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Report No: L031601203

Date: 3/14/2016



NVLAP LAB CODE 200927-0

Report No: L031601203

Report Prepared For: VIVA Railings
 1454 Halsey Way

Model Number: 4000K LED Med/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 Med/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

Manufacturer:	VIVA Railings
Model Number:	4000K LED Med/Clear
Driver Model Number:	N/A
Total Lumens:	620.80
Input Voltage (VDC):	12.00
Input Current (Amp):	0.80
Input Power (W):	9.63
Input Power Factor:	1.00
Current ATHD @ 120V(%):	N/A
Current ATHD @ 277V(%):	N/A
Efficacy:	64
Color Rendering Index (CRI):	96
Correlated Color Temperature (K):	3786
Chromaticity Coordinate x:	0.3887
Chromaticity Coordinate y:	0.3774
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	1:10
Total Operating Time (Hours):	2:05
Off State Power(W):	0.00

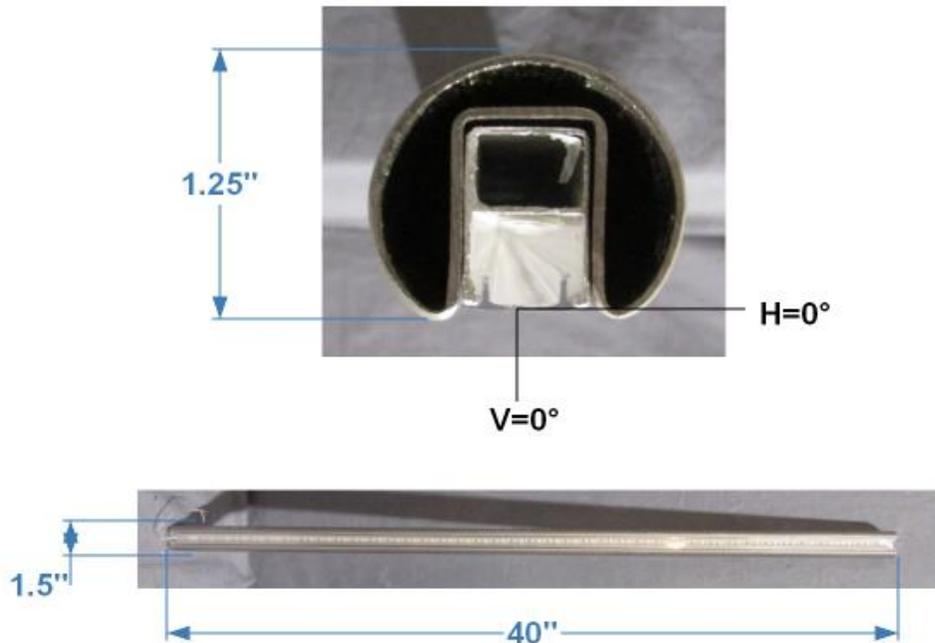
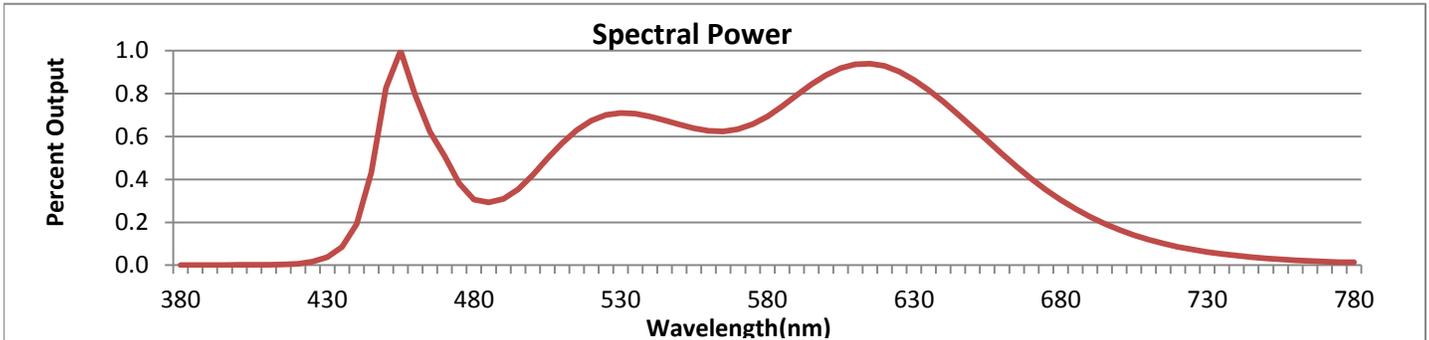


FIG. 1 LUMINAIRE

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



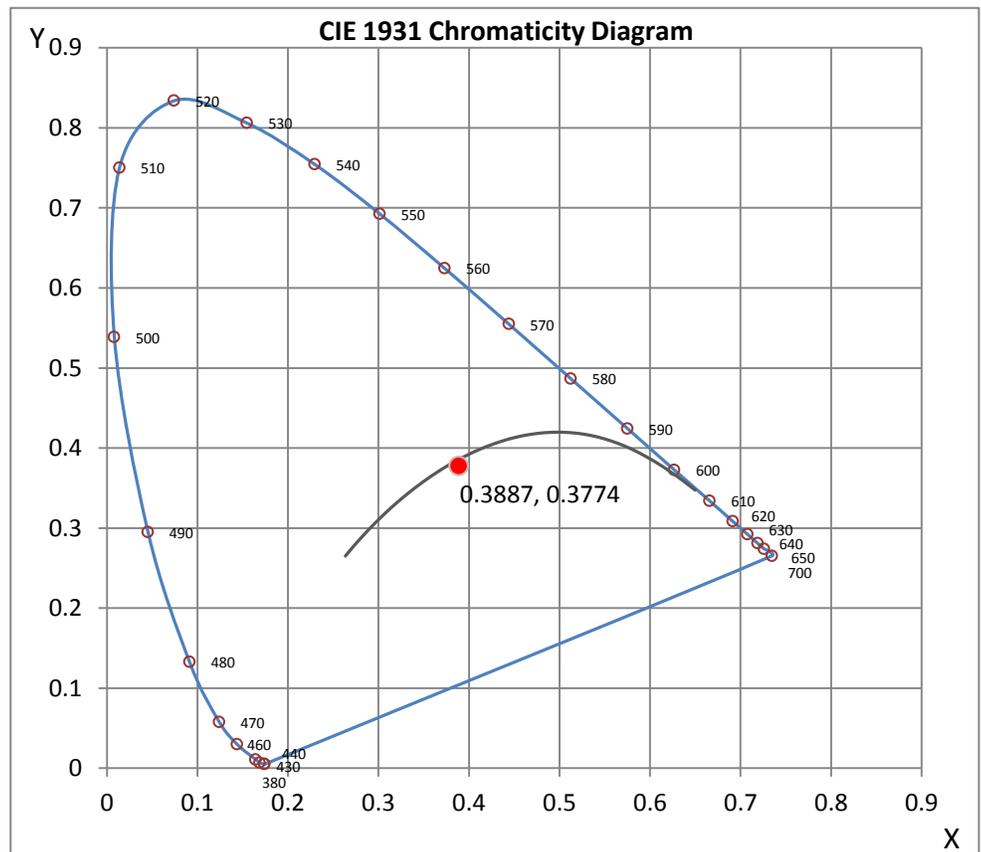
Wavelength	W/m ² nm	440	0.0013	510	0.0040	580	0.0048	650	0.0045	720	0.0006
380	0.0000	450	0.0058	520	0.0047	590	0.0055	660	0.0036	730	0.0004
390	0.0000	460	0.0055	530	0.0050	600	0.0062	670	0.0028	740	0.0003
400	0.0000	470	0.0036	540	0.0048	610	0.0065	680	0.0021	750	0.0002
410	0.0000	480	0.0021	550	0.0046	620	0.0065	690	0.0016	760	0.0002
420	0.0000	490	0.0022	560	0.0044	630	0.0060	700	0.0011	770	0.0001
430	0.0003	500	0.0029	570	0.0044	640	0.0053	710	0.0008	780	0.0001

CRI & CCT

x	0.3887
y	0.3774
u'	0.2303
v'	0.5031
CRI	96.00
CCT	3786
Duv	-0.00200

R Values

R1	97.26
R2	98.75
R3	97.20
R4	99.08
R5	97.42
R6	94.88
R7	94.07
R8	89.41
R9	74.89
R10	98.49
R11	94.05
R12	72.86
R13	97.18
R14	97.10



*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: 11*



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Photometric Test Report

IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601203.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L031601203
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 3/14/2016
 [MANUFAC] VIVA RAILINGS
 [LUMCAT] 4000K LED Med/Clear
 [LUMINAIRE] 1.5"L. X 40"W. X 1.25"H. RAIL LIGHT
 [MORE] 4000K LED Med 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, 9.63W
 [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	621
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	64
Total Luminaire Watts	9.63
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	316.52
Maximum Candela Angle	0H 0V
Maximum Candela (<90 Degrees Vertical)	316.52
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	24.33 (3.9% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601203.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

ZONAL LUMEN SUMMARY

	Lumens	% Lamp	% Luminaire	Zone	%
FL - Front-Low (0-30)	109.9	N.A.	17.7		
FM - Front-Medium (30-60)	153.2	N.A.	24.7	0-20	17.6
FH - Front-High (60-80)	43.2	N.A.	7.0	0-30	35.4
FVH - Front-Very High (80-90)	4.1	N.A.	0.7	0-40	54.5
BL - Back-Low (0-30)	109.9	N.A.	17.7	0-60	84.8
BM - Back-Medium (30-60)	153.2	N.A.	24.7	0-80	98.7
BH - Back-High (60-80)	43.2	N.A.	7.0	0-90	100
BVH - Back-Very High (80-90)	4.1	N.A.	0.7	10-90	95.3
UL - Uplight-Low (90-100)	0.0	N.A.	0.0	20-40	36.9
UH - Uplight-High (100-180)	0.0	N.A.	0.0	20-50	53.9
				40-70	39.4
Total	620.8	N.A.	100.0	60-80	13.9
				70-80	4.8
BUG Rating	B0-U0-G0			80-90	1.3
				90-110	0
				90-120	0
				90-130	0
				90-150	0
				90-180	0
				110-180	0
				0-180	100

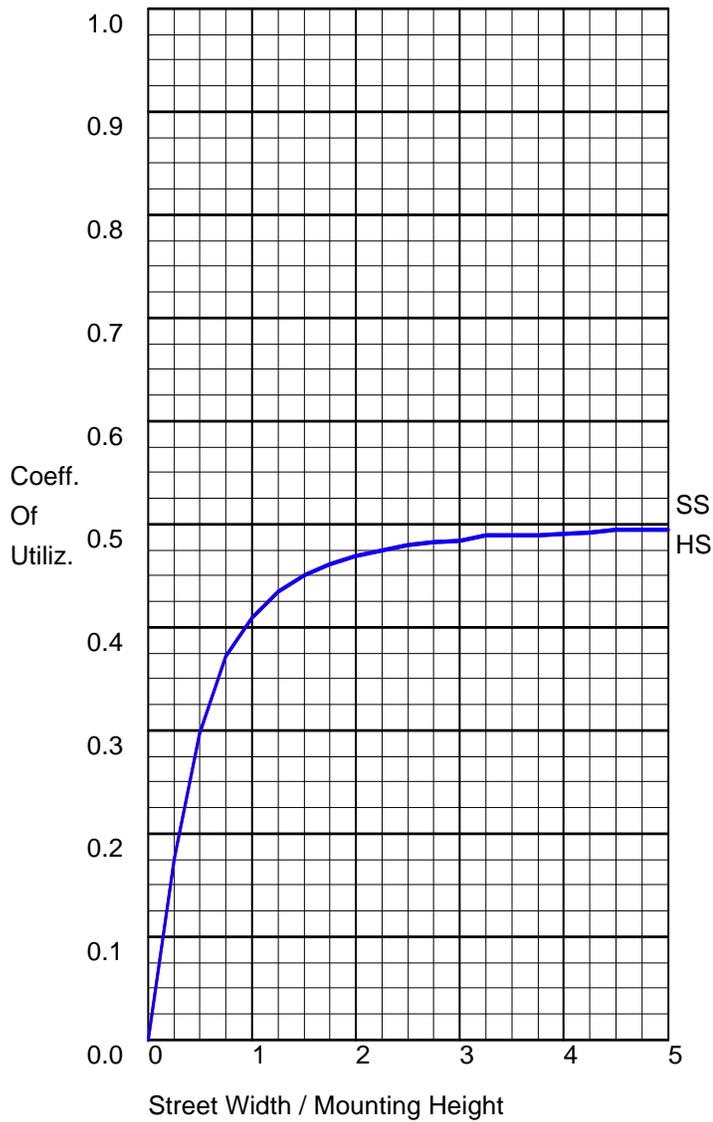
IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601203.IES

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	316.52	316.52	316.52	316.52	316.52	316.52	316.52	316.52	316.52	316.52
5	309.27	309.31	309.39	309.60	309.81	310.19	310.44	310.95	311.32	311.70
10	288.88	289.05	289.30	289.80	290.51	291.52	292.82	294.50	296.14	297.90
15	272.43	272.52	272.85	273.23	273.52	273.90	274.28	274.83	276.08	278.22
20	246.09	246.42	247.10	248.14	249.65	251.29	253.39	256.24	259.47	262.41
25	207.49	207.70	208.46	209.97	212.32	216.39	221.71	228.30	234.26	238.87
30	180.98	181.15	181.94	183.08	184.42	186.27	188.11	191.64	197.80	207.20
35	148.84	149.22	150.35	152.33	154.93	158.62	163.07	167.47	170.58	174.94
40	122.16	122.33	123.13	124.34	126.53	130.13	134.83	139.82	145.87	152.03
45	95.99	97.33	98.71	101.31	103.75	107.40	110.75	114.40	120.15	124.39
50	80.30	81.51	81.13	81.89	83.36	86.17	89.99	94.14	98.29	102.40
55	71.99	72.37	72.20	72.20	71.65	71.53	71.82	75.47	80.13	83.90
60	64.27	64.02	63.39	63.18	62.38	62.05	61.08	60.79	62.72	66.62
65	58.56	57.85	55.75	53.61	51.77	50.76	50.05	49.55	49.17	50.55
70	55.04	53.70	51.77	48.62	44.09	40.06	37.97	36.79	35.95	36.12
75	36.83	36.50	37.51	38.76	37.09	31.93	27.35	25.30	24.67	24.29
80	21.06	20.85	21.19	22.57	24.12	24.33	20.01	15.86	14.56	14.26
85	10.32	10.15	10.40	10.53	10.70	11.29	11.41	8.52	6.75	6.34
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	316.52	316.52	316.52	316.52	316.52	316.52	316.52	316.52	316.52	
5	312.16	312.62	312.83	313.21	313.59	313.84	314.09	314.43	314.47	
10	299.74	301.67	303.65	305.32	306.62	307.72	308.47	309.18	309.52	
15	281.12	284.77	288.59	292.40	295.88	298.65	300.67	301.84	302.30	
20	263.88	265.89	270.17	275.75	281.54	286.95	290.64	292.95	293.58	
25	244.33	250.20	253.56	257.29	264.38	272.31	278.73	282.29	283.43	
30	218.74	226.62	234.85	240.89	245.25	255.15	264.21	269.96	271.85	
35	183.12	196.96	210.39	220.50	227.63	234.38	245.88	253.85	256.58	
40	155.35	162.65	176.66	193.06	204.18	209.84	221.50	231.57	235.77	
45	130.34	133.62	139.41	154.38	171.46	181.99	189.66	201.62	207.66	
50	106.14	109.37	112.47	119.44	138.57	152.83	162.69	176.66	181.99	
55	86.21	89.48	91.04	94.01	102.74	124.76	136.89	149.18	156.23	
60	69.77	71.57	72.66	73.37	76.35	89.15	106.68	114.70	123.25	
65	53.57	55.92	56.22	54.54	54.24	57.22	73.21	80.30	87.60	
70	37.84	39.94	41.11	38.01	35.24	34.90	38.76	45.43	51.35	
75	24.46	25.05	25.93	23.87	20.85	18.38	17.49	21.48	23.75	
80	14.14	14.01	13.76	12.71	10.53	8.81	8.10	8.77	9.40	
85	6.04	5.75	5.16	4.62	3.86	3.27	2.94	2.81	2.85	
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

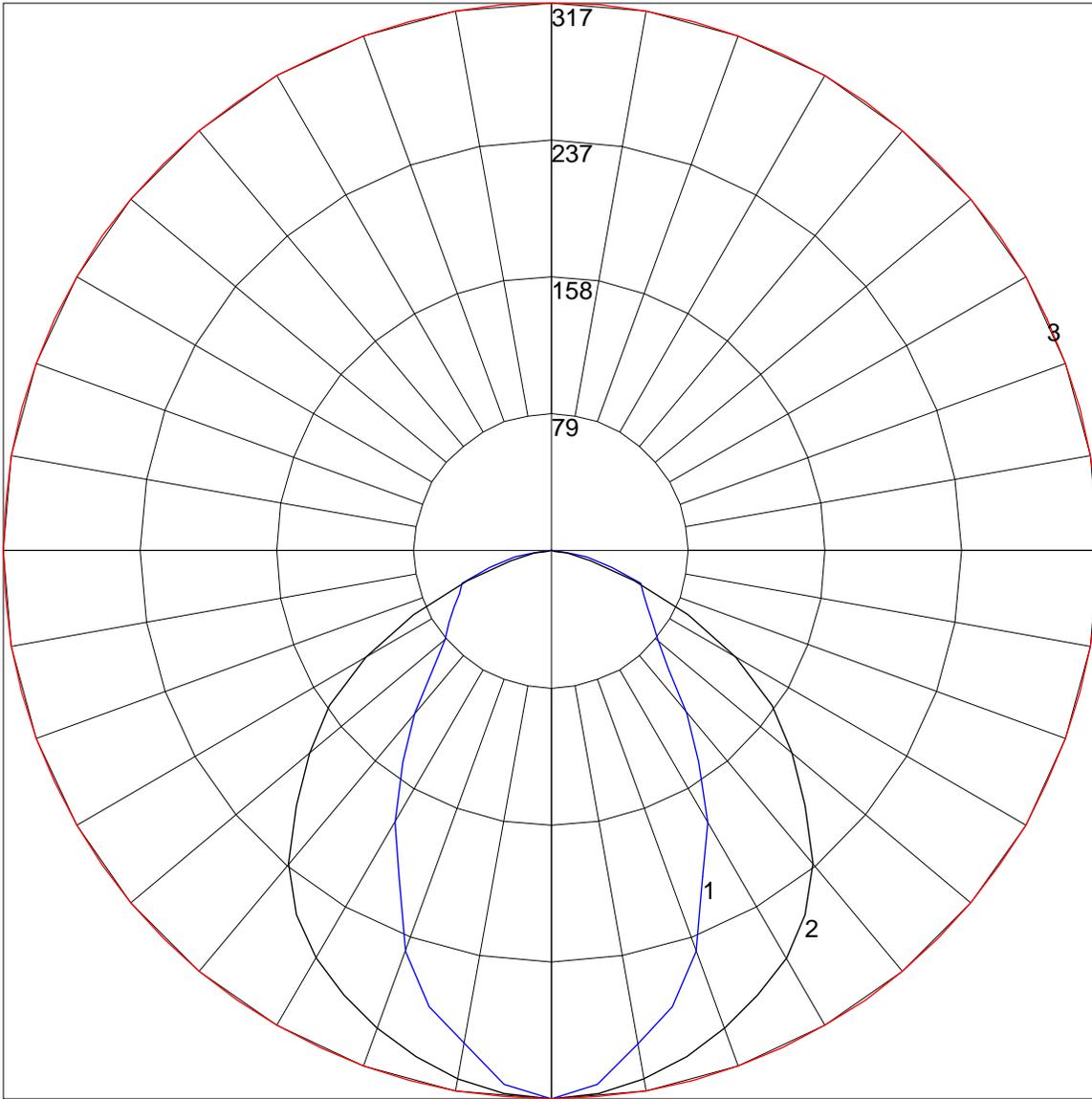
COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	310.4	50.0
Downward House Side	310.4	50.0
Downward Total	620.8	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	620.8	100.0

POLAR GRAPH



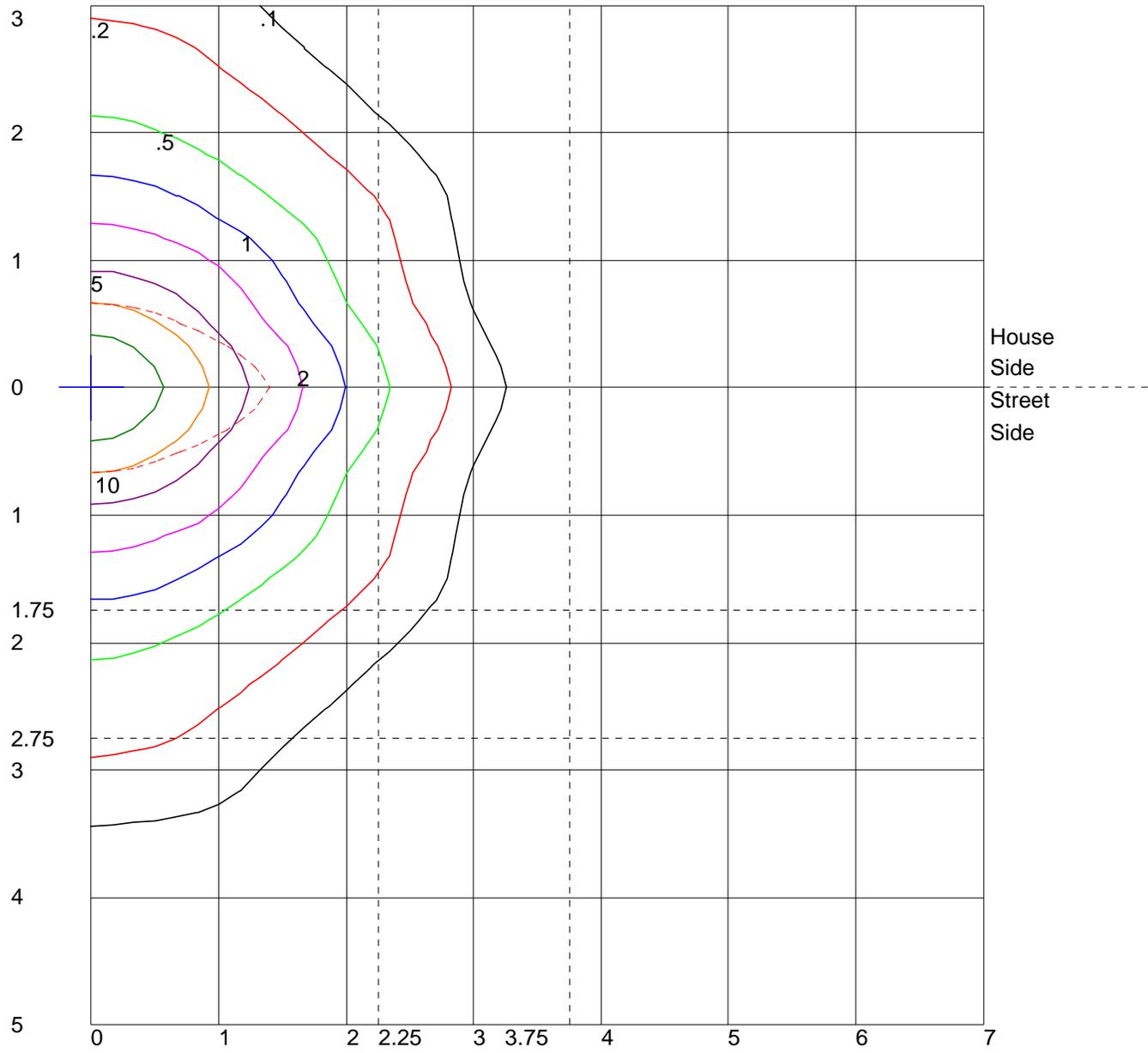
Maximum Candela = 316.52 Located At Horizontal Angle = 0, Vertical Angle = 0

1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)

2 - Vertical Plane Through Horizontal Angles (90 - 270)

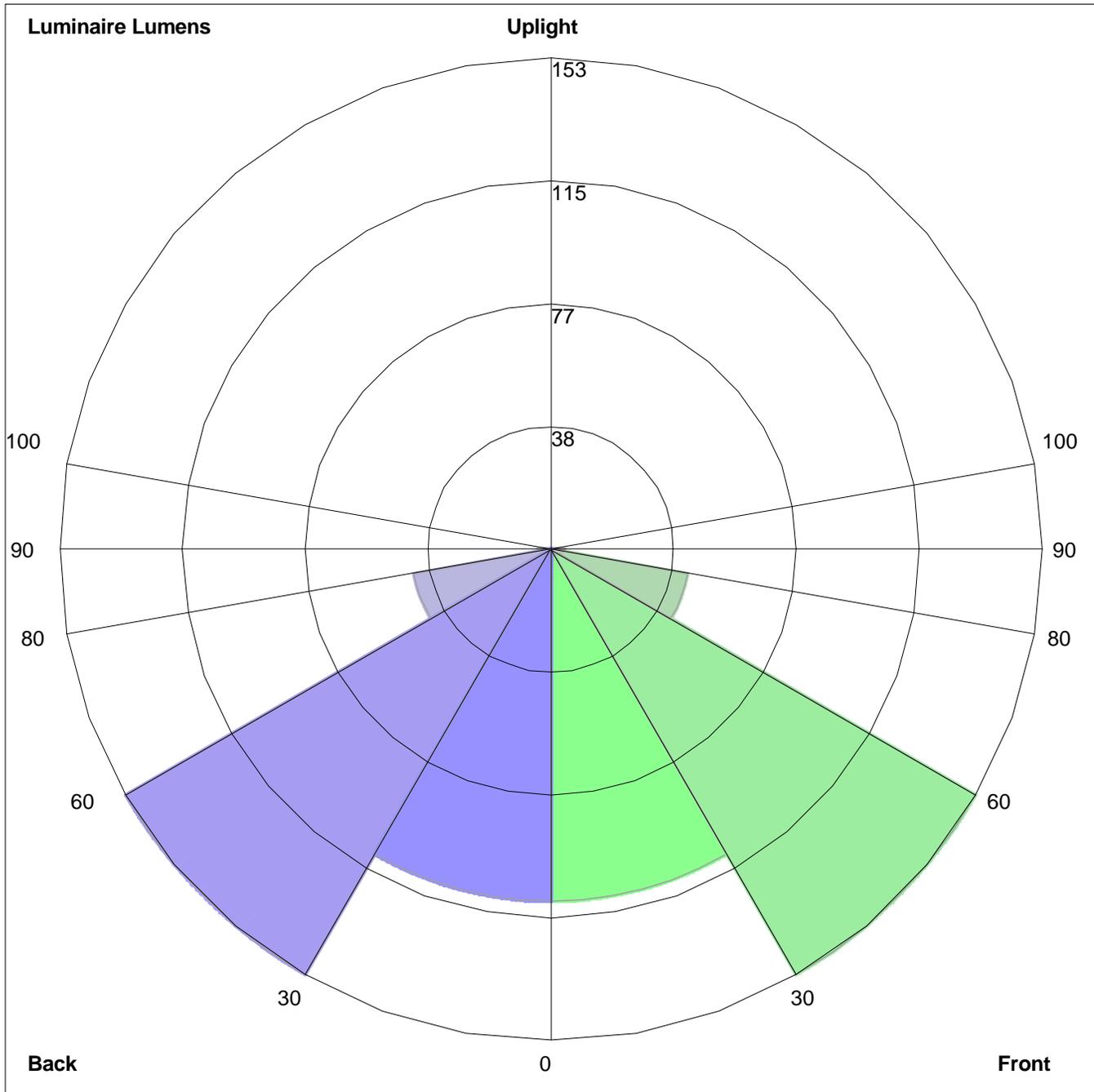
3 - Horizontal Cone Through Vertical Angle (0) (Through Max. Cd.)

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



Distance In Units Of Mounting Height
 Values Based On 3 Foot Mounting Height
 1/2 Maximum Candela Trace Shown As Dashed Curve
 (+) = Maximum Candela Point

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=109.9, Medium=153.2, High=43.2, Very High=4.1
Back: Low=109.9, Medium=153.2, High=43.2, Very High=4.1
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0