LIGHT LABORATORY INC.
8165 E Kaiser Blvd. Anaheim, CA 92808
p. 714.282.2270
f. 714.676.5558

Report No: L111407206
Date: 12/11/2014

NVLAP LAB CODE 200927-0

**Report No:** **L111407206**

**Report Prepared For:** Cast Lighting
1120-A Goffle Rd., Hawthorne, NJ., 07506

**Model Number:** **CMU2CBLED**

**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 CMU2CBLED . Received in working and undamaged condition. No modifications were necessary.

**Testing Condition:** Fixture is tested with no special conditions.

**Sample Arrival Date:** 12/8/14

**Date of Tests:** 12/9/14 - 12/9/14

**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 | 01/04/15 |
| Xitron Power Analysis System | 2503AH | MT-EL01 | 01/09/15 |
| BK Precision DC Power Supply | 1747 | PSDC-04 | 01/08/15 |
| Fluke Digital Thermometer | 52k/J | MT-TP02-GC | 01/04/15 |
| 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:** | Cast Lighting |
| **Model Number:** | CMU2CBLED |
| **Driver Model Number:** | N/A |
| **Total Lumens:** | 130.80 |
| **Input Voltage (VAC/60Hz):** | 12.00 |
| **Input Current (Amp):** | 0.39 |
| **Input Power (W):** | 4.22 |
| **Input Power Factor:** | 0.91 |
| **Current ATHD @ 12V(%):** | 44% |
| **Current ATHD @ 24V(%):** | N/A |
| **Efficacy:** | 31 |
| **Color Rendering Index (CRI):** | 83 |
| **Correlated Color Temperature (K):** | 2809 |
| **Chromaticity Coordinate x:** | 0.4560 |
| **Chromaticity Coordinate y:** | 0.4174 |
| **Ambient Temperature (°C):** | 25.0 |
| **Stabilization Time (Hours):** | 0:30 |
| **Total Operating Time (Hours):** | 1:05 |
| **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.

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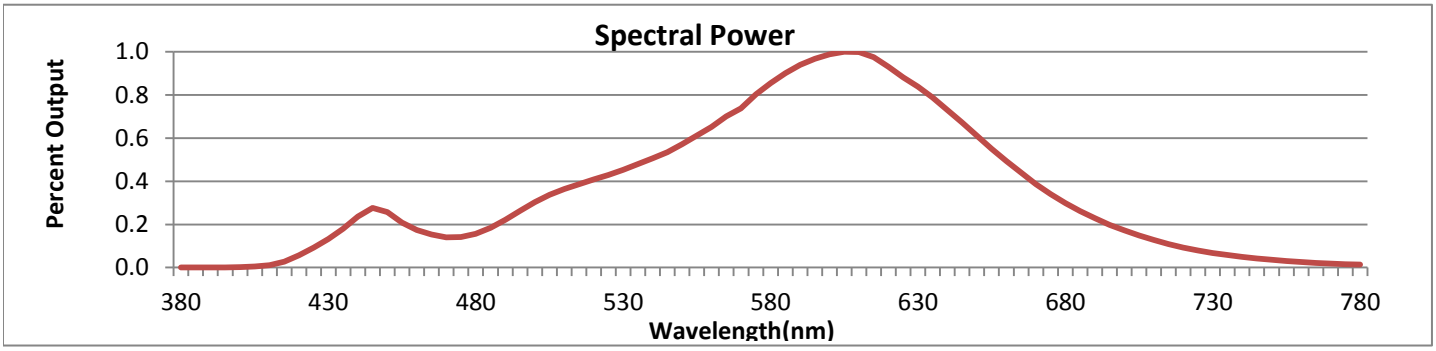


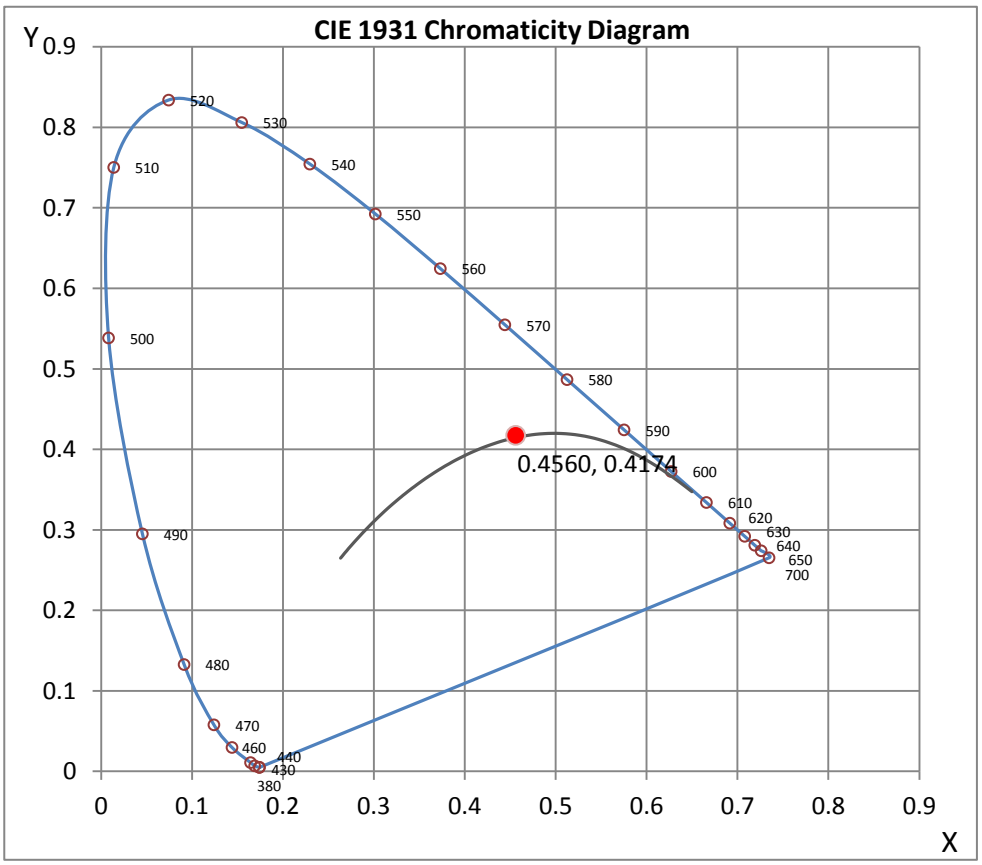

| Wavelength | W/m²nm | 440 | 0.2371 | 510 | 0.3644 | 580 | 0.8546 | 650 | 0.6112 | 720 | 0.0923 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 380 | 0.0009 | 450 | 0.2565 | 520 | 0.4085 | 590 | 0.9402 | 660 | 0.4929 | 730 | 0.0676 |
| 390 | 0.0009 | 460 | 0.1736 | 530 | 0.4531 | 600 | 0.9881 | 670 | 0.3865 | 740 | 0.0493 |
| 400 | 0.0019 | 470 | 0.1406 | 540 | 0.5062 | 610 | 0.9986 | 680 | 0.2994 | 750 | 0.0357 |
| 410 | 0.0113 | 480 | 0.1568 | 550 | 0.5716 | 620 | 0.9305 | 690 | 0.2284 | 760 | 0.0255 |
| 420 | 0.0562 | 490 | 0.2216 | 560 | 0.6521 | 630 | 0.8391 | 700 | 0.1721 | 770 | 0.0188 |
| 430 | 0.1327 | 500 | 0.3032 | 570 | 0.7380 | 640 | 0.7303 | 710 | 0.1281 | 780 | 0.0137 |

**CRI & CCT**

| | |
|---|---|
| **x** | 0.4560 |
| **y** | 0.4174 |
| **u'** | 0.2570 |
| **v'** | 0.5293 |
| **CRI** | 82.60 |
| **CCT** | 2809 |
| **Duv** | 0.00287 |

**R Values**

| | |
|---|---|
| **R1** | 80.16 |
| **R2** | 89.81 |
| **R3** | 97.76 |
| **R4** | 81.44 |
| **R5** | 80.46 |
| **R6** | 88.46 |
| **R7** | 83.77 |
| **R8** | 58.73 |
| **R9** | 7.05 |
| **R10** | 77.69 |
| **R11** | 80.97 |
| **R12** | 75.94 |
| **R13** | 82.09 |
| **R14** | 99.05 |

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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 : Wilson Khounlavong

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 : L111407206.IES**

**DESCRIPTIVE INFORMATION (From Photometric File)**

IESNA:LM-63-2002
[TEST] L111407206
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 12/11/2014
[MANUFAC] CAST LIGHTING
[LUMCAT] CMU2CBLED
[LUMINAIRE] 8-3/4"DIA X 22-1/2"H. LED LUMINAIRE
[MORE] CLEAR LENS
[BALLASTCAT] N.A.
[BALLAST] 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.
[INPUT] 12VAC, 4.22W
[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 | 131 |
| Downward Total Efficiency | N.A. (absolute) |
| Total Luminaire Efficiency | N.A. (absolute) |
| Luminaire Efficacy Rating (LER) | 31 |
| Total Luminaire Watts | 4.22 |
| Ballast Factor | 1.00 |
| Upward Waste Light Ratio | 0.00 |
| Maximum Candela | 57.35 |
| Maximum Candela Angle | 0H 5V |
| Maximum Candela (<90 Degrees Vertical) | 57.35 |
| Maximum Candela Angle (<90 Degrees Vertical) | 0H 5V |
| Maximum Candela At 90 Degrees Vertical | 0 (0.0% Luminaire Lumens) |
| Maximum Candela from 80 to <90 Degrees Vertical | 2.53 (1.9% Luminaire Lumens) |
| Cutoff Classification (deprecated) | N.A. (absolute) |

**IES ROAD REPORT**
**PHOTOMETRIC FILENAME : L111407206.IES**

**LUMINAIRE CLASSIFICATION SYSTEM (LCS)**

| | Lumens | % Lamp | % Luminaire |
|---|---|---|---|
| FL - Front-Low (0-30) | 19.3 | N.A. | 14.8 |
| FM - Front-Medium (30-60) | 36.4 | N.A. | 27.8 |
| FH - Front-High (60-80) | 9.1 | N.A. | 6.9 |
| FVH - Front-Very High (80-90) | 0.6 | N.A. | 0.5 |
| BL - Back-Low (0-30) | 19.3 | N.A. | 14.8 |
| BM - Back-Medium (30-60) | 36.4 | N.A. | 27.8 |
| BH - Back-High (60-80) | 9.1 | N.A. | 6.9 |
| BVH - Back-Very High (80-90) | 0.6 | N.A. | 0.5 |
| UL - Uplight-Low (90-100) | 0.0 | N.A. | 0.0 |
| UH - Uplight-High (100-180) | 0.0 | N.A. | 0.0 |
| Total | 130.8 | N.A. | 100.0 |
| BUG Rating | B0-U0-G0 | | |

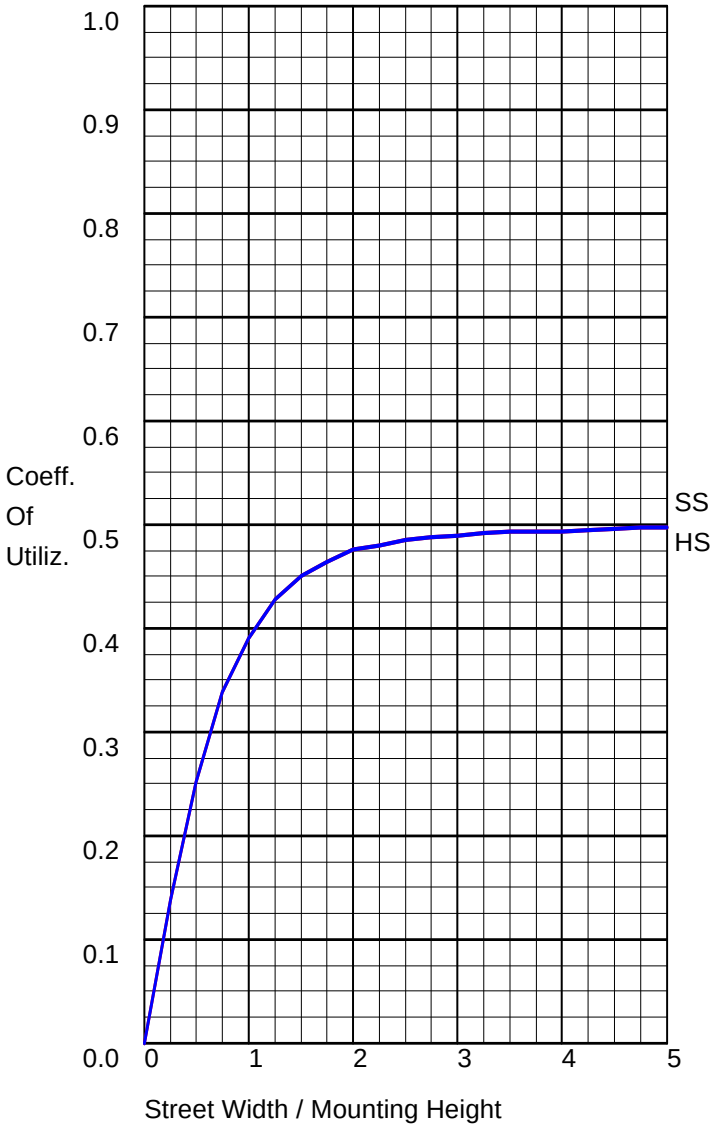
**IES ROAD REPORT**
**PHOTOMETRIC FILENAME : L111407206.IES**

**CANDELA TABULATION**

| Vert. Angles | Horizontal Angles |
|---|---|
| | **0** |
| **0** | 0.00 |
| **5** | 57.35 |
| **10** | 52.48 |
| **15** | 48.77 |
| **20** | 46.08 |
| **25** | 43.82 |
| **30** | 41.78 |
| **35** | 39.55 |
| **40** | 37.10 |
| **45** | 34.03 |
| **50** | 30.11 |
| **55** | 24.73 |
| **60** | 18.55 |
| **65** | 12.63 |
| **70** | 8.00 |
| **75** | 4.84 |
| **80** | 2.53 |
| **85** | 0.99 |
| **90** | 0.00 |

**IES ROAD REPORT**
**PHOTOMETRIC FILENAME : L111407206.IES**

**COEFFICIENTS OF UTILIZATION**

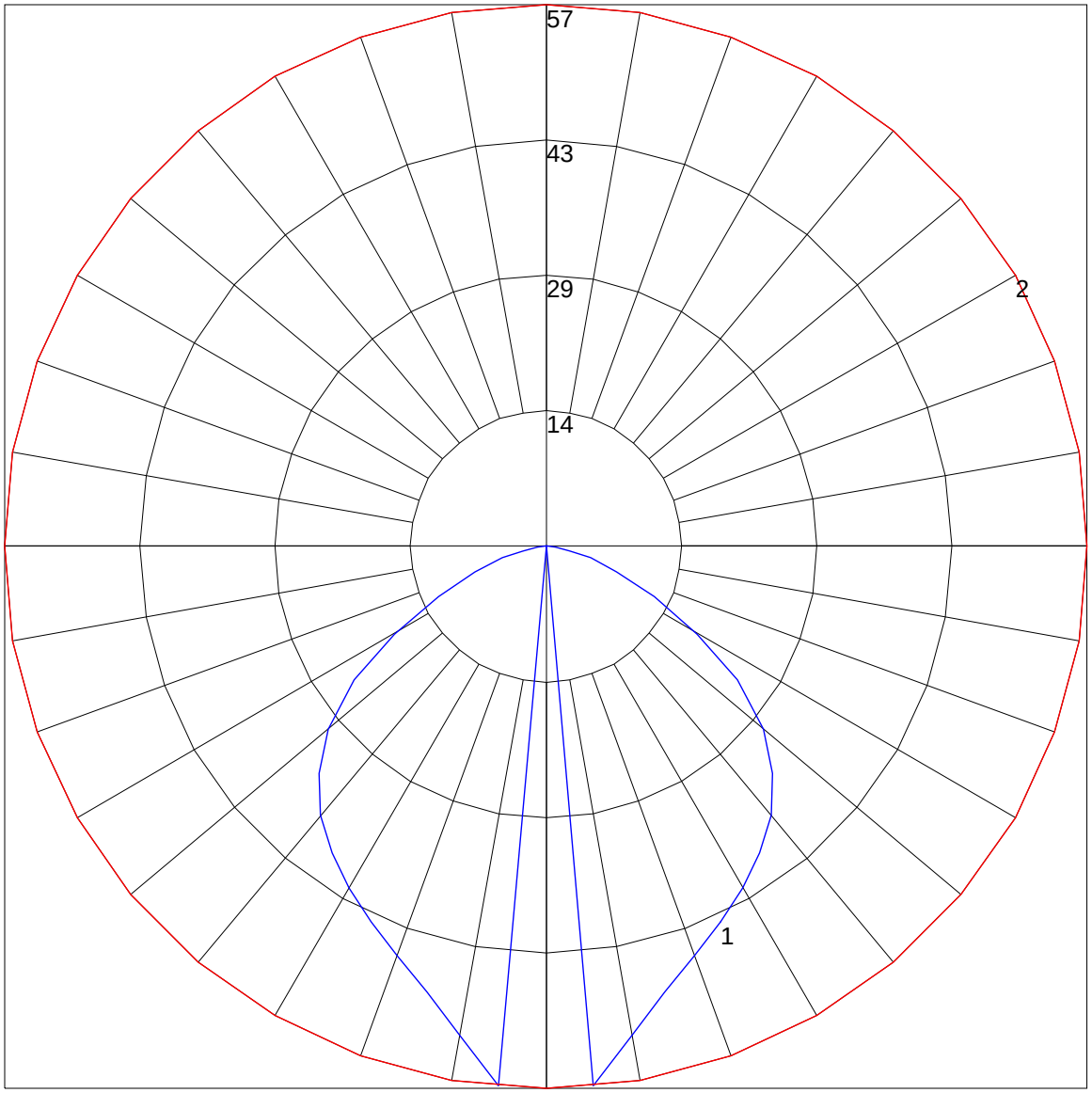



**FLUX DISTRIBUTION**

| | Lumens | Percent Of Luminaire |
|---|---|---|
| Downward Street Side | 65.4 | 50.0 |
| Downward House Side | 65.4 | 50.0 |
| Downward Total | 130.8 | 99.9 |
| Upward Street Side | 0.0 | 0.0 |
| Upward House Side | 0.0 | 0.0 |
| Upward Total | 0.0 | 0.0 |
| Total Flux | 130.8 | 99.9 |

**IES ROAD REPORT**
**PHOTOMETRIC FILENAME : L111407206.IES**

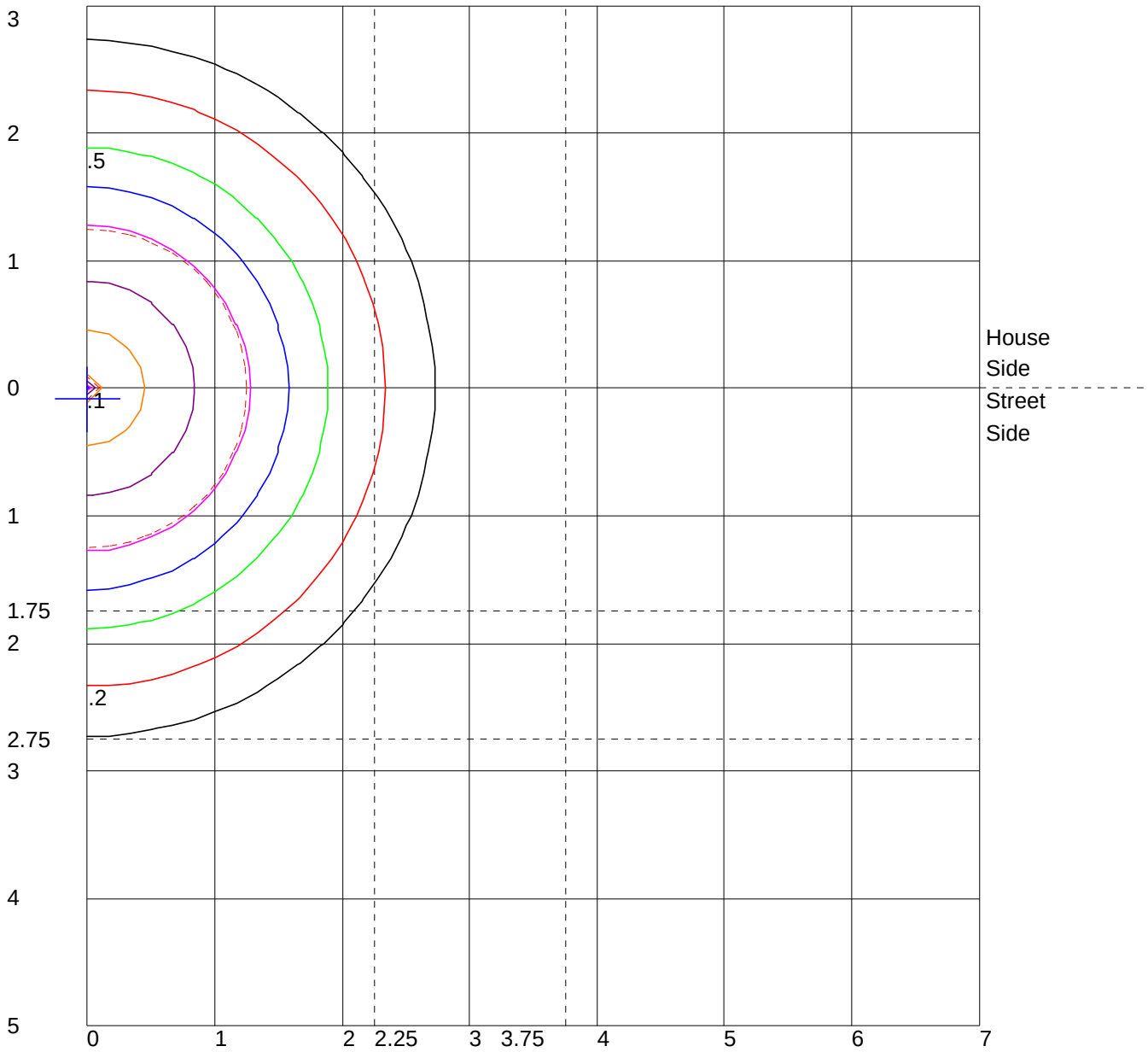
**POLAR GRAPH**




Maximum Candela = 57.35  Located At Horizontal Angle = 0, Vertical Angle = 5
# 1 - Vertical Plane Through Horizontal Angles (0 - 180) (Through Max. Cd.)
# 2 - Horizontal Cone Through Vertical Angle (5) (Through Max. Cd.)

**IES ROAD REPORT**
**PHOTOMETRIC FILENAME : L111407206.IES**

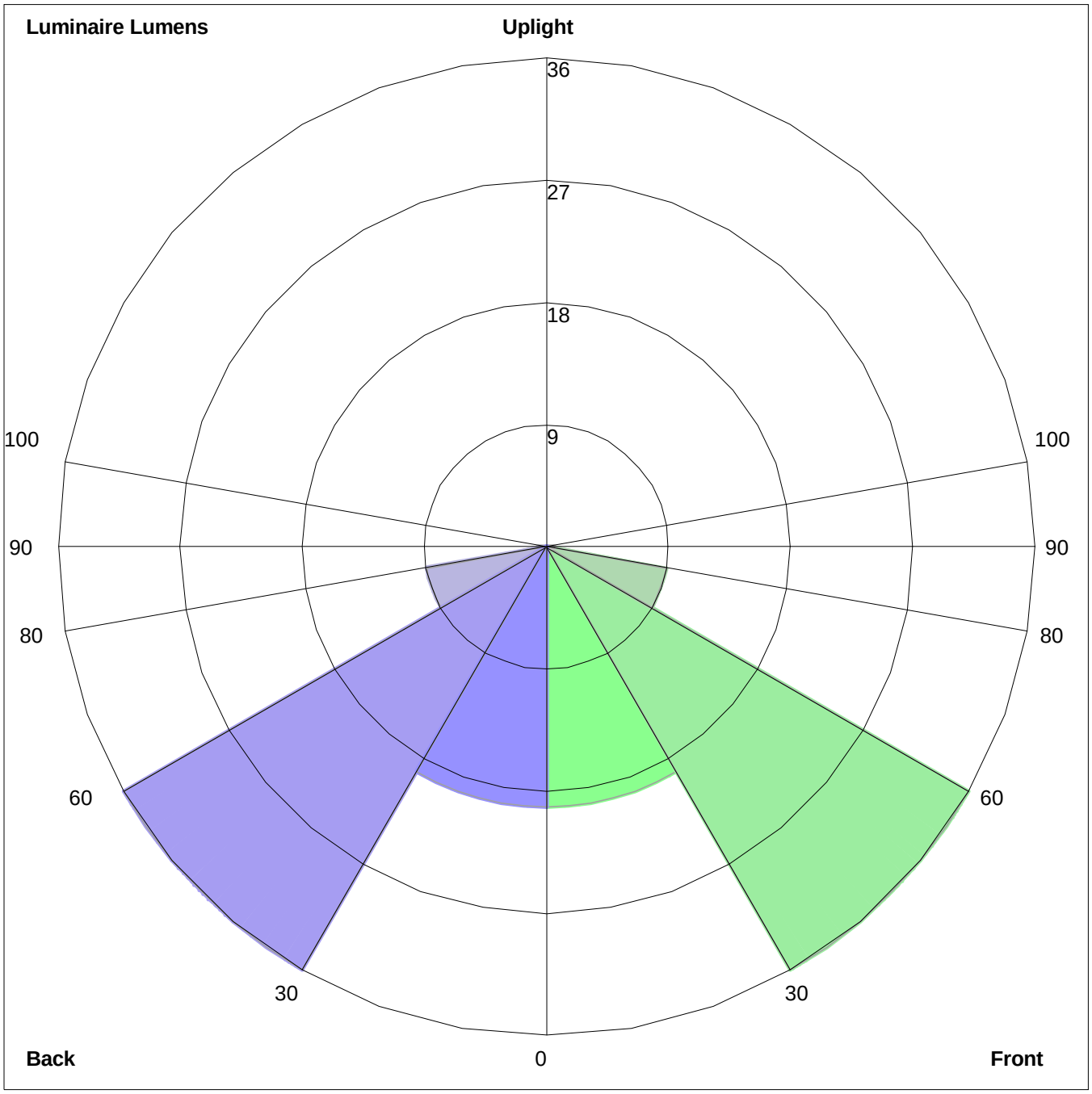
**ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE**




Distance In Units Of Mounting Height
Values Based On 1.83 Foot Mounting Height
1/2 Maximum Candela Trace Shown As Dashed Curve
(+) = Maximum Candela Point

**IES ROAD REPORT**
**PHOTOMETRIC FILENAME : L111407206.IES**

**LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH**




Luminaire Lumens:
Front: Low=19.3, Medium=36.4, High=9.1, Very High=0.6
Back: Low=19.3, Medium=36.4, High=9.1, Very High=0.6
Uplight: Low=0.0, High=0.0

BUG Rating : B0-U0-G0