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Report No: L051602708

Date: 5/24/2016



NVLAP LAB CODE 200927-0

Report No: L051602708

Prepared For: HK Lighting Group
 3529 Old Conejo Road #118, Newbury Park, CA, 91320

Model Number: MB16-RD-SOi-AL

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 MB16-RD-SOi-AL. Received in working and undamaged condition. No modifications were necessary.

Testing Condition: Fixture is tested with no special conditions.

Sample Arrival Date: 5/11/16

Date of Tests: 5/24/16 - 5/24/16

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:	HK Lighting Group
Model Number:	MB16-RD-SOi-AL
Driver Model Number:	HHATCH RS12-60M-LED
Total Lumens:	81.80
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.08
Input Power (W):	9.29
Input Power Factor:	0.93
Current ATHD @ 120V(%):	81%
Current ATHD @ 277V(%):	N/A
Efficacy:	9
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:35
Total Operating Time (Hours):	1:35
Off State Power(W):	0.00

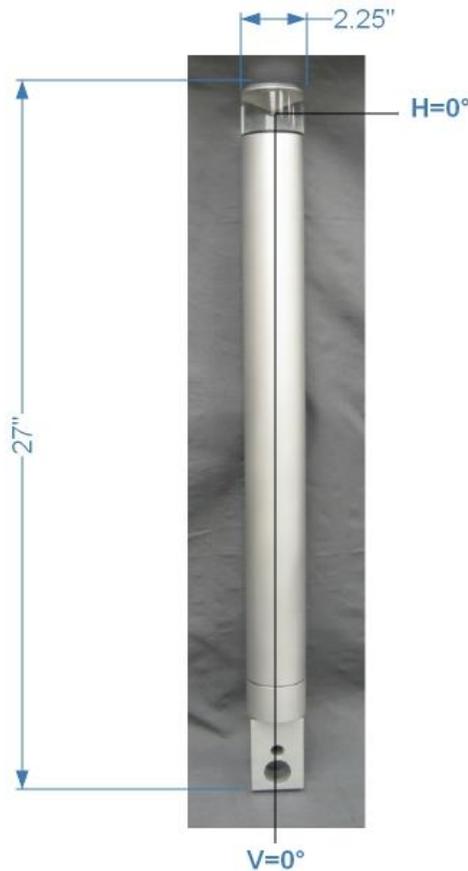


FIG.1 LUMINAIRE

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

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 : L051602708.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L051602708
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 5/24/2016
 [MANUFAC] HK LIGHTING GROUP
 [LUMCAT] MB16-RD-SOi-AL
 [LUMINAIRE] MR16 Mini-Bollard clear anodized finish 9W 3K
 [BALLASTCAT] HHATCH RS12-60M-LED
 [LAMPPOSITION] 0,0
 [LAMPCAT] N/A
 [OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
 [MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
 [INPUT] 120VAC, 9.29W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

IES Classification	Type V
Longitudinal Classification	Medium
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	82
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	9
Total Luminaire Watts	9.29
Ballast Factor	1.00
Upward Waste Light Ratio	0.34
Maximum Candela	11.639
Maximum Candela Angle	0H 75V
Maximum Candela (<90 Degrees Vertical)	11.639
Maximum Candela Angle (<90 Degrees Vertical)	0H 75V
Maximum Candela At 90 Degrees Vertical	10.241 (12.5% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	11.505 (14.0% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L051602708.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	1.2	N.A.	1.4
FM - Front-Medium (30-60)	8.5	N.A.	10.4
FH - Front-High (60-80)	11.4	N.A.	13.9
FVH - Front-Very High (80-90)	6.0	N.A.	7.3
BL - Back-Low (0-30)	1.2	N.A.	1.4
BM - Back-Medium (30-60)	8.5	N.A.	10.4
BH - Back-High (60-80)	11.4	N.A.	13.9
BVH - Back-Very High (80-90)	6.0	N.A.	7.3
UL - Uplight-Low (90-100)	10.0	N.A.	12.3
UH - Uplight-High (100-180)	17.6	N.A.	21.6
Total	81.8	N.A.	100.0
BUG Rating	B0-U2-G0		

ZONAL LUMEN SUMMARY

Zone	%
0-20	0.7
0-30	2.8
0-40	6.9
0-60	23.6
0-80	51.5
0-90	66.2
10-90	66.1
20-40	6.1
20-50	13.1
40-70	29.7
60-80	27.8
70-80	14.9
80-90	14.7
90-110	21.2
90-120	26.4
90-130	29.1
90-150	32.3
90-180	33.8
110-180	12.7
0-180	100

CANDELA TABULATION

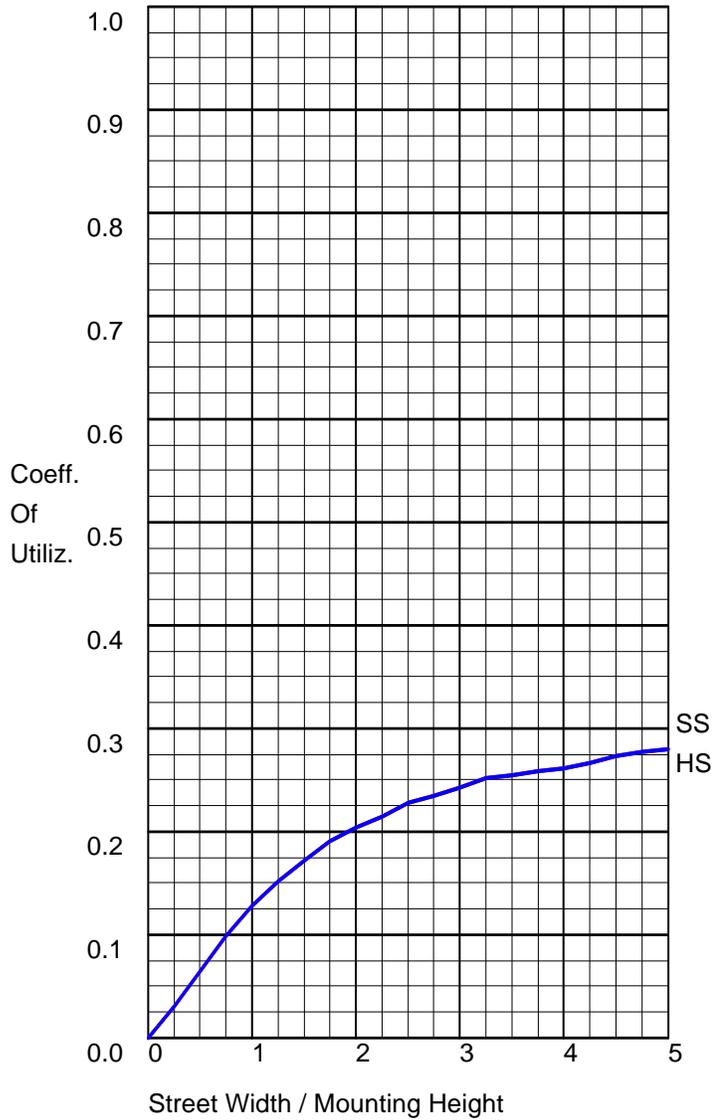
Vert. Angles	Horizontal Angles
	<u>0</u>
0.0	0.000
5.0	0.222
10.0	0.868
15.0	1.912
20.0	2.793
25.0	3.662
30.0	4.469
35.0	5.110
37.5	5.674
40.0	6.218
42.5	6.796
45.0	7.441
47.5	7.796
50.0	8.167
52.5	8.549
55.0	8.960
57.5	9.397
60.0	9.832
62.5	10.256
65.0	10.665
67.5	11.034
70.0	11.331
72.5	11.539
75.0	11.639
77.5	11.615
80.0	11.505
82.5	11.400
85.0	11.084
87.5	10.698
90.0	10.241
92.5	9.727
95.0	9.168
97.5	8.729
100.0	8.138
102.5	7.498
105.0	6.878
107.5	6.220
110.0	5.555
112.5	4.900
115.0	4.272
117.5	3.676
120.0	3.136
122.5	2.678
125.0	2.333
130.0	2.063
135.0	1.895
140.0	1.821
145.0	1.796
150.0	1.773
155.0	1.716
160.0	1.600
165.0	1.380
170.0	1.096

IES ROAD REPORT
PHOTOMETRIC FILENAME : L051602708.IES

CANDELA TABULATION - (Cont.)

175.0	0.802
180.0	0.000

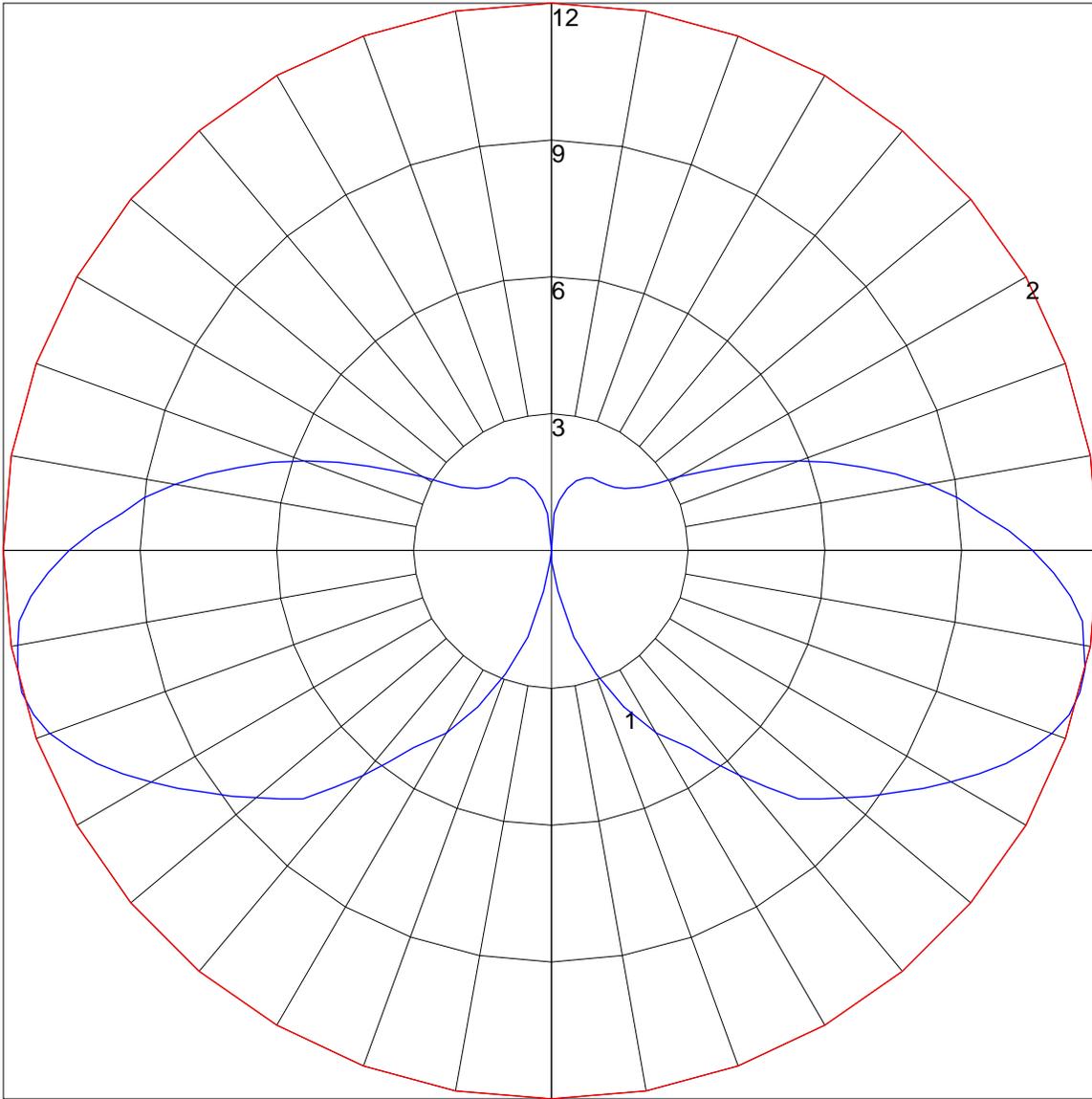
COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

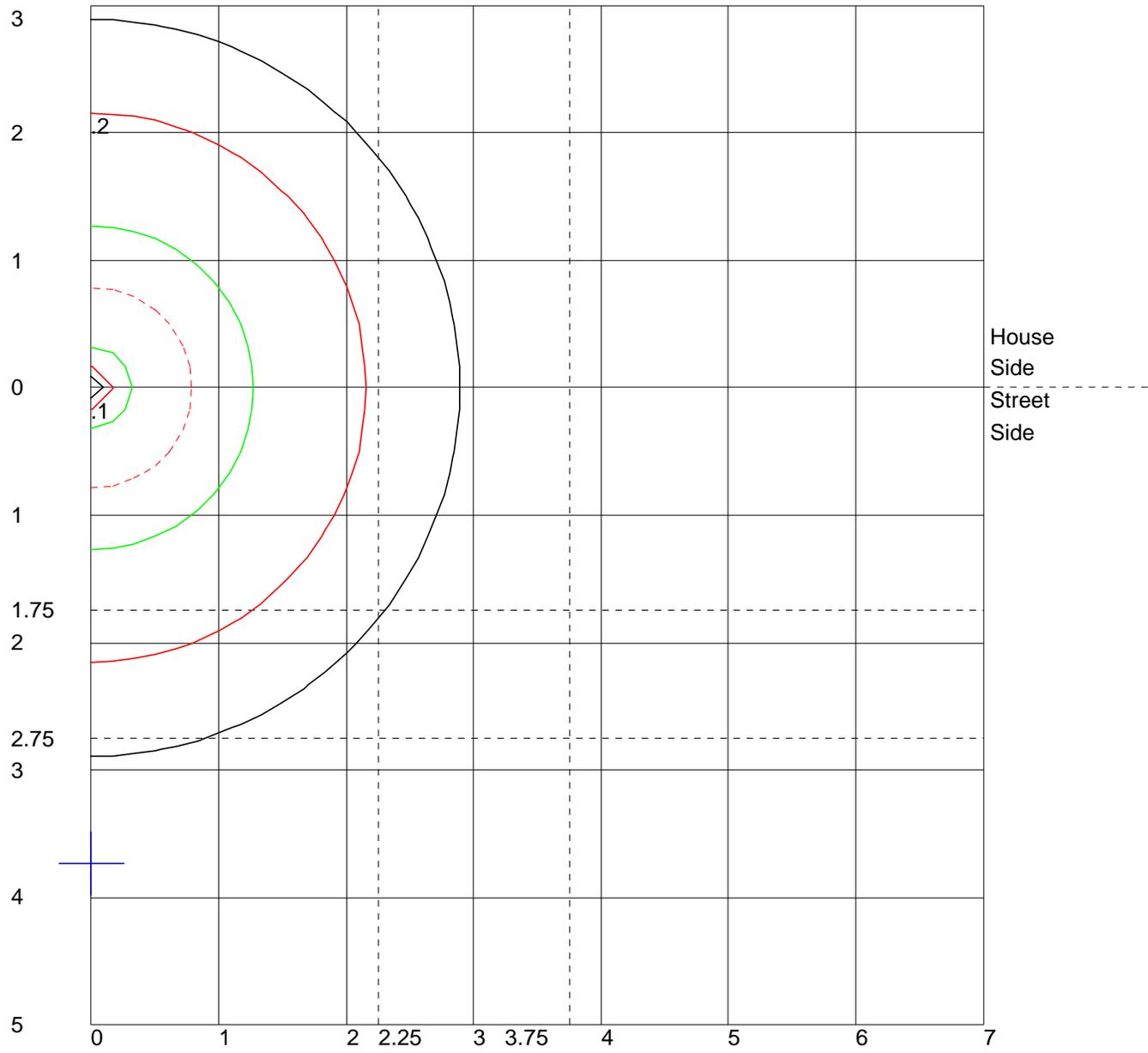
	Lumens	Percent Of Luminaire
Downward Street Side	27.1	33.1
Downward House Side	27.1	33.1
Downward Total	54.2	66.2
Upward Street Side	13.8	16.9
Upward House Side	13.8	16.9
Upward Total	27.6	33.7
Total Flux	81.8	100.0

POLAR GRAPH



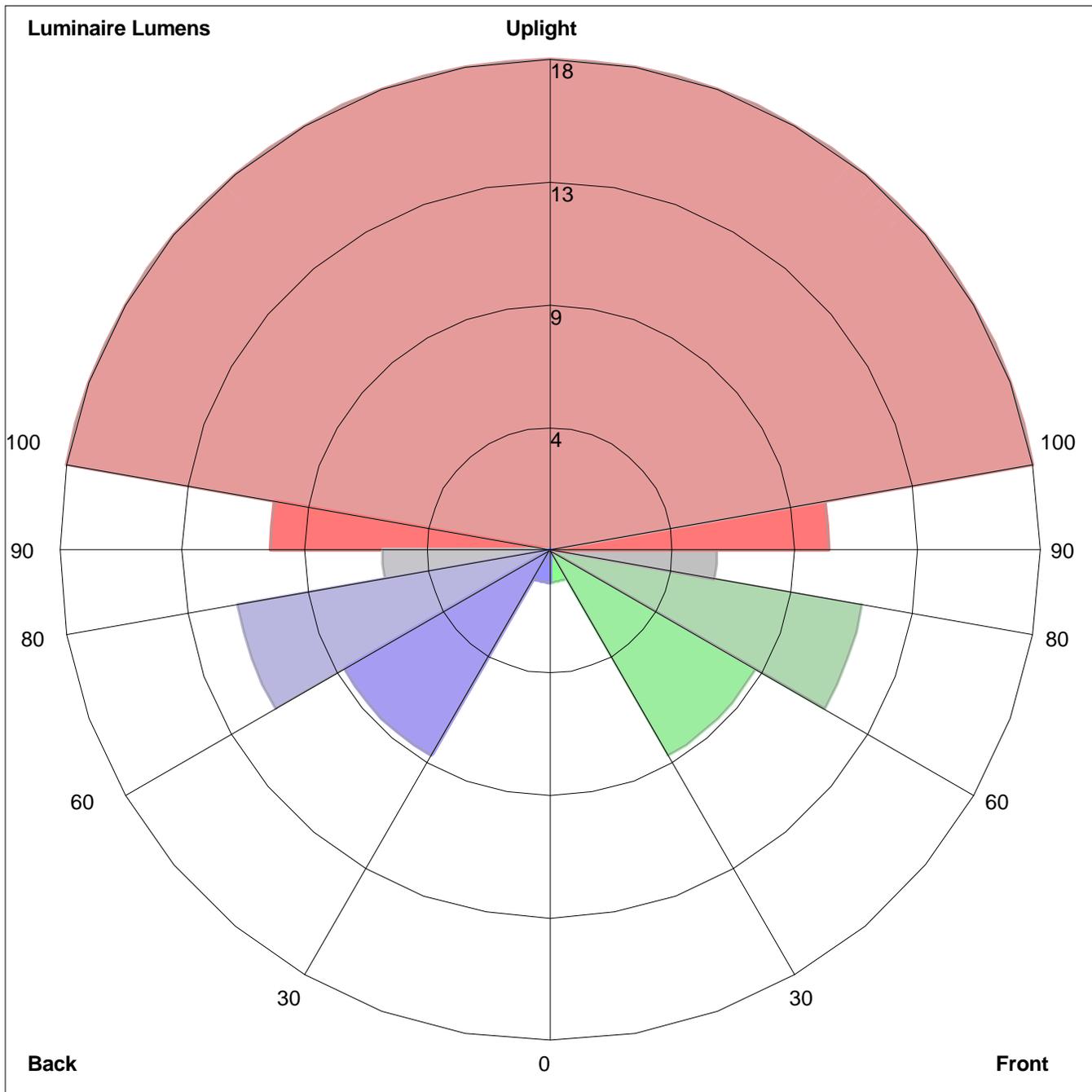
Maximum Candela = 11.639 Located At Horizontal Angle = 0, Vertical Angle = 75
1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (75) (Through Max. Cd.)

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



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

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=1.2, Medium=8.5, High=11.4, Very High=6.0
Back: Low=1.2, Medium=8.5, High=11.4, Very High=6.0
Uplight: Low=10.0, High=17.6

BUG Rating : B0-U2-G0