

**Report No:** L111708102 **Issue Date:** 12/13/2017

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

**Model Number:** CPL312

**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>	CPL312
<b>Driver Model Number:</b>	CUSTOM LED DRIVER
<b>Total Lumens:</b>	1163.40
<b>Input Voltage (VAC/60Hz):</b>	24.00
<b>Input Current (Amp):</b>	0.63
<b>Input Power (W):</b>	13.27
<b>Input Power Factor:</b>	0.88
<b>Current ATHD @ 24V(%):</b>	47%
<b>Efficacy:</b>	88
<b>Color Rendering Index (CRI):</b>	69
<b>Correlated Color Temperature (K):</b>	4498
<b>Chromaticity Coordinate x:</b>	0.3629
<b>Chromaticity Coordinate y:</b>	0.3749
<b>Ambient Temperature (°C):</b>	25.0
<b>Stabilization Time (Hours):</b>	0:55
<b>Total Operating Time (Hours):</b>	1:25

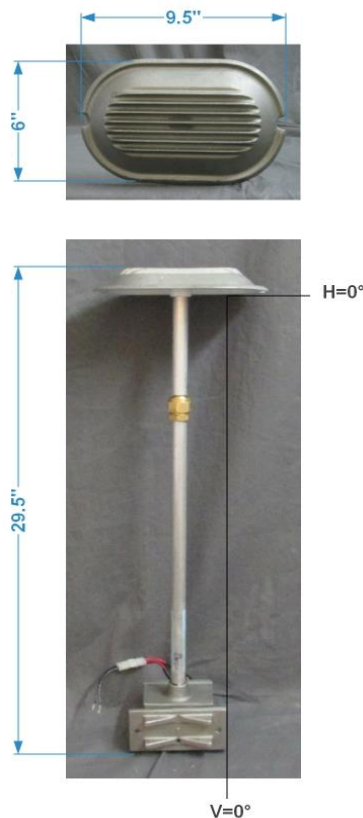
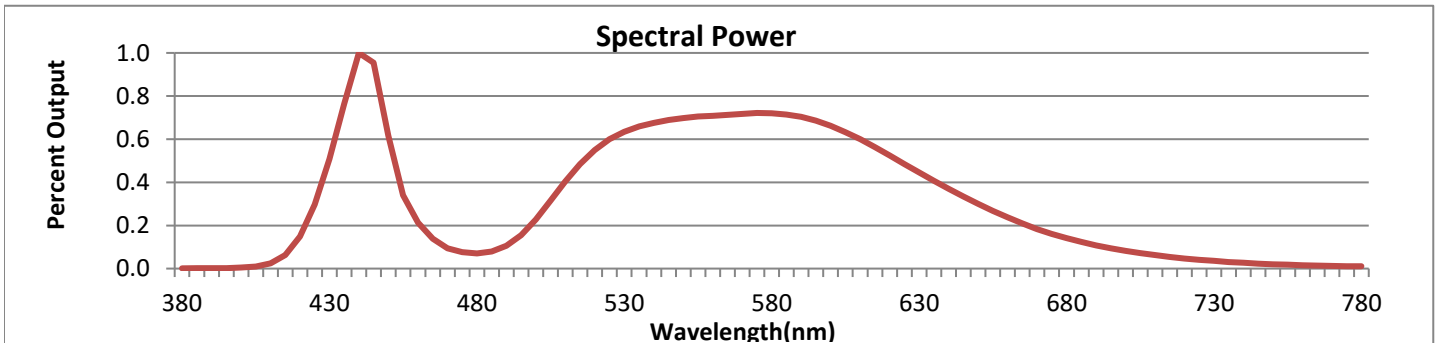


FIG. 1 LUMINAIRE

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



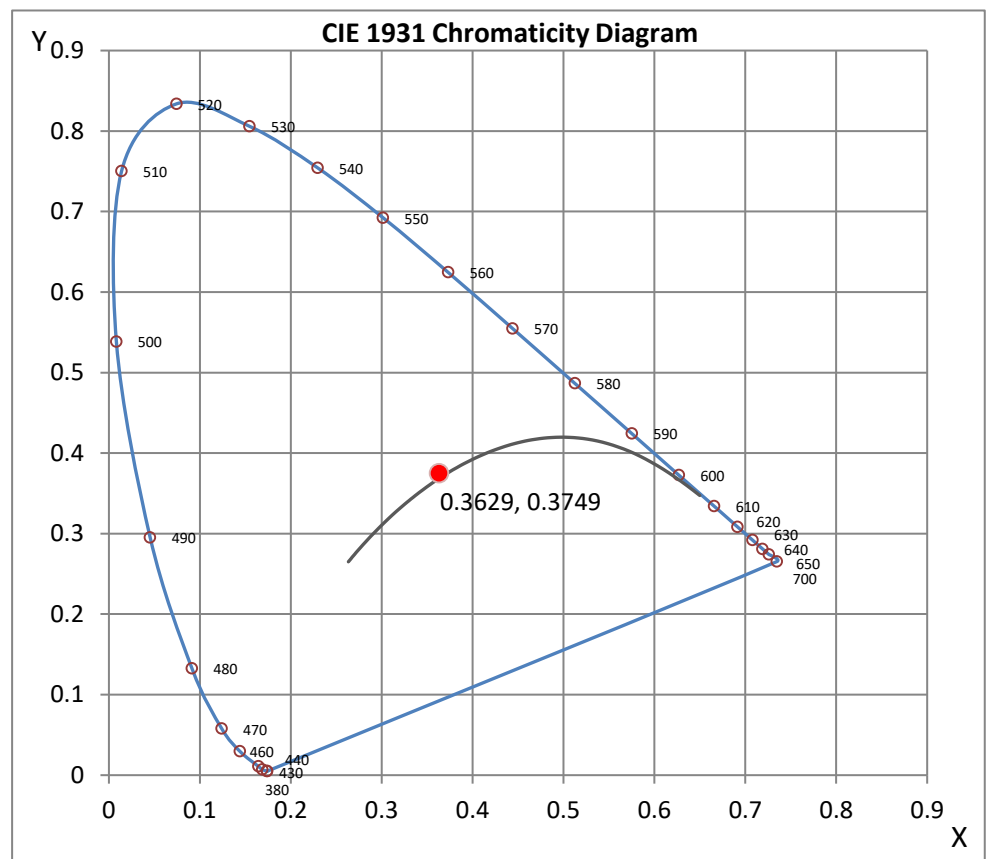
Wavelength	W/m <sup>2</sup> nm	440	1.0000	510	0.4045	580	0.7197	650	0.3000	720	0.0468
380	0.0011	450	0.6165	520	0.5493	590	0.7040	660	0.2373	730	0.0354
390	0.0018	460	0.2126	530	0.6349	600	0.6630	670	0.1831	740	0.0266
400	0.0045	470	0.0947	540	0.6763	610	0.5993	680	0.1414	750	0.0204
410	0.0236	480	0.0708	550	0.6974	620	0.5246	690	0.1080	760	0.0156
420	0.1483	490	0.1052	560	0.7088	630	0.4463	700	0.0821	770	0.0119
430	0.5074	500	0.2280	570	0.7180	640	0.3699	710	0.0622	780	0.0105

**CRI & CCT**

x	0.3629
y	0.3749
u'	0.2143
v'	0.4982
CRI	69.40
CCT	4498
Duv	0.00473

**R Values**

R1	67.92
R2	73.00
R3	77.58
R4	71.58
R5	67.71
R6	63.50
R7	77.86
R8	56.08
R9	-29.15
R10	36.73
R11	69.84
R12	40.21
R13	67.54
R14	86.86



\*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*



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

# Photometric Test Report

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708102.IES**

**DESCRIPTIVE INFORMATION (From Photometric File)**

IESNA:LM-63-2002  
 [TEST] L111708102  
 [TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)  
 [ISSUEDATE] 12/13/2017  
 [MANUFAC] CAST Lighting LLC.  
 [LUMCAT] CPL312  
 [LUMINAIRE] Gen 3 Perimeter 12 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, 13.27W  
 [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	1163
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	88
Total Luminaire Watts	13.27
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	709.47
Maximum Candela Angle	125H 75V
Maximum Candela (<90 Degrees Vertical)	709.47
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	364.52 (31.3% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708102.IES**

**LUMINAIRE CLASSIFICATION SYSTEM (LCS)**

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	71.0	N.A.	6.1
FM - Front-Medium (30-60)	171.9	N.A.	14.8
FH - Front-High (60-80)	274.4	N.A.	23.6
FVH - Front-Very High (80-90)	19.6	N.A.	1.7
BL - Back-Low (0-30)	57.3	N.A.	4.9
BM - Back-Medium (30-60)	161.1	N.A.	13.8
BH - Back-High (60-80)	363.9	N.A.	31.3
BVH - Back-Very High (80-90)	44.3	N.A.	3.8
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
<b>Total</b>	<b>1163.5</b>	<b>N.A.</b>	<b>100.0</b>
<b>BUG Rating</b>	<b>B1-U0-G1</b>		

**ZONAL LUMEN SUMMARY**

Zone	%
0-20	4.8
0-30	11
0-40	18.6
0-60	39.6
0-80	94.5
0-90	100
10-90	99
20-40	13.9
20-50	22.8
40-70	41.7
60-80	54.9
70-80	34.1
80-90	5.5
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 : L111708102.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	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58
5.0	152.86	152.73	152.26	151.78	151.65	151.72	151.25	150.17	148.82	147.81
10.0	173.04	172.98	172.84	172.91	172.71	172.84	172.78	172.51	172.17	171.50
15.0	179.23	178.83	178.43	178.43	178.02	178.29	178.83	180.38	181.59	182.19
20.0	186.23	186.03	185.09	183.54	181.72	179.84	178.70	178.83	179.37	179.64
25.0	183.14	182.53	180.18	176.48	172.51	170.62	169.34	169.28	170.29	171.30
30.0	158.78	158.71	158.71	158.58	156.90	155.89	155.75	156.83	157.50	158.18
35.0	138.19	139.00	140.21	141.49	141.69	141.89	143.24	143.71	143.58	143.98
37.5	132.81	133.48	134.29	135.70	136.98	137.32	138.53	138.80	138.73	138.26
40.0	131.20	131.26	132.47	133.42	134.56	134.83	135.64	135.84	135.70	134.83
42.5	132.14	132.61	133.62	134.56	134.96	134.96	135.64	134.83	134.96	134.36
45.0	137.92	137.79	138.87	139.94	140.28	140.28	139.47	138.80	138.26	137.45
47.5	146.27	146.07	146.67	147.48	147.48	146.87	145.53	144.65	144.11	143.31
50.0	155.01	154.74	154.34	154.74	154.95	153.47	151.78	151.11	150.24	149.29
52.5	159.59	160.13	159.99	159.66	159.05	157.64	157.03	155.35	155.35	154.74
55.0	162.55	162.35	161.81	161.54	161.20	160.33	159.99	158.85	159.32	159.25
57.5	166.18	165.71	164.97	164.43	163.89	162.62	161.94	161.74	162.55	163.02
60.0	176.95	176.48	175.00	173.31	172.64	171.50	170.02	169.82	170.76	171.83
62.5	191.88	191.88	191.14	190.60	189.60	187.71	187.38	186.90	187.64	188.32
65.0	206.82	206.95	207.69	207.96	209.51	210.59	211.93	211.93	212.54	213.55
67.5	209.78	213.01	217.92	221.82	224.65	228.01	237.63	250.42	257.28	260.04
70.0	176.95	177.62	178.23	181.19	194.91	228.82	264.88	289.17	330.88	375.02
72.5	251.36	252.50	254.25	256.74	258.49	259.50	263.60	293.41	347.77	401.86
75.0	138.73	139.94	148.15	168.74	206.08	269.52	328.33	335.46	340.03	384.30
77.5	41.04	41.11	41.31	43.13	55.24	85.98	189.26	197.74	229.22	266.56
80.0	35.26	35.26	35.59	36.00	36.47	37.00	56.04	55.64	50.60	148.55
85.0	13.32	13.32	13.39	13.52	13.86	15.74	20.12	23.28	22.40	21.60
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	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58
5.0	146.47	144.32	140.68	137.99	134.90	130.73	128.91	125.14	119.36	113.23
10.0	170.49	169.34	167.93	166.99	165.58	164.30	163.02	161.20	159.45	158.18
15.0	181.45	179.77	176.61	172.51	169.08	166.45	164.37	162.89	161.34	160.40
20.0	179.23	177.62	174.46	171.09	168.74	167.06	165.51	164.23	163.69	163.09
25.0	171.97	171.77	170.08	169.75	168.94	167.73	167.33	167.39	168.20	168.27
30.0	159.32	160.46	161.81	162.68	161.74	160.60	160.93	161.41	161.14	159.93
35.0	145.33	146.20	146.81	146.94	146.40	146.00	145.93	145.53	145.53	144.45
37.5	139.27	140.48	140.55	139.40	139.54	138.73	138.26	137.39	137.66	137.12
40.0	135.17	136.04	136.38	134.76	134.29	133.08	131.94	131.26	131.40	131.40
42.5	133.69	134.16	133.69	132.88	132.14	130.52	129.04	127.63	128.24	127.97
45.0	136.04	135.97	135.91	135.30	134.63	133.75	132.74	131.13	131.20	130.99
47.5	142.10	142.03	141.96	141.76	141.76	140.95	140.01	139.47	139.20	137.92
50.0	148.29	148.08	148.49	148.82	148.89	149.70	149.63	149.56	148.89	148.02
52.5	153.87	153.33	153.53	154.48	156.02	156.83	158.04	158.24	158.04	157.37
55.0	158.71	158.24	158.38	159.52	162.15	163.83	165.37	165.71	165.37	164.57
57.5	162.68	162.21	163.56	164.97	167.60	169.61	171.16	171.63	172.17	171.63
60.0	171.43	171.03	173.38	175.67	178.63	181.39	183.07	183.94	184.01	184.82
62.5	188.79	189.12	191.88	195.31	199.01	203.12	205.54	206.89	206.62	206.89
65.0	214.02	214.62	218.53	222.70	227.54	232.18	236.76	238.04	236.42	236.83
67.5	262.06	264.34	270.06	275.58	286.34	297.11	306.33	313.53	320.19	329.81

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708102.IES**

**CANDELA TABULATION - (Cont.)**

<b>70.0</b>	383.97	394.26	408.52	425.34	444.45	462.21	477.42	488.39	494.24	502.25
<b>72.5</b>	458.45	483.68	497.13	513.75	531.71	550.22	560.44	570.33	587.02	605.45
<b>75.0</b>	418.68	483.27	526.87	516.78	506.35	493.16	481.52	465.17	462.89	485.96
<b>77.5</b>	260.98	283.05	355.64	372.13	388.95	398.84	389.01	320.86	308.14	350.87
<b>80.0</b>	148.08	146.00	163.49	168.20	171.50	171.77	167.80	159.86	159.32	172.64
<b>85.0</b>	21.13	20.99	21.19	21.53	22.00	22.54	23.14	23.55	24.09	24.22
<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>	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58	96.58
<b>5.0</b>	107.18	105.43	99.64	95.61	90.42	84.03	75.02	62.84	54.77	49.99
<b>10.0</b>	156.43	153.60	149.56	144.99	140.01	135.03	130.19	120.57	111.28	99.98
<b>15.0</b>	159.79	158.85	157.97	156.90	155.96	154.41	152.39	149.97	144.52	138.40
<b>20.0</b>	162.48	161.61	160.60	159.19	157.23	155.82	154.54	153.00	149.77	143.44
<b>25.0</b>	167.39	165.24	163.15	161.27	159.12	157.17	154.21	151.92	148.96	142.70
<b>30.0</b>	157.91	155.75	155.35	155.08	153.40	152.66	151.72	150.91	149.56	142.57
<b>35.0</b>	143.98	143.98	144.85	144.52	144.32	145.12	145.53	147.01	147.95	142.30
<b>37.5</b>	136.58	137.86	139.20	139.07	139.47	140.01	140.88	142.23	143.44	138.66
<b>40.0</b>	131.47	132.61	133.55	133.48	134.43	135.23	136.24	137.45	137.99	133.28
<b>42.5</b>	128.51	129.51	130.32	130.19	130.32	130.39	131.73	132.34	133.01	128.91
<b>45.0</b>	130.79	130.93	131.47	132.07	131.40	131.73	132.68	132.74	133.35	128.30
<b>47.5</b>	137.59	137.32	137.18	137.79	136.85	136.44	136.71	137.72	137.99	130.46
<b>50.0</b>	146.54	145.73	145.59	145.80	144.79	143.58	142.63	142.97	143.91	136.04
<b>52.5</b>	155.35	153.87	153.94	153.74	152.52	151.78	149.97	149.97	149.56	138.93
<b>55.0</b>	162.82	161.00	160.60	160.13	158.71	157.50	156.22	155.42	151.85	140.95
<b>57.5</b>	171.23	169.28	167.93	167.19	165.58	163.29	162.08	159.45	148.82	142.50
<b>60.0</b>	184.75	182.87	182.26	180.71	179.44	177.08	174.66	169.68	149.70	150.44
<b>62.5</b>	206.95	204.87	203.59	202.31	200.43	198.07	195.31	186.97	164.23	165.85
<b>65.0</b>	238.31	238.58	240.46	243.62	246.25	247.93	249.14	227.14	206.15	207.29
<b>67.5</b>	338.35	346.83	353.09	358.94	363.45	368.22	372.60	332.77	296.64	298.99
<b>70.0</b>	510.66	515.30	518.73	522.03	525.79	530.64	534.34	475.00	413.71	416.19
<b>72.5</b>	622.21	630.01	635.66	645.08	653.56	662.98	667.82	584.87	511.40	508.70
<b>75.0</b>	519.74	548.27	593.07	650.93	702.00	709.47	709.20	638.96	539.38	537.23
<b>77.5</b>	428.17	445.60	459.59	471.97	478.63	529.70	589.37	564.35	485.96	485.02
<b>80.0</b>	201.37	226.40	249.95	270.40	285.27	306.33	343.87	322.54	328.13	360.22
<b>85.0</b>	24.49	24.69	24.76	24.96	25.23	25.57	26.04	26.44	27.11	49.05
<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>	96.58	96.58	96.58	96.58	96.58	96.58	96.58
<b>5.0</b>	44.00	39.76	33.44	28.39	22.07	15.27	13.05
<b>10.0</b>	92.17	87.73	79.53	68.56	59.41	50.19	49.25
<b>15.0</b>	135.23	129.99	122.85	118.62	118.62	117.14	115.59
<b>20.0</b>	136.24	128.17	122.11	121.31	121.91	121.10	117.74
<b>25.0</b>	136.04	132.88	125.01	119.76	120.03	125.28	125.95
<b>30.0</b>	135.91	132.41	122.32	117.81	116.93	120.90	126.89
<b>35.0</b>	137.79	135.97	127.03	120.84	119.56	122.52	131.33
<b>37.5</b>	135.23	134.09	124.00	119.56	118.21	121.10	127.70
<b>40.0</b>	131.20	130.25	122.65	117.14	115.25	117.67	127.29
<b>42.5</b>	126.76	127.09	120.36	115.45	113.17	115.65	120.97
<b>45.0</b>	126.42	126.42	119.15	115.59	113.10	115.59	123.39
<b>47.5</b>	128.91	130.46	123.66	119.56	117.88	120.57	134.83

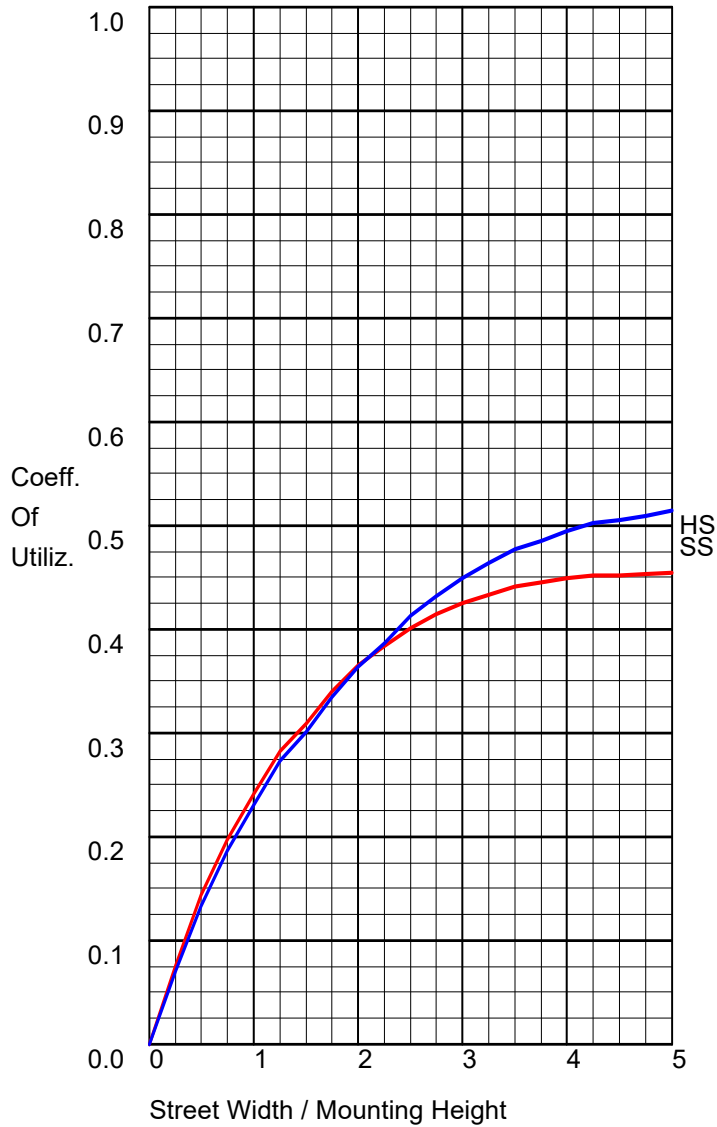


**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L111708102.IES**

**CANDELA TABULATION - (Cont.)**

<b>50.0</b>	133.89	136.51	126.89	124.54	124.20	130.12	140.88
<b>52.5</b>	137.86	139.81	127.77	127.90	128.77	134.09	154.34
<b>55.0</b>	140.95	143.24	130.52	130.59	132.88	137.86	154.74
<b>57.5</b>	143.24	145.26	130.32	132.27	135.30	134.29	144.65
<b>60.0</b>	151.52	154.14	138.80	137.59	141.49	137.52	136.58
<b>62.5</b>	168.07	170.08	146.47	146.87	149.36	138.53	125.95
<b>65.0</b>	210.05	213.88	179.91	181.45	183.47	154.27	142.23
<b>67.5</b>	305.52	314.00	262.73	259.36	263.54	212.54	214.76
<b>70.0</b>	422.45	388.74	326.78	326.58	327.99	256.27	196.73
<b>72.5</b>	506.62	423.06	363.45	365.06	362.57	213.41	99.98
<b>75.0</b>	535.75	413.71	374.01	377.31	375.49	298.52	72.39
<b>77.5</b>	487.65	356.79	338.42	344.00	340.30	237.23	46.96
<b>80.0</b>	364.52	278.88	244.77	242.48	224.92	153.87	38.75
<b>85.0</b>	69.37	37.74	60.01	63.45	20.32	20.25	23.28
<b>90.0</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

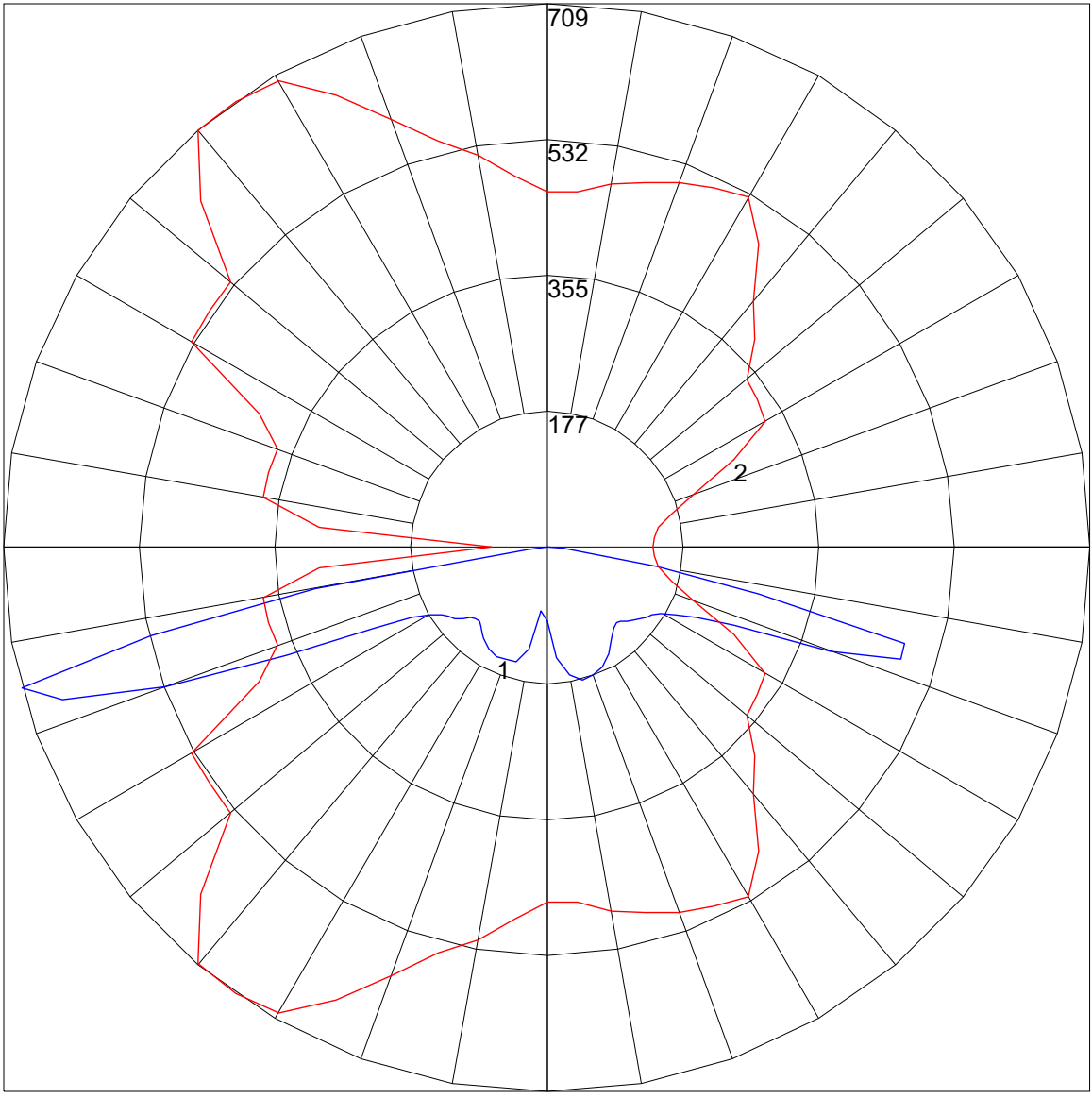
**COEFFICIENTS OF UTILIZATION**



**FLUX DISTRIBUTION**

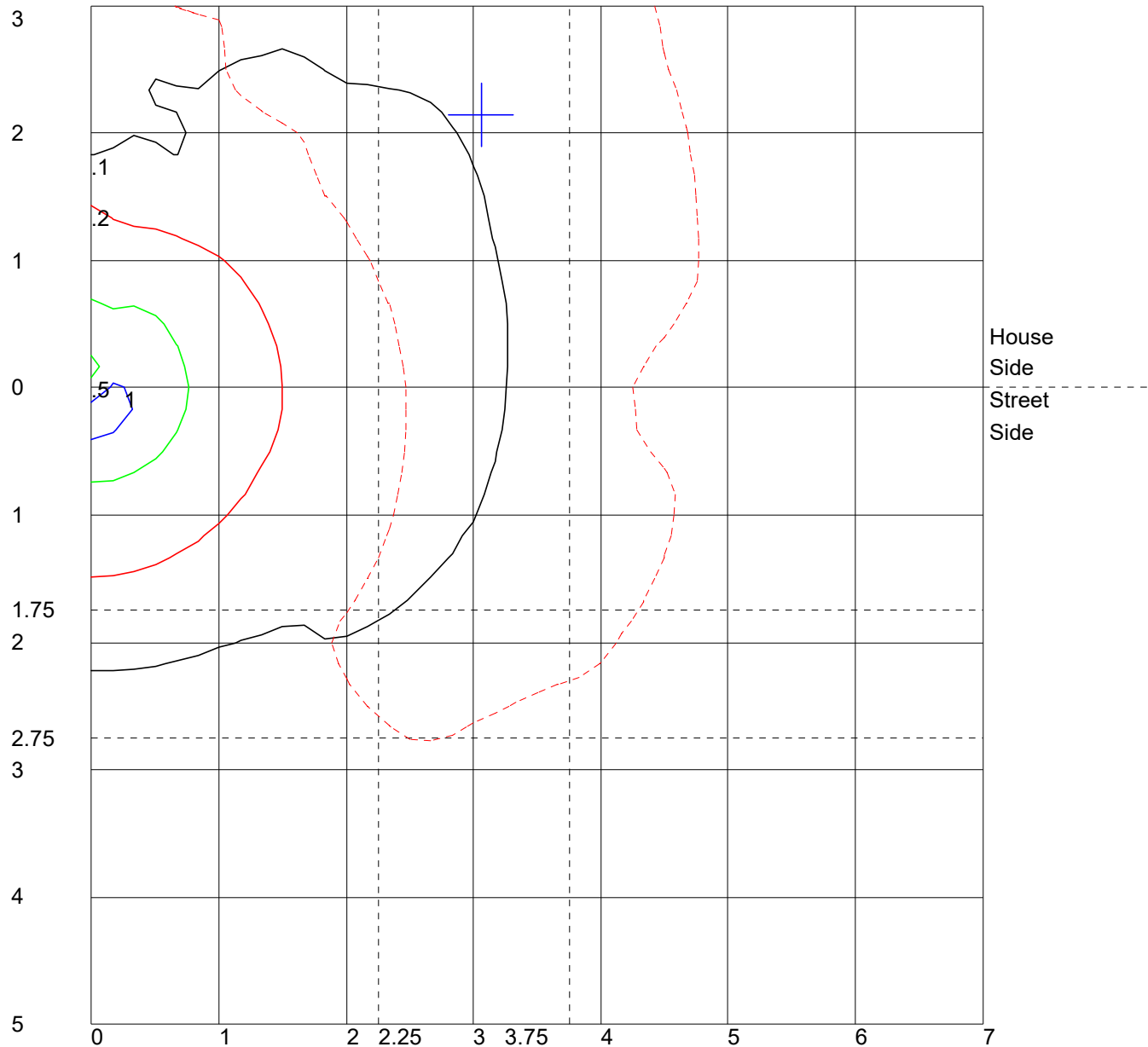
	Lumens	Percent Of Luminaire
Downward Street Side	536.8	46.1
Downward House Side	626.6	53.9
Downward Total	1163.4	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	1163.4	100.0

POLAR GRAPH



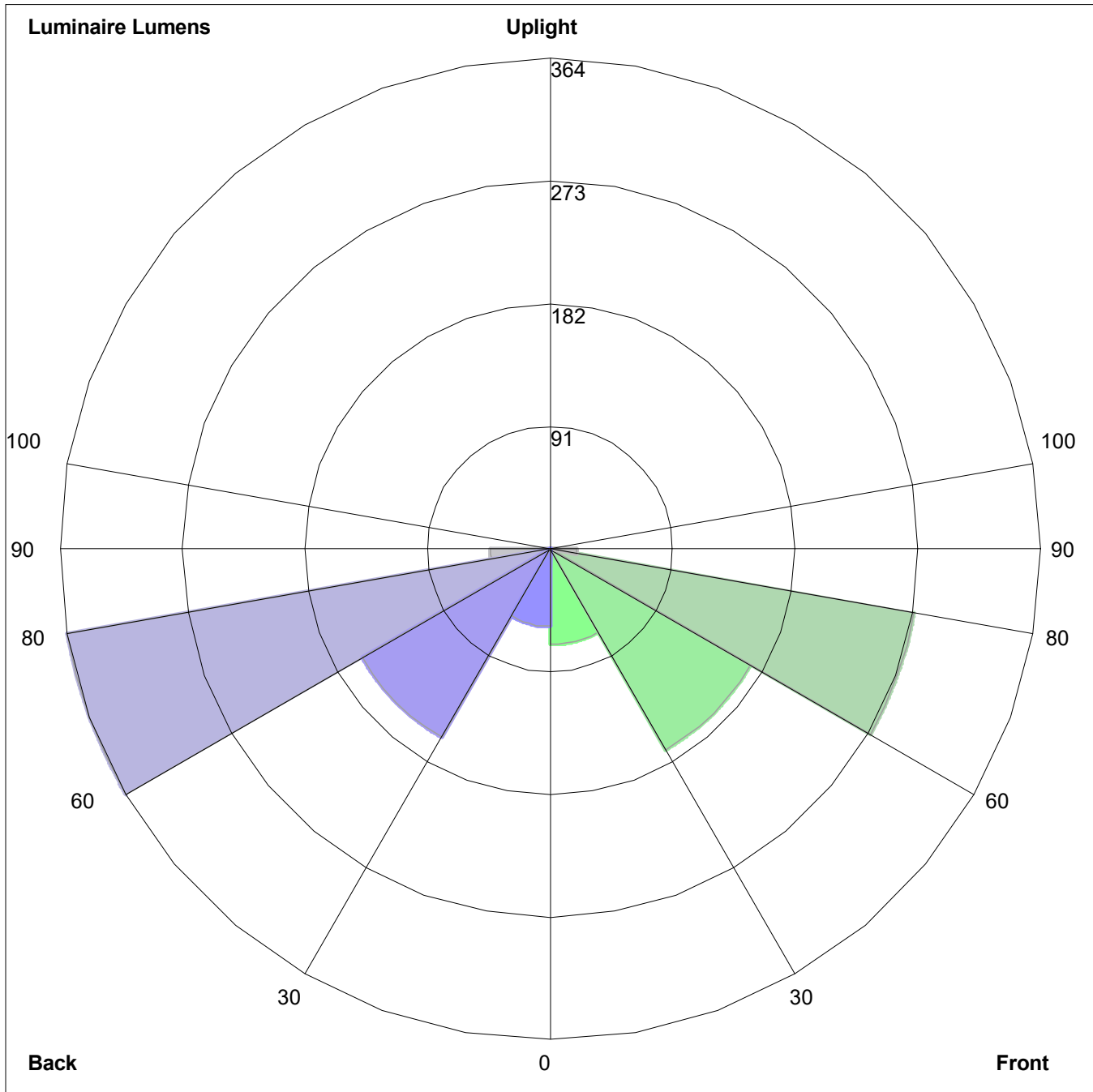
Maximum Candela = 709.47 Located At Horizontal Angle = 125, Vertical Angle = 75  
# 1 - Vertical Plane Through Horizontal Angles (125 - 305) (Through Max. Cd.)  
# 2 - Horizontal Cone Through Vertical Angle (75) (Through Max. Cd.)

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=71.0, Medium=171.9, High=274.4, Very High=19.6  
Back: Low=57.3, Medium=161.1, High=363.9, Very High=44.3  
Uplight: Low=0.0, High=0.0

BUG Rating : B1-U0-G1