LIGHT LABORATORY INC.
8165 E Kaiser Blvd. Anaheim, CA 92808
www.lightlaboratory.com

NVLAP TESTING
NVLAP LAB CODE 200927-0

Report No: **L091706906** **Issue Date: 10/9/2017**

Report Prepared For: USTE, dba Vista Professional Outdoor Lighting
1625 Surveyor Ave., Simi Valley CA 93063

Model Number: **1470/1471-4Q-B**

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. Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 10/3/17

Date of Tests: 10/4/17 - 10/9/17

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	11/28/17
ITECH	IT6122	PS-DC03-S1	11/28/17
Fluke Digital Thermometer	52k/J	MT-TP02-GC	11/28/17
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:	USTE, dba Vista Professional Outdoor Lighting
Model Number:	1470/1471-4Q-B
Driver Model Number:	ERP ESS020W-0500-34 (2 DRIVERS)
Total Lumens:	2163.40
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.29
Input Power (W):	34.96
Input Power Factor:	0.99
Current ATHD @ 120V(%):	12%
Current ATHD @ 277V(%):	N/A
Efficacy:	62
Color Rendering Index (CRI):	81
Correlated Color Temperature (K):	2917
Chromaticity Coordinate x:	0.4477
Chromaticity Coordinate y:	0.4155
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	1:00
Total Operating Time (Hours):	1:50

FIG. 1 LUMINAIRE

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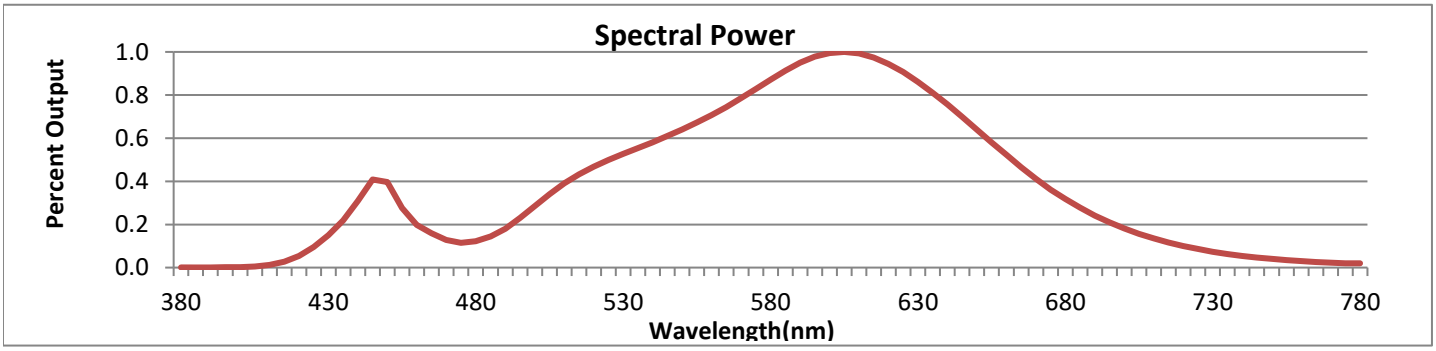


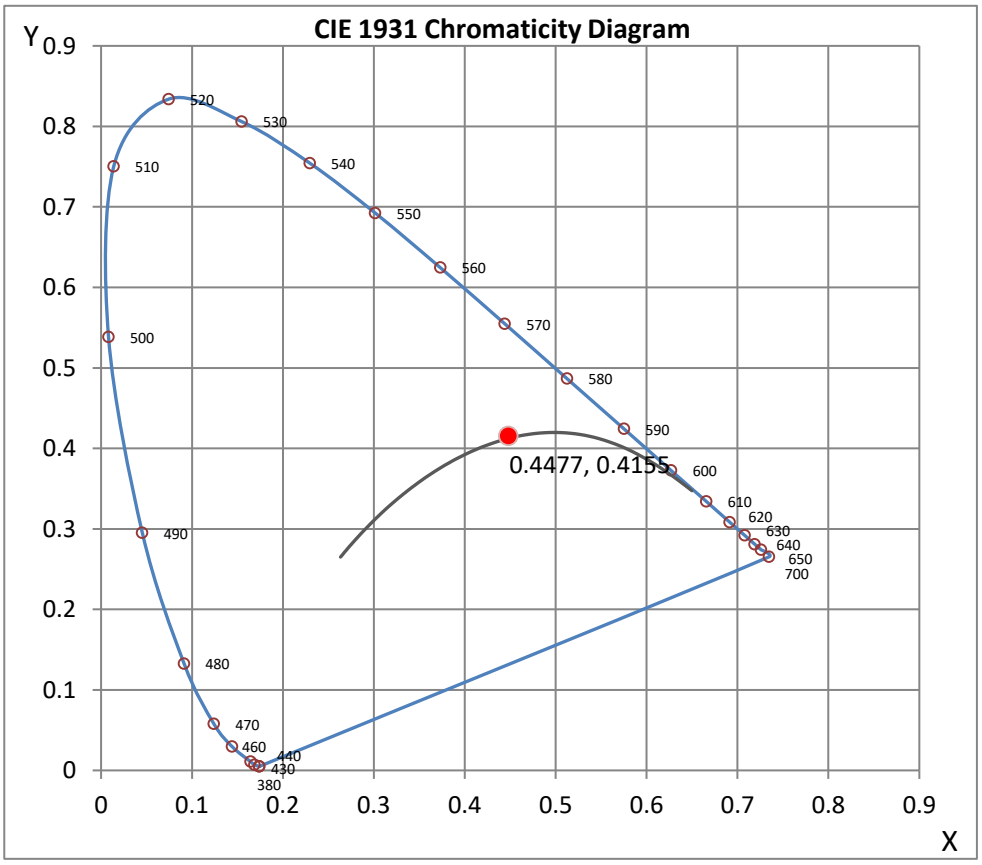
Wavelength	W/m²nm	440	0.3098	510	0.3902	580	0.8710	650	0.6407	720	0.0998
380	0.0007	450	0.3970	520	0.4684	590	0.9498	660	0.5222	730	0.0738
390	0.0011	460	0.1981	530	0.5274	600	0.9953	670	0.4109	740	0.0546
400	0.0027	470	0.1275	540	0.5812	610	0.9931	680	0.3175	750	0.0403
410	0.0123	480	0.1227	550	0.6404	620	0.9443	690	0.2414	760	0.0300
420	0.0541	490	0.1805	560	0.7062	630	0.8614	700	0.1815	770	0.0223
430	0.1497	500	0.2855	570	0.7857	640	0.7567	710	0.1351	780	0.0192

CRI & CCT

x	0.4477
y	0.4155
u'	0.2526
v'	0.5274
CRI	81.30
CCT	2917
Duv	0.00307

R Values

R1	79.25
R2	87.05
R3	94.85
R4	81.22
R5	78.52
R6	83.24
R7	85.28
R8	60.96
R9	8.24
R10	70.36
R11	80.03
R12	65.26
R13	80.51
R14	96.63



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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 : Joseph Shin

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 : L091706906.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L091706906
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
[ISSUEDATE] 10/9/2017
[MANUFAC] USTE, DBA VISTA PROFESSIONAL OUTDOOR LIGHTING
[LUMCAT] 1470/1471-4Q-B
[LUMINAIRE] Bollard, 4 quadrant distribution, 500mA
[BALLASTCAT] ERP ESS020W-0500-34 (2 DRIVERS)
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[INPUT] 120VAC, 34.96W
[TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

IES Classification	Type V
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	2163
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	62
Total Luminaire Watts	34.96
Ballast Factor	1.00
Upward Waste Light Ratio	0.06
Maximum Candela	471
Maximum Candela Angle	0H 15V
Maximum Candela (<90 Degrees Vertical)	471
Maximum Candela Angle (<90 Degrees Vertical)	0H 15V
Maximum Candela At 90 Degrees Vertical	73.2 (3.4% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	172.1 (8.0% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091706906.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	185.0	N.A.	8.6
FM - Front-Medium (30-60)	438.7	N.A.	20.3
FH - Front-High (60-80)	324.8	N.A.	15.0
FVH - Front-Very High (80-90)	64.6	N.A.	3.0
BL - Back-Low (0-30)	185.0	N.A.	8.6
BM - Back-Medium (30-60)	438.7	N.A.	20.3
BH - Back-High (60-80)	324.8	N.A.	15.0
BVH - Back-Very High (80-90)	64.6	N.A.	3.0
UL - Uplight-Low (90-100)	59.6	N.A.	2.8
UH - Uplight-High (100-180)	77.6	N.A.	3.6
Total	2163.4	N.A.	100.0
BUG Rating	B1-U3-G1		

ZONAL LUMEN SUMMARY

Zone	%
0-20	7.6
0-30	17.1
0-40	29.1
0-60	57.7
0-80	87.7
0-90	93.7
10-90	92.2
20-40	21.6
20-50	34.6
40-70	46.8
60-80	30
70-80	11.7
80-90	6
90-110	4.3
90-120	5.3
90-130	5.8
90-150	6.2
90-180	6.3
110-180	2
0-180	100

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091706906.IES

CANDELA TABULATION

Vert. Angles	Horizontal Angles
	0
0.0	81.7
5.0	323.7
10.0	447.0
15.0	471.0
20.0	462.7
25.0	444.5
30.0	433.0
35.0	416.6
37.5	405.9
40.0	393.7
42.5	380.0
45.0	364.4
47.5	347.3
50.0	336.2
52.5	344.8
55.0	373.3
57.5	401.0
60.0	412.5
62.5	418.1
65.0	415.9
67.5	387.1
70.0	335.3
72.5	277.9
75.0	232.0
77.5	199.9
80.0	172.1
85.0	114.2
90.0	73.2
95.0	52.8
100.0	39.7
105.0	31.4
110.0	25.1
115.0	20.5
120.0	16.7
125.0	13.4
130.0	10.4
135.0	7.6
140.0	5.6
145.0	4.1
150.0	3.4
155.0	3.2
160.0	2.9
165.0	2.4
170.0	1.9
175.0	1.8
180.0	0.0

IES ROAD REPORT
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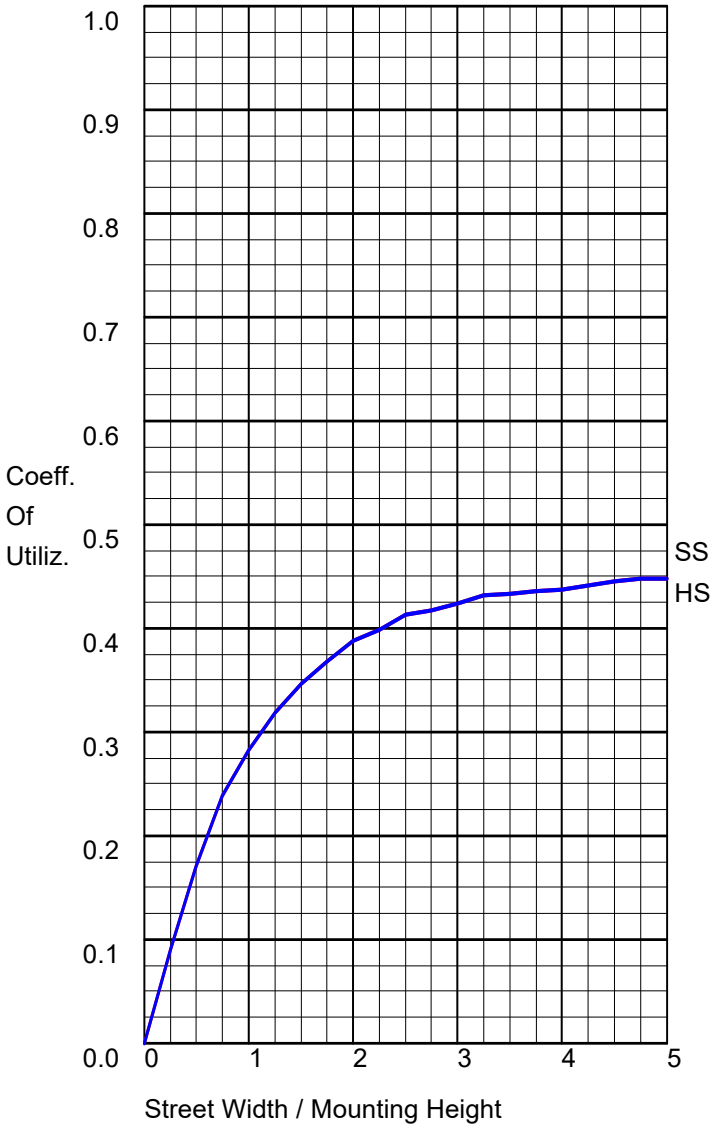
COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

	Lumens	Percent Of Luminaire
Downward Street Side	1013.1	46.8
Downward House Side	1013.1	46.8
Downward Total	2026.2	93.7
Upward Street Side	68.6	3.2
Upward House Side	68.6	3.2
Upward Total	137.2	6.3
Total Flux	2163.4	100.0

IES ROAD REPORT
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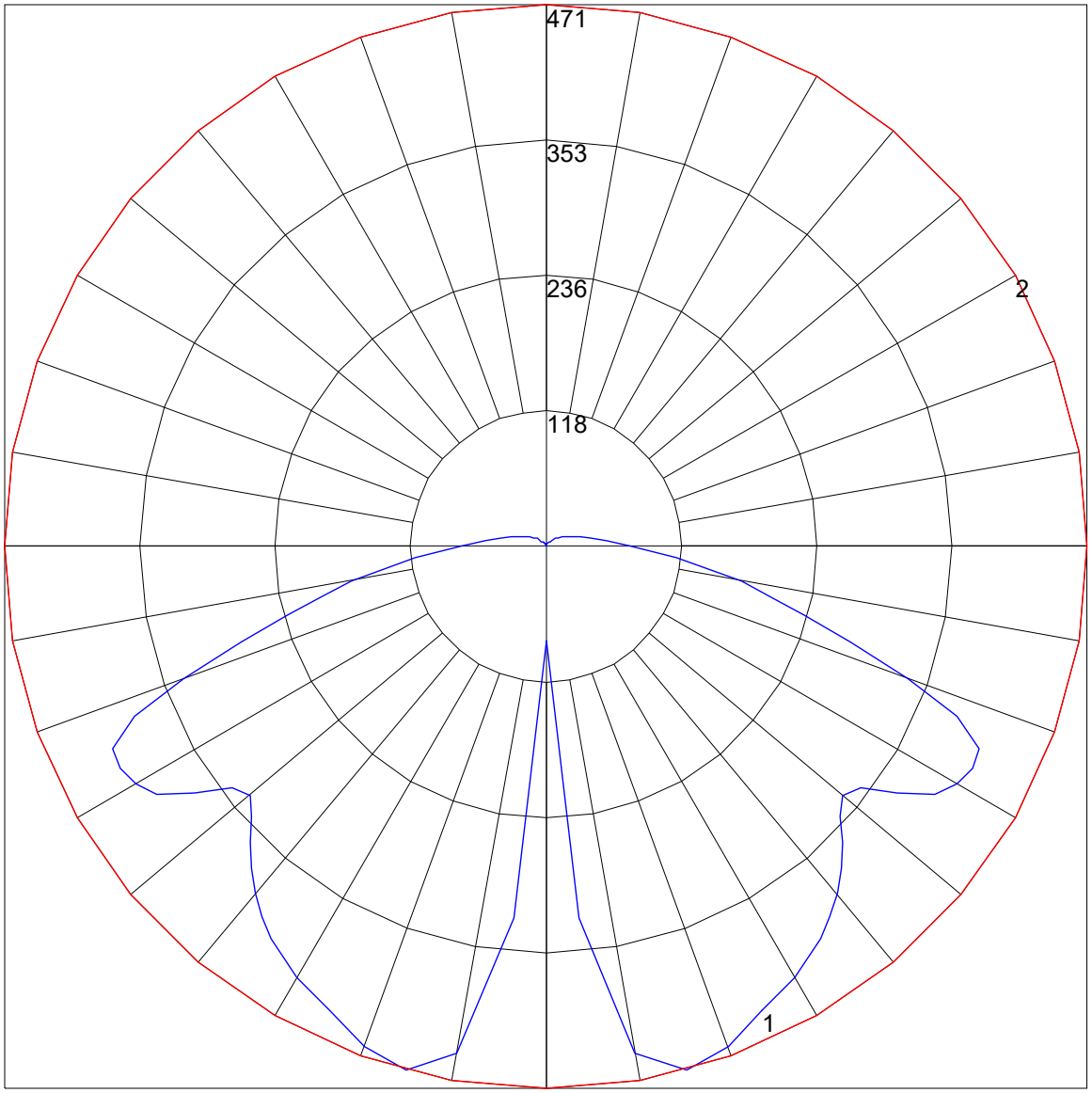
POLAR GRAPH



Maximum Candela = 471 Located At Horizontal Angle = 0, Vertical Angle = 15
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (15) (Through Max. Cd.)

IES ROAD REPORT
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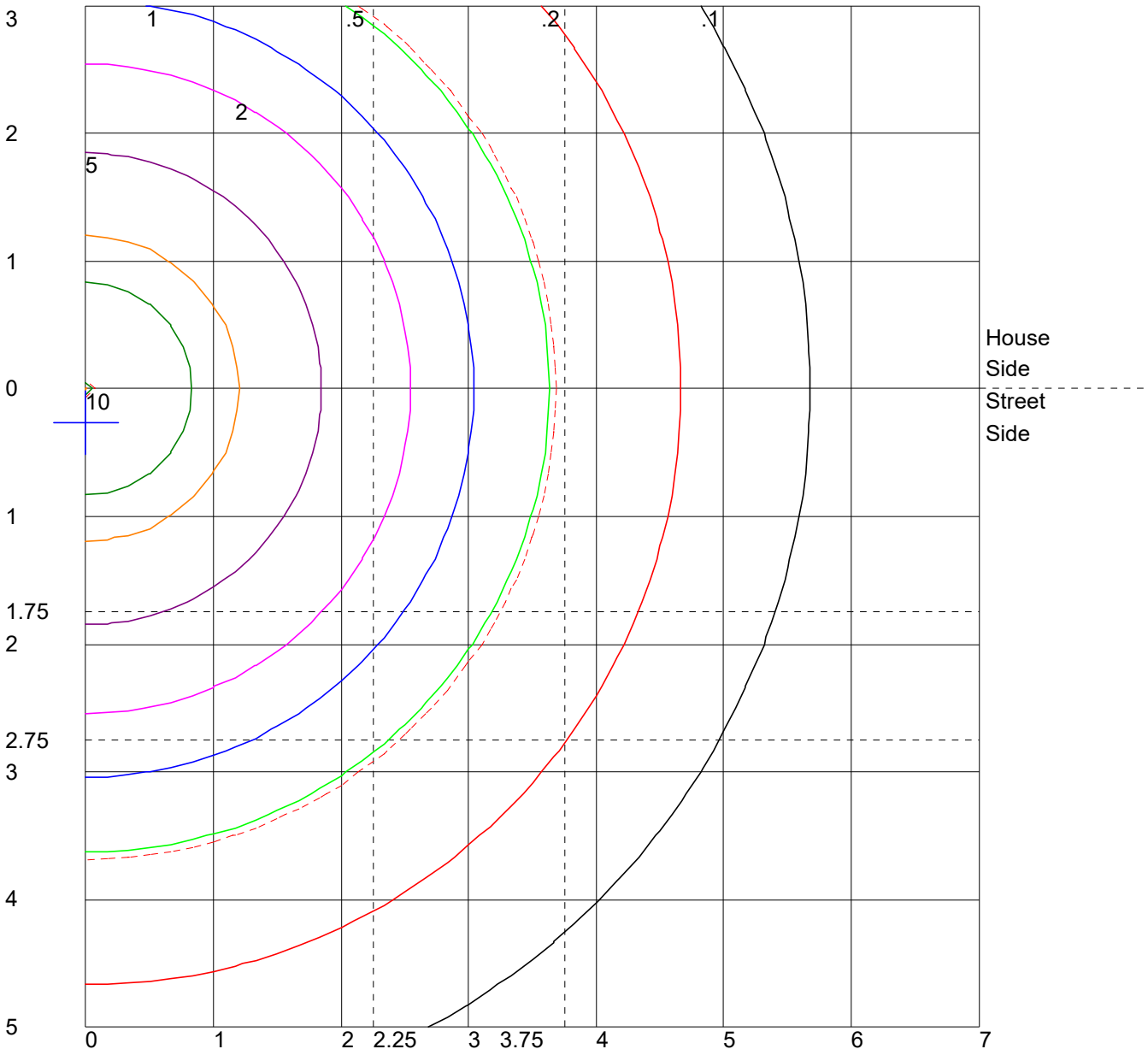
ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



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
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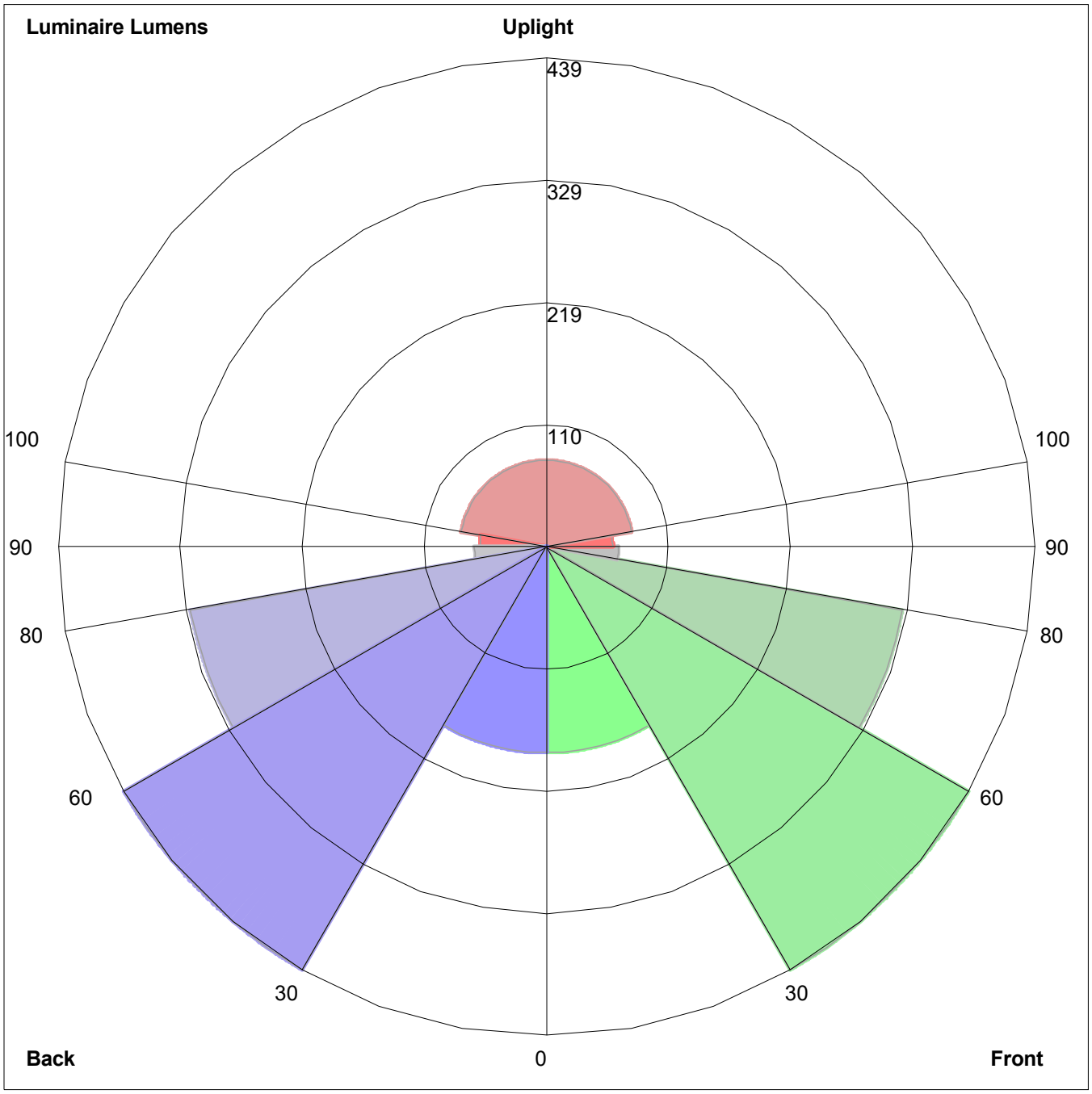
LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=185.0, Medium=438.7, High=324.8, Very High=64.6
Back: Low=185.0, Medium=438.7, High=324.8, Very High=64.6
Uplight: Low=59.6, High=77.6

BUG Rating : B1-U3-G1