



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

Report No: L111708101



**Report No:** L111708101 **Issue Date:** 12/13/2017

**Report Prepared For:** CAST Lighting LLC.  
1120 Goffle Road Hawthorne NJ 07506-2024

**Model Number:** CPL38

**Test:** Photometric/Colorimetric/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. Received in working and undamaged condition. No modifications were necessary.

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

**Sample Arrival Date:** 12/7/17

**Date of Tests:** 12/11/17 - 12/13/17

**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-S4	1/9/19
BK PRECISION	1747	PS-DC04	1/10/19
Fluke Digital Thermometer	52K/J	MT-TP05	1/10/19
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**

<b>Manufacturer:</b>	CAST Lighting LLC.
<b>Model Number:</b>	CPL38
<b>Driver Model Number:</b>	CUSTOM LED DRIVER
<b>Total Lumens:</b>	830.20
<b>Input Voltage (VAC/60Hz):</b>	24.00
<b>Input Current (Amp):</b>	0.4
<b>Input Power (W):</b>	8.28
<b>Input Power Factor:</b>	0.87
<b>Current ATHD @ 24V(%):</b>	49%
<b>Efficacy:</b>	100
<b>Color Rendering Index (CRI):</b>	69
<b>Correlated Color Temperature (K):</b>	4487
<b>Chromaticity Coordinate x:</b>	0.3635
<b>Chromaticity Coordinate y:</b>	0.3766
<b>Ambient Temperature (°C):</b>	25.0
<b>Stabilization Time (Hours):</b>	0:45
<b>Total Operating Time (Hours):</b>	1:15

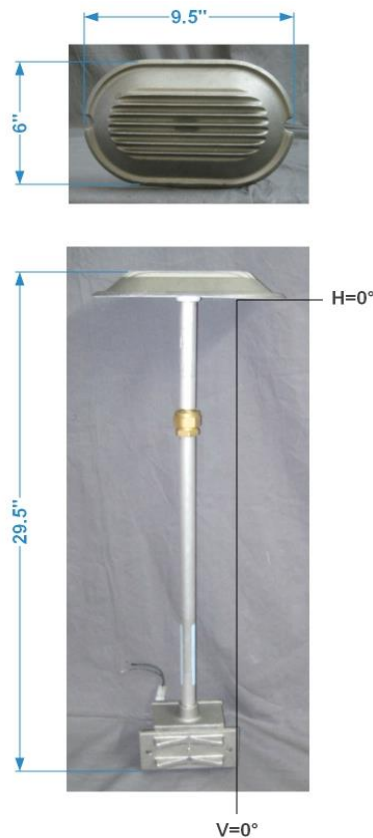
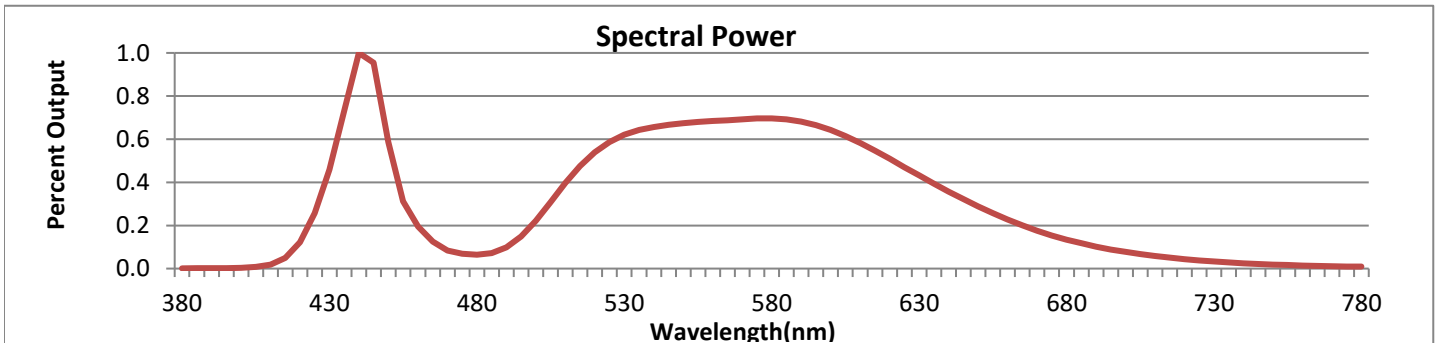


FIG. 1 LUMINAIRE

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



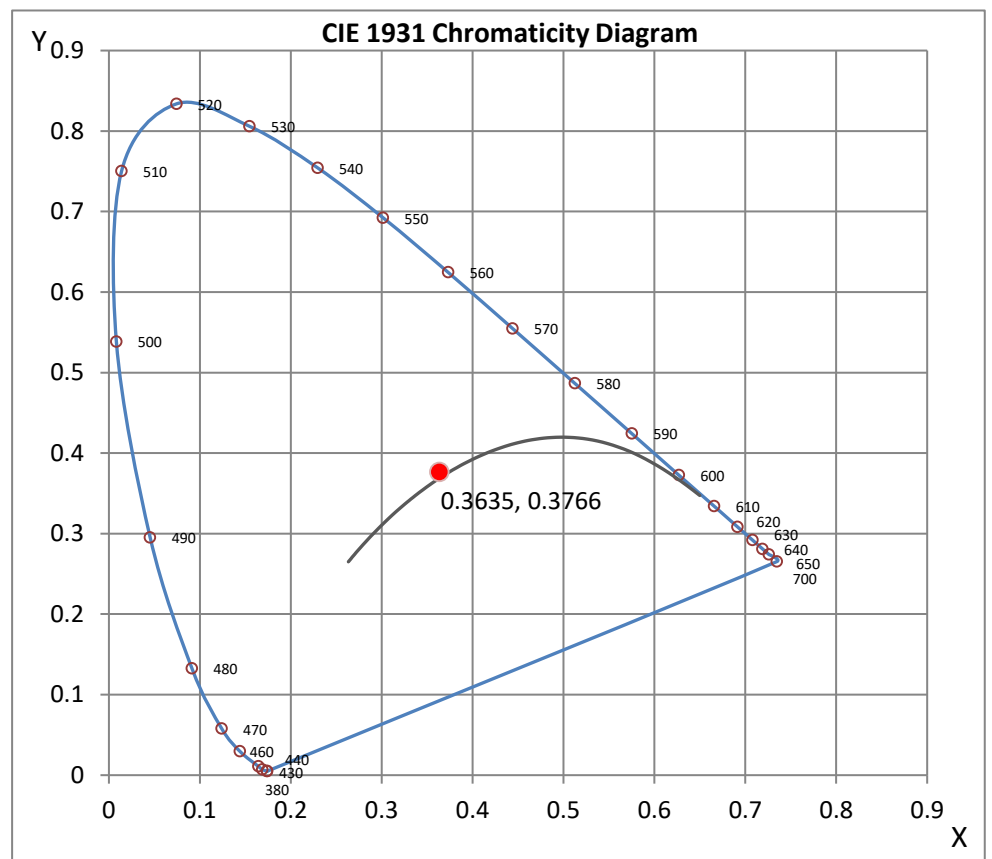
Wavelength	W/m <sup>2</sup> nm	440	1.0000	510	0.3966	580	0.6961	650	0.2889	720	0.0437
380	0.0010	450	0.5869	520	0.5386	590	0.6822	660	0.2273	730	0.0329
390	0.0016	460	0.1951	530	0.6203	600	0.6434	670	0.1750	740	0.0248
400	0.0037	470	0.0843	540	0.6570	610	0.5823	680	0.1340	750	0.0188
410	0.0181	480	0.0637	550	0.6742	620	0.5088	690	0.1019	760	0.0142
420	0.1215	490	0.0980	560	0.6841	630	0.4321	700	0.0773	770	0.0109
430	0.4588	500	0.2211	570	0.6923	640	0.3570	710	0.0582	780	0.0095

**CRI & CCT**

x	0.3635
y	0.3766
u'	0.2141
v'	0.4990
CRI	69.30
CCT	4487
Duv	0.00532

**R Values**

R1	67.88
R2	72.88
R3	77.56
R4	71.61
R5	67.65
R6	63.42
R7	77.79
R8	55.89
R9	-29.85
R10	36.59
R11	70.06
R12	39.71
R13	67.48
R14	86.88



\*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 : 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: 13*



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# Photometric Test Report

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708101.IES**

## DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002  
[TEST] L111708101  
[TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)  
[ISSUEDATE] 12/13/2017  
[MANUFAC] CAST Lighting LLC.  
[LUMCAT] CPL38  
[LUMINAIRE] Gen 3 Perimeter 8 Watt Fixture  
[BALLASTCAT] CUSTOM LED DRIVER  
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND  
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.  
[INPUT] 24VAC, 8.28W  
[TEST PROCEDURE] IESNA:LM-79-08

## CHARACTERISTICS

IES Classification	N.A.
Longitudinal Classification	N.A.
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	830
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	100
Total Luminaire Watts	8.28
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	503.32
Maximum Candela Angle	125H 75V
Maximum Candela (<90 Degrees Vertical)	503.32
Maximum Candela Angle (<90 Degrees Vertical)	125H 75V
Maximum Candela At 90 Degrees Vertical	0 (0.0% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	263 (31.7% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708101.IES**

**LUMINAIRE CLASSIFICATION SYSTEM (LCS)**

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	51.5	N.A.	6.2
FM - Front-Medium (30-60)	122.8	N.A.	14.8
FH - Front-High (60-80)	197.3	N.A.	23.8
FVH - Front-Very High (80-90)	13.9	N.A.	1.7
BL - Back-Low (0-30)	41.3	N.A.	5.0
BM - Back-Medium (30-60)	115.3	N.A.	13.9
BH - Back-High (60-80)	257.8	N.A.	31.0
BVH - Back-Very High (80-90)	30.4	N.A.	3.7
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	830.3	N.A.	100.0
BUG Rating	B1-U0-G1		

**ZONAL LUMEN SUMMARY**

Zone	%
0-20	4.8
0-30	11.2
0-40	18.9
0-60	39.9
0-80	94.7
0-90	100
10-90	99
20-40	14
20-50	23
40-70	41.7
60-80	54.8
70-80	34.1
80-90	5.3
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 : L111708101.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>
0.0	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01
5.0	108.32	108.52	108.79	109.13	109.53	109.73	109.06	108.19	107.11	105.76
10.0	123.12	123.32	123.66	124.13	124.20	124.33	124.47	125.01	125.01	124.74
15.0	128.51	128.64	128.51	128.84	129.25	129.72	130.25	131.26	132.34	132.81
20.0	135.64	135.17	134.56	133.55	132.68	131.40	130.73	130.52	131.26	130.93
25.0	134.43	134.43	132.47	129.18	126.15	124.94	124.60	124.87	125.48	125.81
30.0	118.82	117.74	117.00	115.92	113.64	113.10	113.70	115.12	115.92	116.13
35.0	101.06	101.26	101.46	101.93	101.80	101.73	102.87	103.54	103.88	104.28
37.5	96.21	96.55	97.02	97.69	98.43	98.57	99.24	99.78	100.11	100.38
40.0	93.92	94.13	94.39	95.27	96.14	95.94	96.48	96.82	96.95	96.68
42.5	93.65	93.99	94.87	95.47	95.81	96.01	95.87	95.94	95.87	95.47
45.0	97.69	97.83	98.57	99.10	99.17	99.24	98.30	97.69	97.56	97.15
47.5	103.88	103.68	104.35	104.42	104.28	103.95	102.67	101.93	101.59	101.59
50.0	110.21	109.73	109.47	109.73	109.60	108.73	107.04	106.77	105.83	105.76
52.5	113.17	113.30	113.23	112.69	112.29	111.62	110.54	109.87	109.80	109.47
55.0	115.05	114.91	114.78	114.51	114.38	113.64	112.63	112.90	113.30	112.49
57.5	117.74	117.27	117.07	116.66	116.46	115.72	115.39	115.39	116.26	115.86
60.0	125.28	124.80	123.80	122.79	122.18	121.58	121.04	121.10	121.98	121.71
62.5	137.12	136.71	135.77	135.03	134.22	133.42	133.28	132.68	133.69	134.22
65.0	150.71	150.91	151.18	151.65	151.65	150.64	149.97	150.24	150.78	151.52
67.5	160.93	161.41	160.87	161.54	163.89	168.20	174.05	179.44	181.99	183.67
70.0	124.60	126.29	131.94	144.59	163.22	180.92	198.61	220.81	246.04	264.07
72.5	176.95	177.08	177.82	180.18	181.32	182.87	200.16	224.45	258.22	298.39
75.0	108.59	112.02	122.99	144.72	176.01	203.66	232.65	235.68	248.94	279.28
77.5	28.93	29.33	31.55	39.29	55.30	73.13	135.64	154.07	167.26	187.51
80.0	24.89	24.89	25.10	25.37	25.63	26.04	38.08	39.70	45.89	103.28
85.0	9.15	9.15	9.22	9.35	9.69	11.24	14.33	16.15	15.41	15.00
90.0	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>	<u>95</u>
0.0	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01
5.0	104.35	102.20	100.32	98.70	97.09	92.85	88.88	87.20	85.85	83.36
10.0	124.40	123.59	121.91	120.57	118.68	116.66	114.78	113.37	111.48	109.67
15.0	132.27	130.93	128.37	125.68	123.26	120.77	119.42	118.21	117.14	116.13
20.0	130.39	128.77	126.15	123.66	121.64	120.16	118.82	118.55	118.14	117.54
25.0	125.68	125.41	123.53	122.45	121.58	120.50	120.16	120.30	120.97	121.17
30.0	116.73	117.74	117.67	117.81	117.00	115.99	115.65	116.13	115.72	114.91
35.0	105.36	106.77	106.64	105.97	105.56	105.16	105.09	104.28	104.28	103.61
37.5	101.26	102.33	102.20	100.99	101.32	100.65	100.05	99.37	99.37	98.70
40.0	97.29	98.43	98.23	97.02	96.75	95.74	94.80	94.13	94.19	94.19
42.5	95.61	96.61	95.87	94.93	94.53	93.45	92.24	91.30	91.50	91.57
45.0	96.95	97.62	97.29	96.75	95.94	95.54	94.87	93.99	94.13	93.79
47.5	101.12	101.66	102.06	101.46	101.39	100.65	100.45	100.05	99.57	99.17
50.0	105.83	105.76	106.17	106.57	106.50	106.57	106.30	106.71	106.64	106.24
52.5	109.26	109.33	109.60	110.47	111.62	111.69	112.16	112.69	112.76	112.69
55.0	112.29	112.36	113.10	113.91	115.86	116.80	117.61	117.81	117.47	117.67
57.5	115.59	115.59	116.39	117.67	119.56	120.84	121.64	122.11	122.25	122.38
60.0	121.51	121.91	122.85	125.01	127.29	129.45	130.25	131.13	130.73	131.26
62.5	133.89	134.09	135.77	138.53	141.49	143.98	146.33	146.67	146.87	147.48
65.0	152.12	151.72	154.34	157.77	161.41	164.50	168.07	168.74	168.67	169.21
67.5	185.22	185.96	189.53	194.44	201.84	209.85	216.51	221.49	226.33	232.65

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708101.IES**

**CANDELA TABULATION - (Cont.)**

<b>70.0</b>	270.74	276.66	286.28	298.79	312.38	325.64	336.67	344.34	349.45	354.70
<b>72.5</b>	330.28	341.85	349.72	360.89	374.01	388.48	398.57	405.90	414.78	428.04
<b>75.0</b>	314.80	349.25	371.72	363.51	356.32	348.38	341.18	331.02	329.07	341.85
<b>77.5</b>	184.01	209.98	250.28	262.73	274.57	282.91	275.11	224.24	217.38	249.14
<b>80.0</b>	103.41	105.29	114.17	120.03	121.78	122.25	118.62	112.49	112.49	125.14
<b>85.0</b>	14.73	14.67	14.87	15.21	15.61	15.88	16.28	16.62	16.75	16.96
<b>90.0</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Vert. Horizontal Angles**  
**Angles**

	<u><b>100</b></u>	<u><b>105</b></u>	<u><b>110</b></u>	<u><b>115</b></u>	<u><b>120</b></u>	<u><b>125</b></u>	<u><b>130</b></u>	<u><b>135</b></u>	<u><b>140</b></u>	<u><b>145</b></u>
<b>0.0</b>	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01	68.01
<b>5.0</b>	77.51	73.13	70.91	68.42	66.14	63.04	60.08	55.78	50.26	42.79
<b>10.0</b>	107.58	105.50	103.75	102.00	100.72	98.57	95.47	88.88	81.54	77.10
<b>15.0</b>	115.45	114.98	113.97	113.17	112.16	111.01	109.67	107.38	103.34	99.04
<b>20.0</b>	116.87	115.92	115.32	114.24	113.03	112.02	110.81	109.20	106.77	102.13
<b>25.0</b>	120.77	119.62	118.28	116.53	114.71	113.10	111.15	109.33	106.98	102.47
<b>30.0</b>	113.50	112.16	111.75	111.28	110.61	109.53	108.66	108.32	107.58	102.67
<b>35.0</b>	103.48	103.48	104.49	104.49	104.08	104.42	104.89	106.17	106.64	103.14
<b>37.5</b>	99.04	99.98	100.99	100.79	100.79	101.32	101.80	103.01	104.02	101.06
<b>40.0</b>	94.60	95.67	96.08	95.67	96.41	96.88	97.49	98.36	99.10	96.08
<b>42.5</b>	91.97	92.71	93.18	93.12	93.65	93.72	94.39	94.87	95.27	92.78
<b>45.0</b>	93.65	94.13	94.46	94.46	94.46	94.53	95.13	95.00	95.00	92.31
<b>47.5</b>	98.90	98.63	98.43	98.77	98.23	98.03	98.36	98.03	98.16	93.59
<b>50.0</b>	105.70	104.76	104.96	104.96	103.95	103.41	102.74	103.01	102.74	97.49
<b>52.5</b>	111.55	110.34	110.47	110.07	109.33	108.93	107.99	107.78	107.11	100.45
<b>55.0</b>	117.07	115.45	115.18	114.91	113.30	112.83	112.76	111.82	110.47	101.73
<b>57.5</b>	121.71	120.97	120.23	119.56	118.14	116.73	116.26	114.78	107.65	102.67
<b>60.0</b>	131.13	129.92	129.85	128.98	128.17	126.22	125.21	120.36	108.73	108.73
<b>62.5</b>	147.14	145.53	144.72	143.91	142.50	140.55	139.40	130.12	119.36	119.83
<b>65.0</b>	169.82	169.34	170.89	173.11	174.86	176.61	177.55	162.48	148.82	149.63
<b>67.5</b>	238.98	244.23	248.67	253.85	257.68	260.85	263.54	236.42	212.07	213.95
<b>70.0</b>	360.15	362.91	365.47	369.30	372.40	376.43	377.17	332.90	294.28	296.77
<b>72.5</b>	439.41	443.38	447.95	457.77	463.76	467.93	470.83	416.60	361.70	361.83
<b>75.0</b>	367.95	390.36	421.17	462.35	499.76	503.32	502.04	441.96	383.16	382.76
<b>77.5</b>	302.49	316.69	327.12	336.06	338.35	376.84	420.50	397.83	346.63	346.83
<b>80.0</b>	142.50	160.26	174.19	187.64	203.25	217.18	246.45	227.41	232.79	256.20
<b>85.0</b>	16.89	17.02	17.16	17.29	17.29	17.29	17.43	17.29	17.90	32.83
<b>90.0</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Vert. Horizontal Angles**  
**Angles**

	<u><b>150</b></u>	<u><b>155</b></u>	<u><b>160</b></u>	<u><b>165</b></u>	<u><b>170</b></u>	<u><b>175</b></u>	<u><b>180</b></u>
<b>0.0</b>	68.01	68.01	68.01	68.01	68.01	68.01	68.01
<b>5.0</b>	37.54	35.59	33.91	31.49	31.15	29.13	28.80
<b>10.0</b>	70.64	64.12	58.53	48.98	47.43	41.65	38.35
<b>15.0</b>	94.26	89.21	86.66	82.96	80.80	77.71	76.70
<b>20.0</b>	95.27	91.57	87.60	86.86	86.79	86.46	85.31
<b>25.0</b>	97.49	94.87	90.22	86.25	86.52	91.77	89.35
<b>30.0</b>	97.22	94.19	88.81	84.37	83.76	87.94	86.12
<b>35.0</b>	99.44	97.35	91.23	86.25	85.51	88.41	87.20
<b>37.5</b>	97.96	96.61	91.30	85.98	84.98	87.73	85.72
<b>40.0</b>	94.06	92.91	88.07	83.70	82.42	84.77	83.83
<b>42.5</b>	91.03	90.83	87.40	82.15	80.87	83.43	81.68
<b>45.0</b>	90.16	89.95	85.78	82.69	80.74	83.09	83.56
<b>47.5</b>	91.77	92.85	89.42	84.98	83.83	86.86	89.35

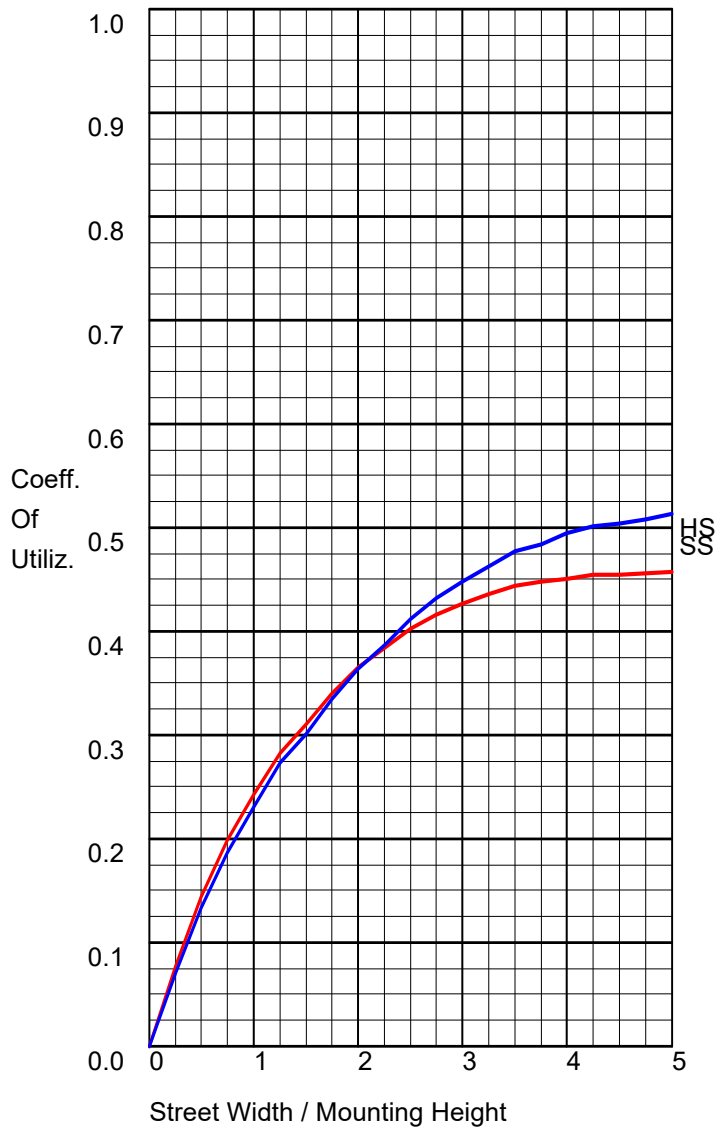


**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708101.IES**

**CANDELA TABULATION - (Cont.)**

<b>50.0</b>	95.87	97.22	93.52	88.81	88.47	93.79	95.00
<b>52.5</b>	98.23	99.44	92.58	90.49	91.16	96.48	99.57
<b>55.0</b>	100.52	101.93	95.20	92.65	93.92	98.77	101.19
<b>57.5</b>	102.54	103.21	94.53	93.52	95.13	94.33	94.87
<b>60.0</b>	109.20	110.41	102.20	97.76	99.37	95.87	92.58
<b>62.5</b>	120.84	121.91	108.32	104.82	105.23	92.38	82.89
<b>65.0</b>	150.84	151.78	131.67	129.65	129.72	108.05	91.77
<b>67.5</b>	217.38	221.22	192.69	183.61	185.56	148.22	137.79
<b>70.0</b>	300.07	277.06	234.94	231.31	231.04	181.93	134.56
<b>72.5</b>	362.24	305.18	258.02	258.49	256.40	196.59	84.10
<b>75.0</b>	382.89	323.68	268.18	268.85	264.75	153.53	67.55
<b>77.5</b>	349.45	268.31	244.09	248.94	236.09	111.48	32.43
<b>80.0</b>	263.00	214.49	177.22	140.68	142.50	65.87	27.45
<b>85.0</b>	46.63	31.89	39.56	27.52	12.65	12.58	12.92
<b>90.0</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

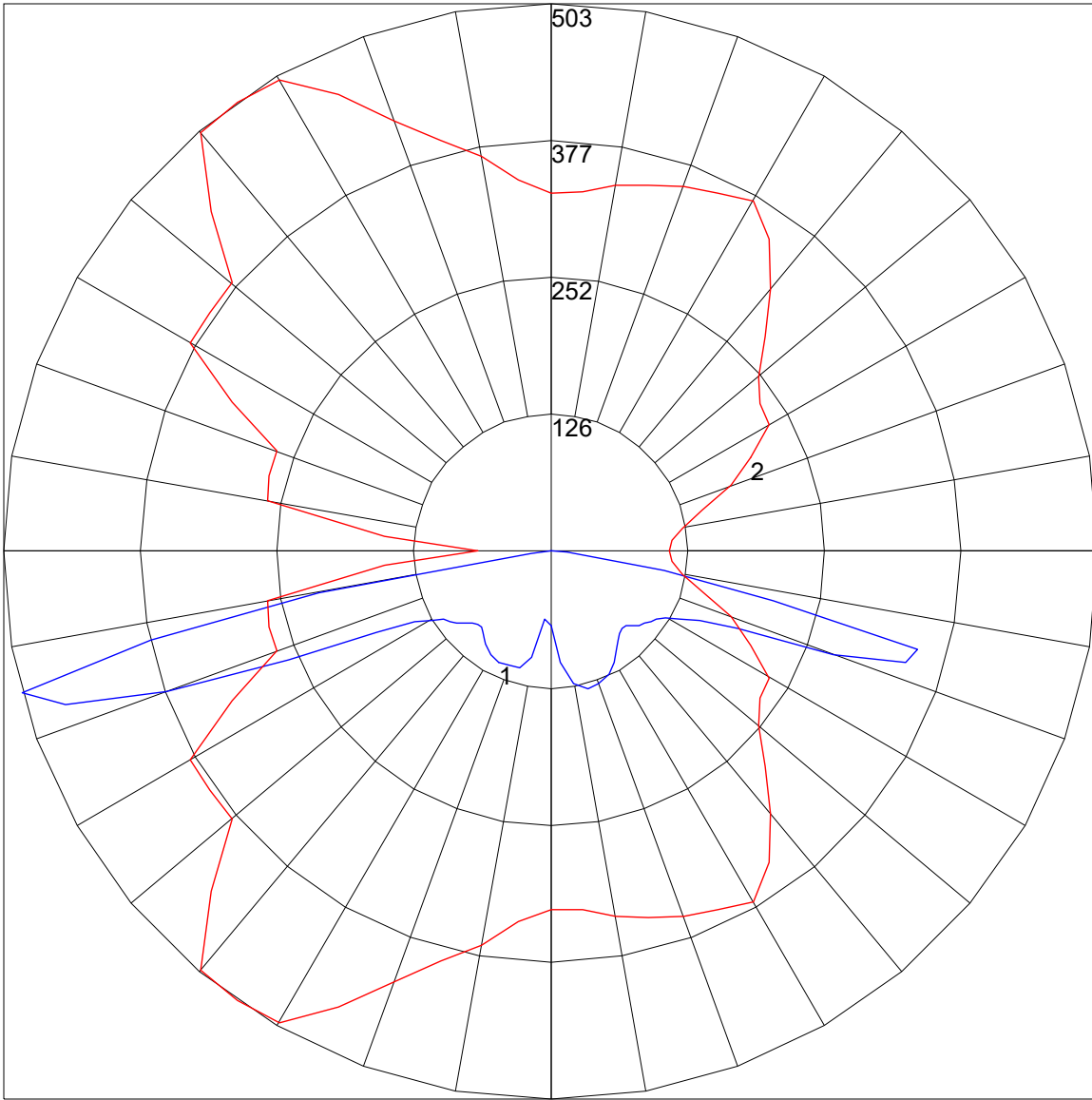
**COEFFICIENTS OF UTILIZATION**



**FLUX DISTRIBUTION**

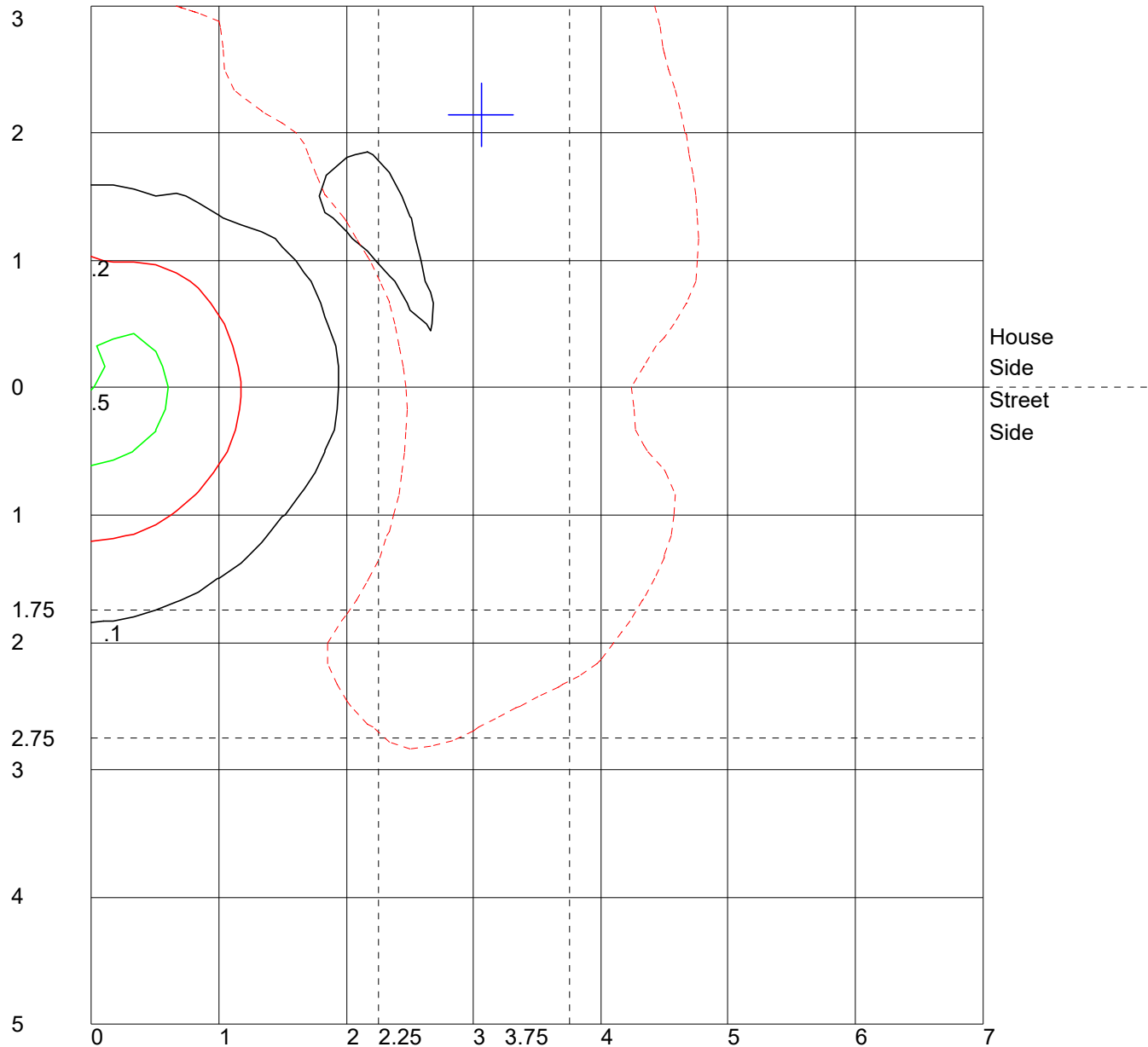
	Lumens	Percent Of Luminaire
Downward Street Side	385.4	46.4
Downward House Side	444.8	53.6
Downward Total	830.2	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	830.2	100.0

POLAR GRAPH



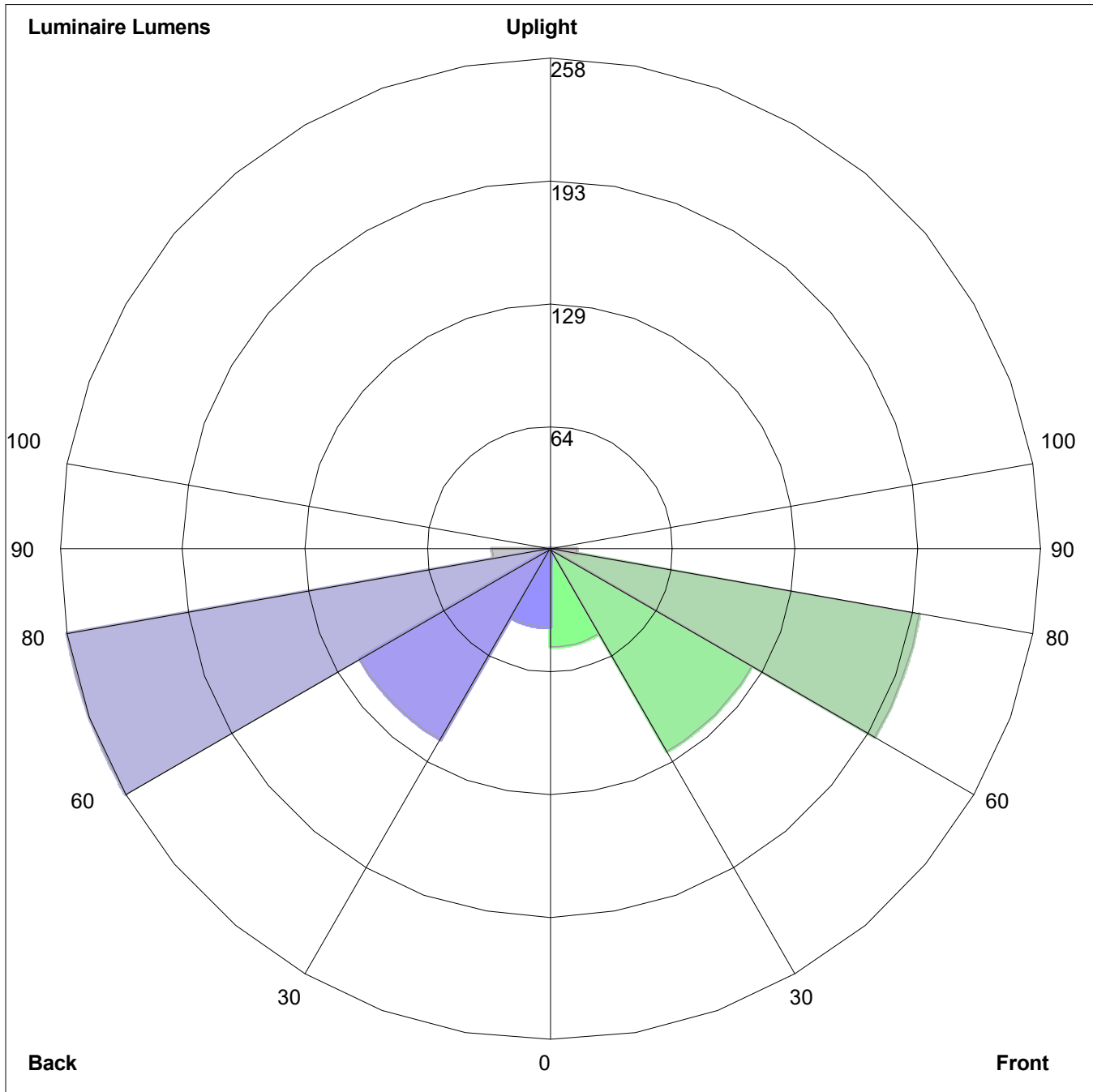
Maximum Candela = 503.32 Located At Horizontal Angle = 125, Vertical Angle = 75  
# 1 - Vertical Plane Through Horizontal Angles (125 - 305) (Through Max. Cd.)  
# 2 - Horizontal Cone Through Vertical Angle (75) (Through Max. Cd.)

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



Distance In Units Of Mounting Height  
 Values Based On 12 Foot Mounting Height  
 1/2 Maximum Candela Trace Shown As Dashed Curve  
 (+) = Maximum Candela Point

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=51.5, Medium=122.8, High=197.3, Very High=13.9  
Back: Low=41.3, Medium=115.3, High=257.8, Very High=30.4  
Uplight: Low=0.0, High=0.0

BUG Rating : B1-U0-G1