LIGHT LABORATORY INC.
8165 E Kaiser Blvd. Anaheim, CA 92808
p. 714.282.2270
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Report No: L031601205
Date: 3/14/2016

NVLAP LAB CODE 200927-0

Report No: L031601205

Prepared For: VIVA Railings
1454 Halsey Way

Model Number: 3000K LED High/ Frost

Test: Photometric/Electrical Test

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/ Frost. 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.

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Test Summary	
Manufacturer:	VIVA Railings
Model Number:	3000K LED High/ Frost
Driver Model Number:	N/A
Total Lumens:	506.60
Input Voltage (VDC):	12.00
Input Current (Amp):	1.25
Input Power (W):	15.00
Input Power Factor:	1.00
Current ATHD @ 120V(%):	N/A
Current ATHD @ 277V(%):	N/A
Efficacy:	34
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:20
Off State Power(W):	0.00

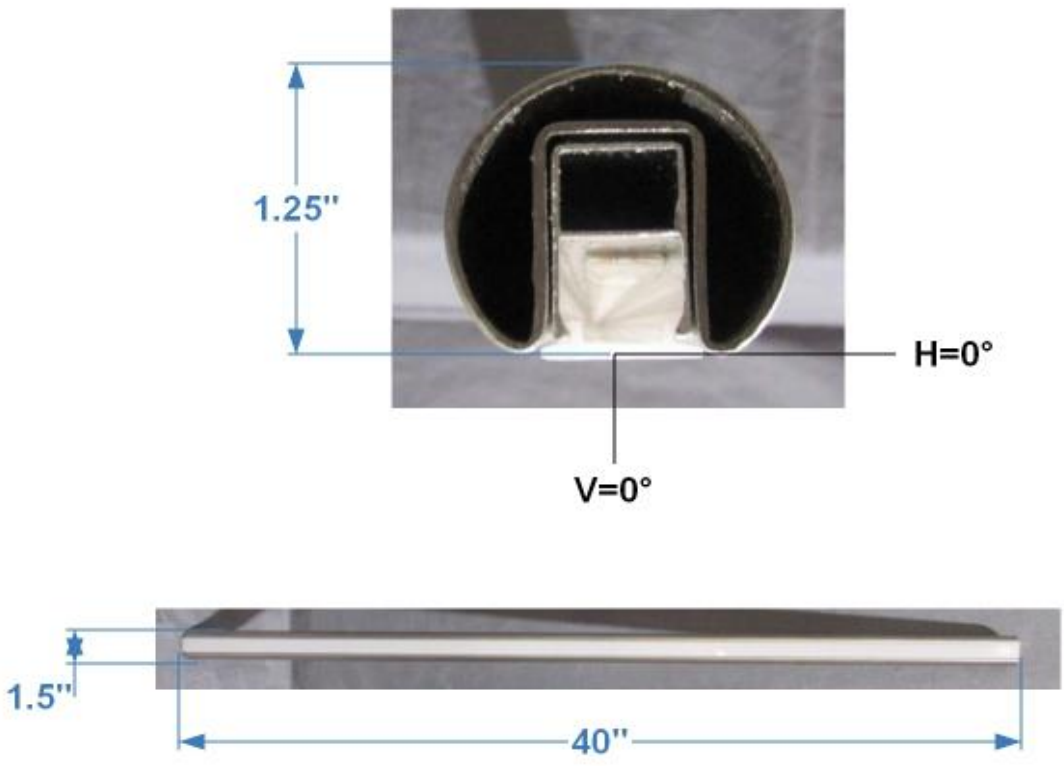

FIG.1 LUMINAIRE

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

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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: 10*

*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 : L031601205.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L031601205
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 3/14/2016
[MANUFAC] VIVA RAILINGS
[LUMCAT] 3000K LED High/ Frost
[LUMINAIRE] 1.5"L. X 40"W. X 1.25"H. RAIL LIGHT
[MORE] 3000K LED High Power Frost
[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, 15.00W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

IES Classification	Type VS
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	507
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	34
Total Luminaire Watts	15
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	192.04
Maximum Candela Angle	0H 0V
Maximum Candela (<90 Degrees Vertical)	192.04
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	20.98 (4.1% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601205.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	72.0	N.A.	14.2
FM - Front-Medium (30-60)	128.1	N.A.	25.3
FH - Front-High (60-80)	48.3	N.A.	9.5
FVH - Front-Very High (80-90)	4.9	N.A.	1.0
BL - Back-Low (0-30)	72.0	N.A.	14.2
BM - Back-Medium (30-60)	128.1	N.A.	25.3
BH - Back-High (60-80)	48.3	N.A.	9.5
BVH - Back-Very High (80-90)	4.9	N.A.	1.0
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	506.6	N.A.	100.0
BUG Rating	B0-U0-G0		

ZONAL LUMEN SUMMARY

Zone	%
0-20	13.6
0-30	28.4
0-40	45.7
0-60	79
0-80	98.1
0-90	100
10-90	96.4
20-40	32
20-50	49.6
40-70	45.4
60-80	19.1
70-80	7
80-90	1.9
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 : L031601205.IES

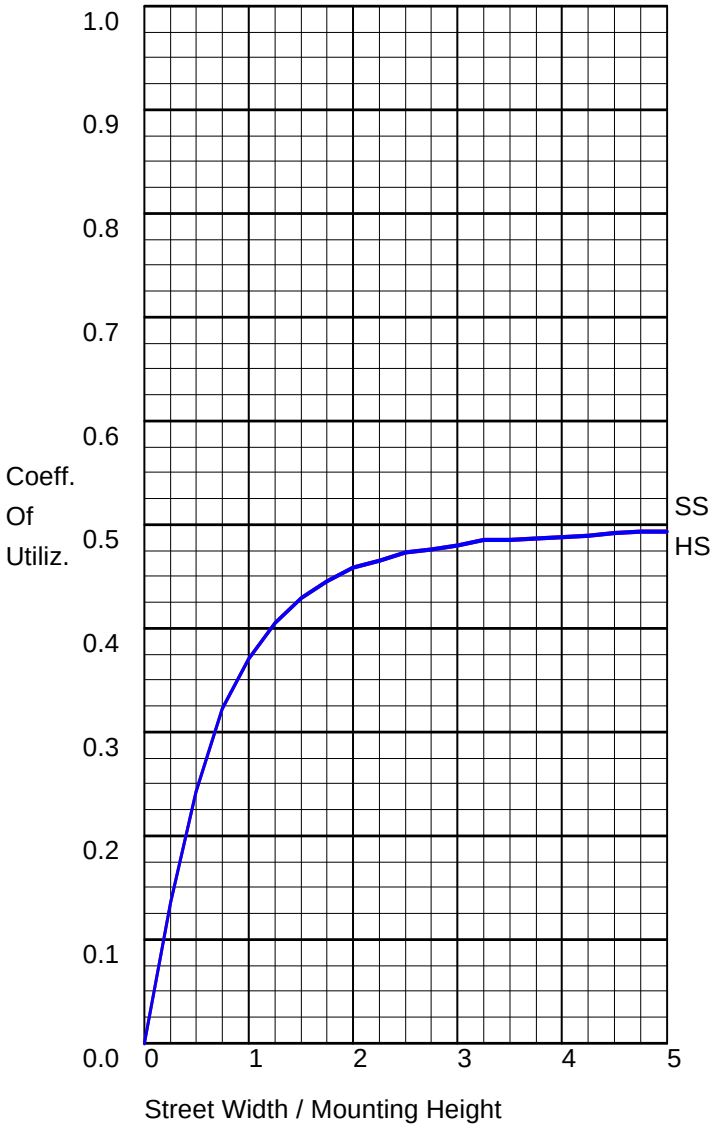
CANDELA TABULATION

Vert. Angles	Horizontal Angles									
	0	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**
0	192.04	192.04	192.04	192.04	192.04	192.04	192.04	192.04	192.04	192.04
5	190.80	190.71	190.71	190.80	190.75	190.84	190.84	190.92	190.96	191.01
10	186.27	186.31	186.35	186.43	186.48	186.64	186.77	186.89	187.10	187.23
15	178.55	178.55	178.63	178.92	179.18	179.43	179.76	180.18	180.52	180.85
20	168.23	168.23	168.44	168.77	169.23	169.74	170.37	171.04	171.79	172.67
25	156.90	156.94	157.07	157.36	157.74	158.28	159.00	159.92	161.01	162.14
30	145.49	145.57	145.74	146.03	146.50	147.04	147.54	148.22	149.05	150.23
35	133.32	133.41	133.57	133.87	134.25	134.79	135.59	136.34	137.31	138.15
40	122.25	122.25	122.25	122.33	122.42	122.75	123.13	123.84	124.76	125.77
45	111.84	111.76	111.72	111.59	111.59	111.51	111.55	111.68	112.05	112.81
50	100.77	100.77	100.68	100.60	100.47	100.39	100.22	100.01	99.97	100.14
55	88.94	88.94	88.90	88.77	88.73	88.52	88.31	88.10	87.85	87.64
60	76.35	76.35	76.31	76.23	76.06	75.85	75.68	75.43	75.18	74.88
65	62.84	62.76	62.76	62.63	62.55	62.42	62.26	62.00	61.75	61.46
70	48.75	48.71	48.62	48.62	48.45	48.37	48.20	47.99	47.83	47.57
75	34.57	34.53	34.48	34.44	34.36	34.23	34.11	33.94	33.73	33.48
80	20.98	20.98	20.98	20.89	20.81	20.64	20.43	20.31	20.14	19.93
85	9.48	9.44	9.40	9.36	9.27	9.15	8.98	8.85	8.60	8.43
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								
	50	**55**	**60**	**65**	**70**	**75**	**80**	**85**	**90**
0	192.04	192.04	192.04	192.04	192.04	192.04	192.04	192.04	192.04
5	191.05	191.01	191.09	191.09	191.17	191.17	191.22	191.22	191.22
10	187.40	187.57	187.73	187.90	188.07	188.07	188.11	188.20	188.20
15	181.23	181.57	181.94	182.24	182.66	182.91	183.04	183.16	183.16
20	173.43	174.14	174.73	175.27	175.74	176.16	176.49	176.66	176.78
25	163.23	164.49	165.58	166.63	167.30	167.97	168.39	168.69	168.90
30	151.61	153.17	154.68	156.23	157.32	158.12	158.79	159.25	159.42
35	139.20	140.66	142.47	144.27	145.87	147.00	147.80	148.38	148.59
40	126.82	127.83	129.34	131.14	132.99	134.50	135.59	136.13	136.51
45	113.90	114.86	115.83	117.30	119.06	120.90	122.16	122.88	123.25
50	100.56	101.48	102.32	103.37	104.67	106.52	107.98	108.74	109.07
55	87.60	87.93	88.69	89.32	90.15	91.58	93.13	93.93	94.31
60	74.55	74.42	74.72	75.01	75.64	76.39	77.65	78.45	78.70
65	61.17	60.87	60.66	60.75	60.91	61.21	61.96	62.55	62.76
70	47.32	46.99	46.65	46.48	46.31	46.31	46.57	46.94	46.90
75	33.27	32.97	32.68	32.47	32.14	31.93	32.01	32.35	32.47
80	19.68	19.47	19.21	19.00	18.71	18.38	18.08	18.04	18.12
85	8.22	7.97	7.72	7.51	7.22	7.05	6.80	6.54	6.54
90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601205.IES

COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	253.3	50.0
Downward House Side	253.3	50.0
Downward Total	506.6	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	506.6	100.0

IES ROAD REPORT
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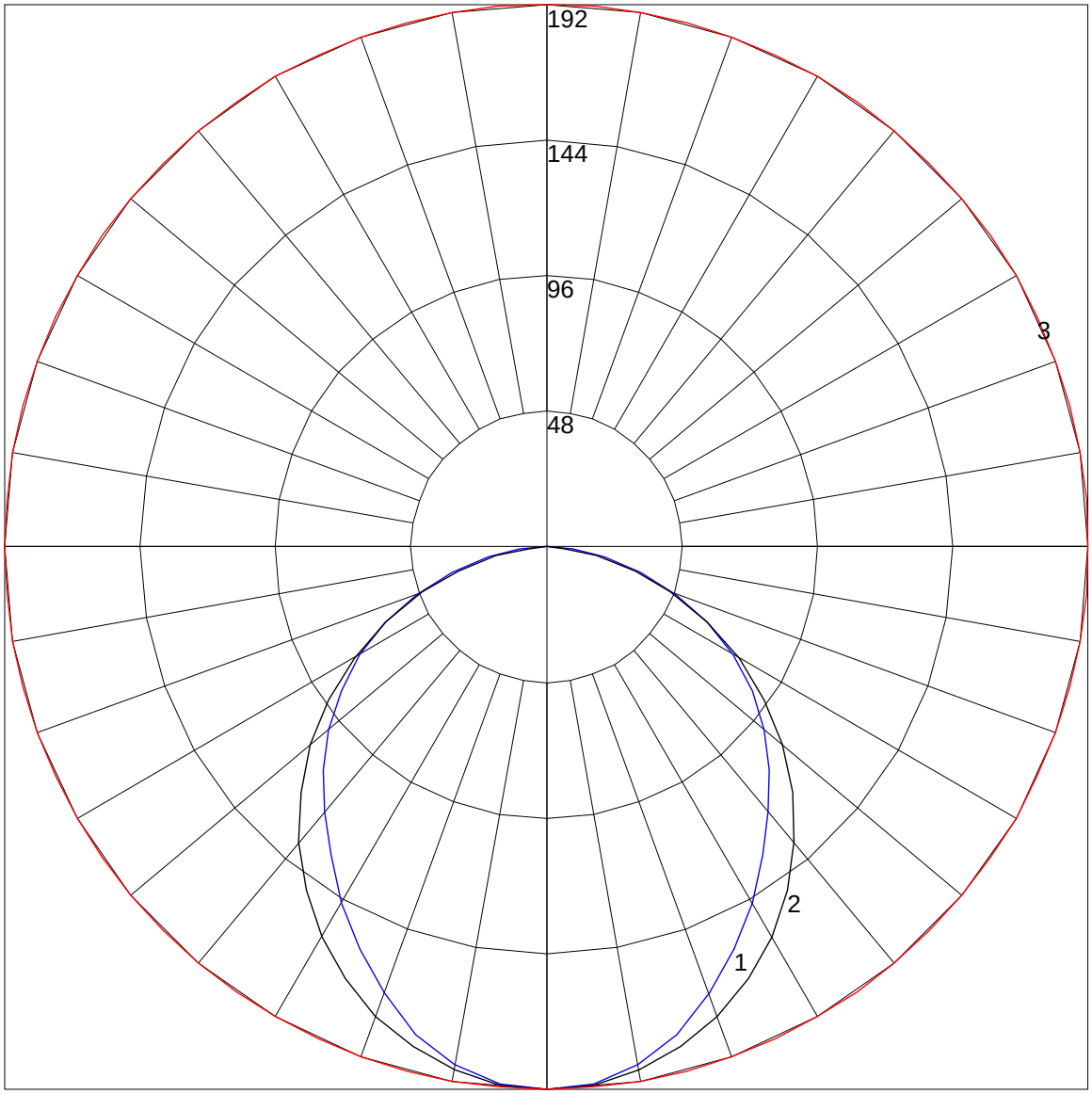
POLAR GRAPH



Maximum Candela = 192.04 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.)

IES ROAD REPORT
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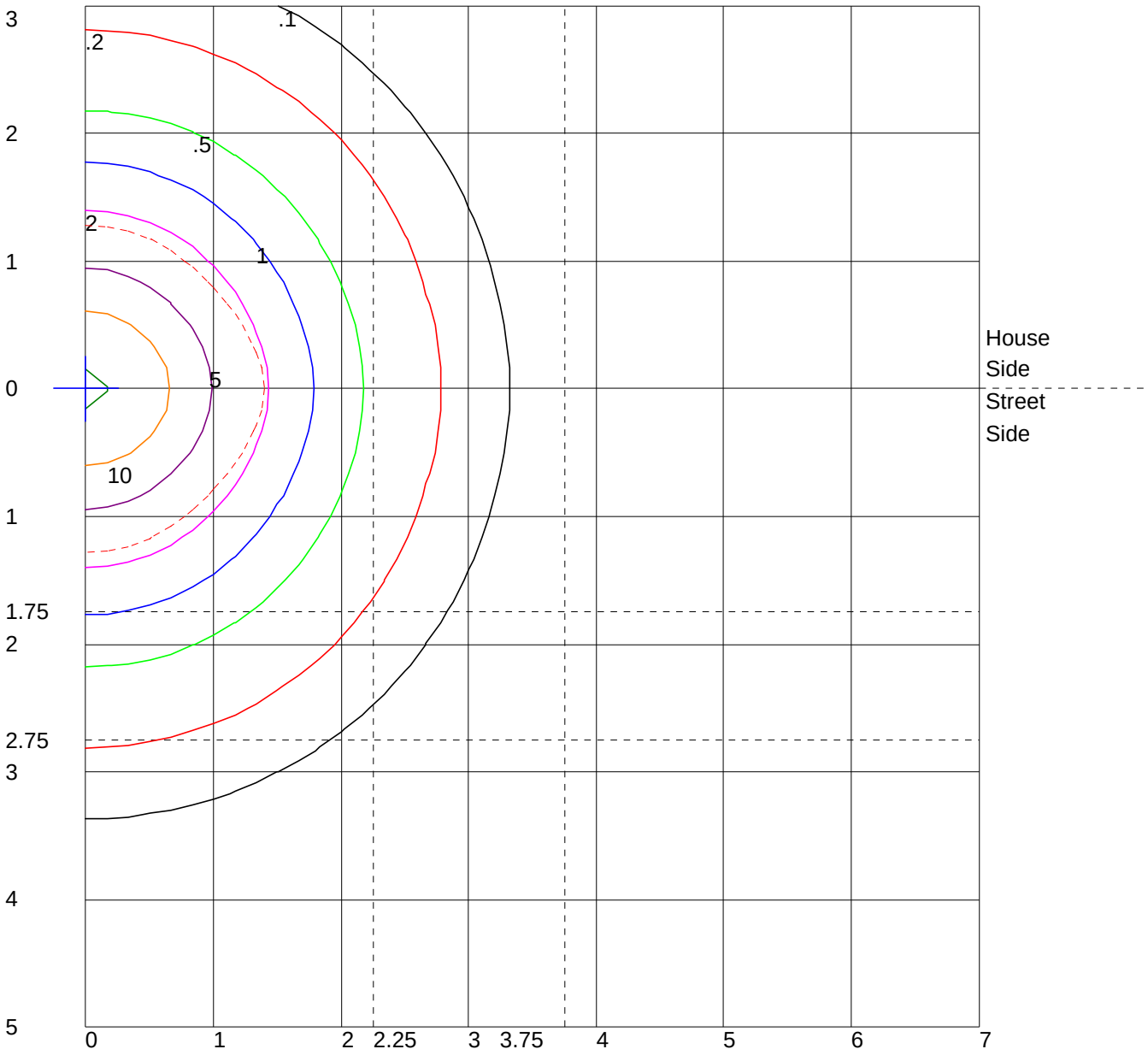
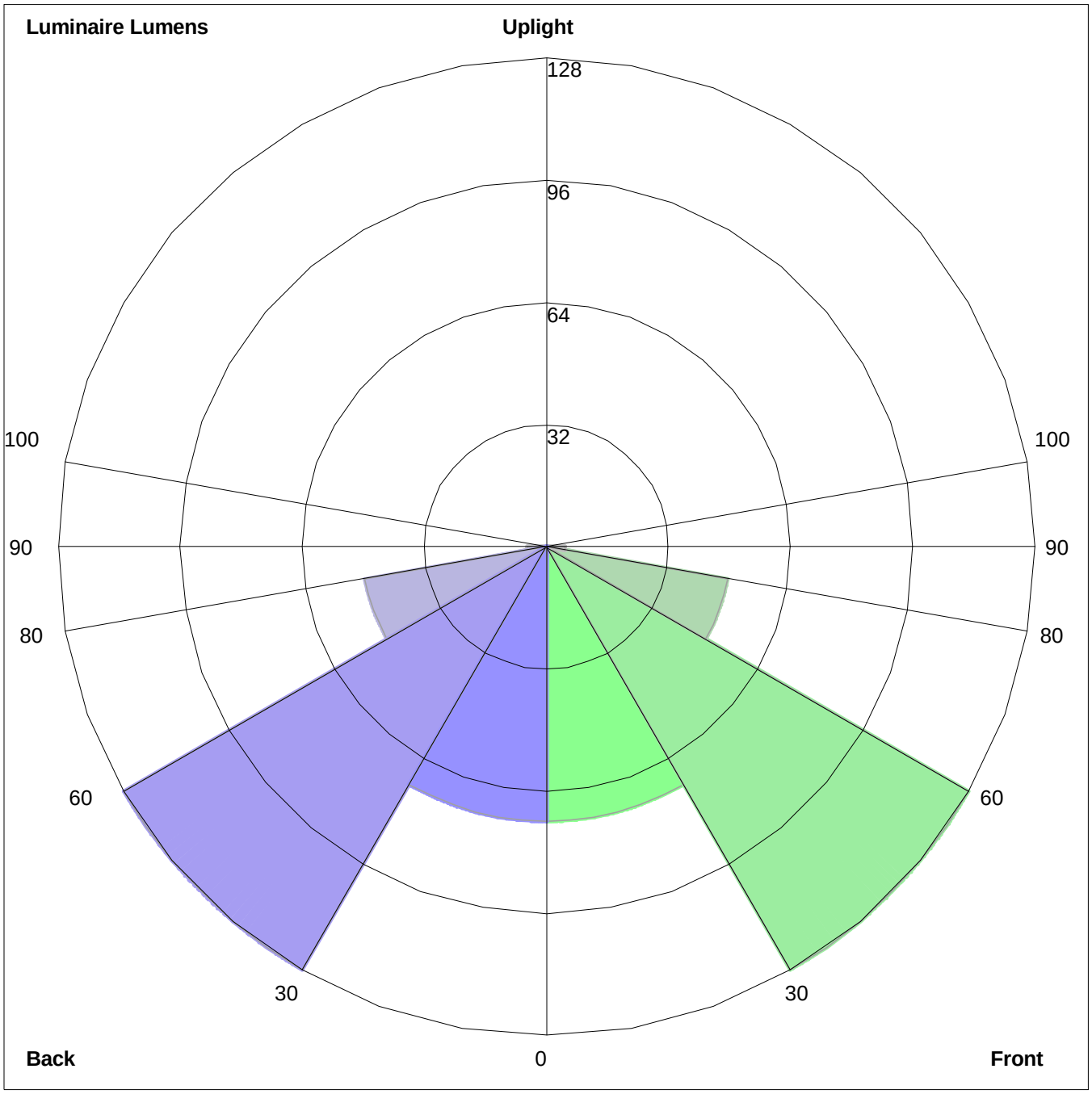
ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



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

IES ROAD REPORT
PHOTOMETRIC FILENAME : L031601205.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=72.0, Medium=128.1, High=48.3, Very High=4.9
Back: Low=72.0, Medium=128.1, High=48.3, Very High=4.9
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0