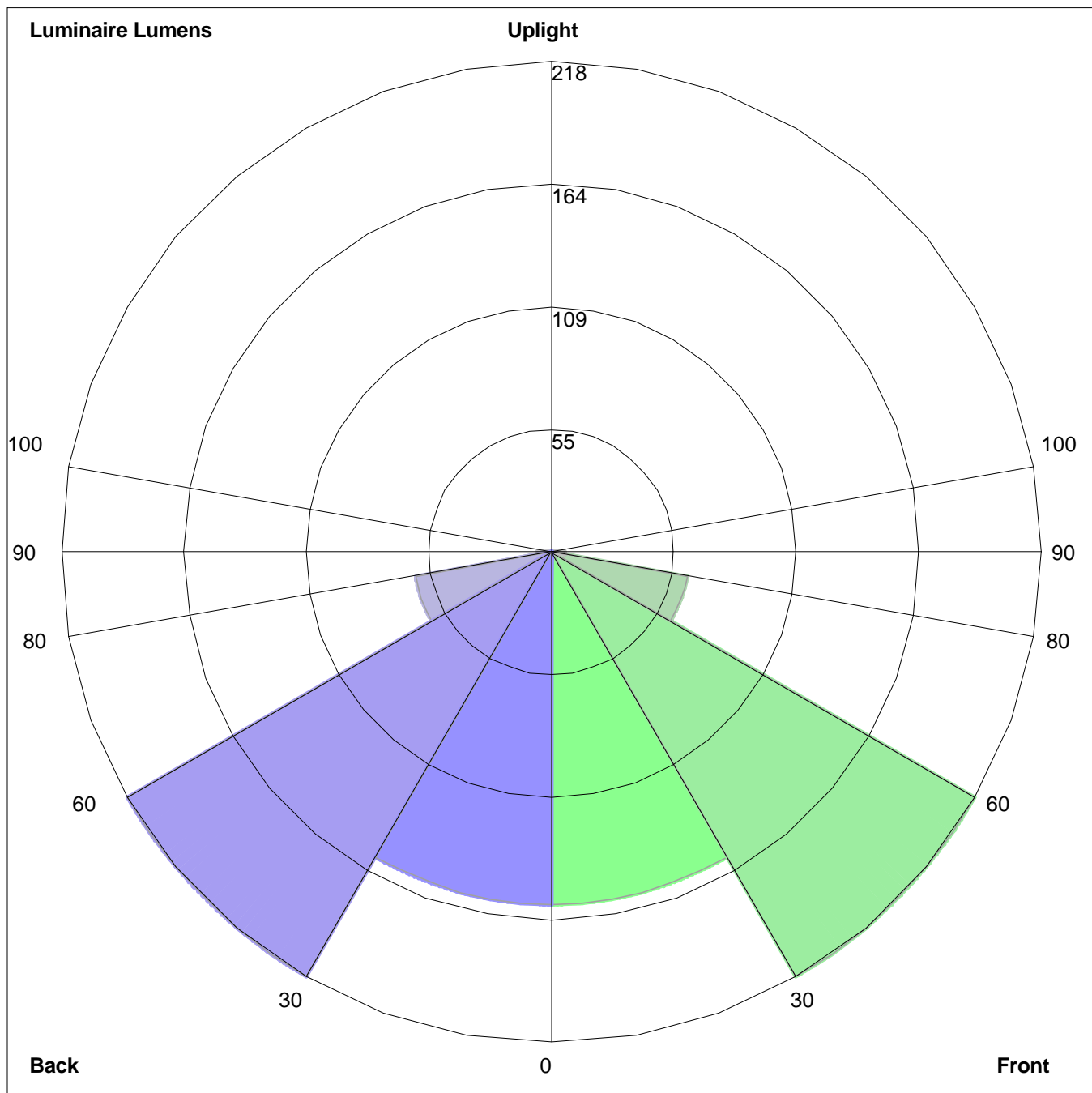


Maximum Candela = 445 Located At Horizontal Angle = 0, Vertical Angle = 0  
# 1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)  
# 2 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)

## ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=157.0, Medium=218.5, High=61.6, Very High=6.2  
Back: Low=157.0, Medium=218.5, High=61.6, Very High=6.2  
Uplight: Low=0.0, High=0.0

BUG Rating : B1-U0-G0