

Report No: L111708103 **Issue Date:** 12/13/2017

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

Model Number: CPL316

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

Manufacturer:	CAST Lighting LLC.
Model Number:	CPL316
Driver Model Number:	CUSTOM LED DRIVER
Total Lumens:	1562.00
Input Voltage (VAC/60Hz):	24.00
Input Current (Amp):	0.76
Input Power (W):	15.74
Input Power Factor:	0.86
Current ATHD @ 24V(%):	49%
Efficacy:	99
Color Rendering Index (CRI):	69
Correlated Color Temperature (K):	4487
Chromaticity Coordinate x:	0.3642
Chromaticity Coordinate y:	0.3803
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:45
Total Operating Time (Hours):	1:15

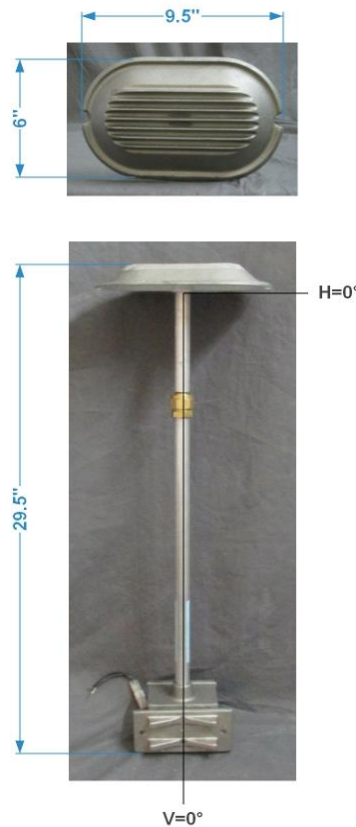
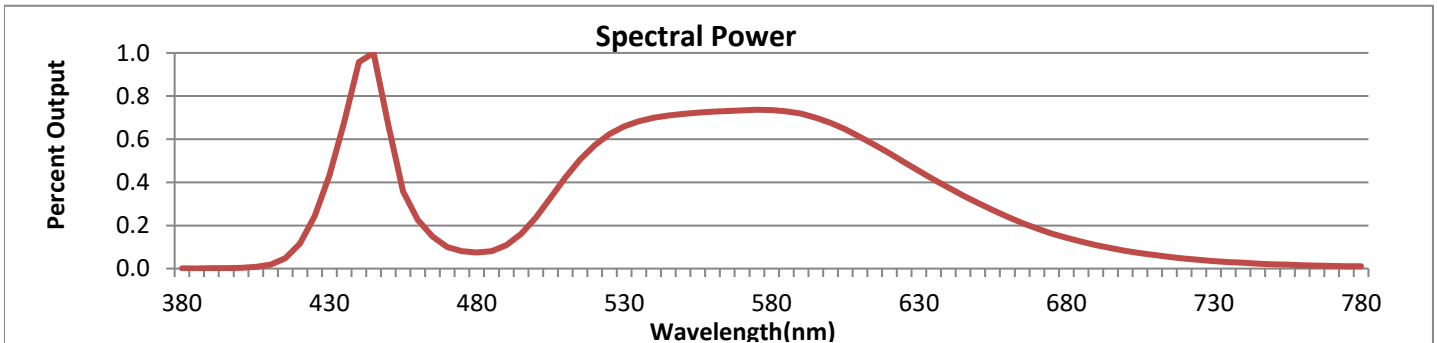


FIG. 1 LUMINAIRE

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



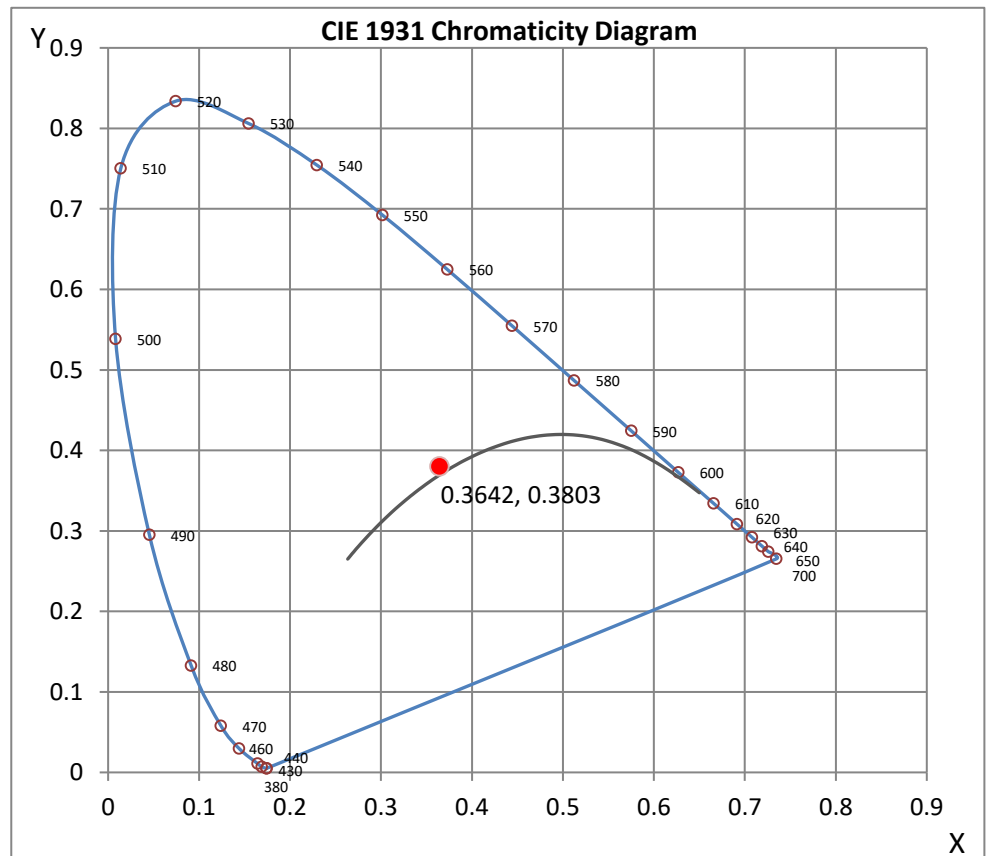
Wavelength	W/m ² nm	440	0.9580	510	0.4219	580	0.7351	650	0.3043	720	0.0470
380	0.0011	450	0.6655	520	0.5725	590	0.7182	660	0.2407	730	0.0353
390	0.0016	460	0.2265	530	0.6596	600	0.6762	670	0.1855	740	0.0268
400	0.0038	470	0.1006	540	0.6988	610	0.6111	680	0.1425	750	0.0204
410	0.0179	480	0.0749	550	0.7172	620	0.5340	690	0.1087	760	0.0155
420	0.1161	490	0.1083	560	0.7272	630	0.4536	700	0.0826	770	0.0119
430	0.4325	500	0.2366	570	0.7339	640	0.3759	710	0.0622	780	0.0103

CRI & CCT

x	0.3642
y	0.3803
u'	0.2131
v'	0.5007
CRI	69.40
CCT	4487
Duv	0.00681

R Values

R1	67.37
R2	73.01
R3	78.38
R4	71.55
R5	67.19
R6	63.50
R7	78.64
R8	55.54
R9	-31.45
R10	37.01
R11	69.39
R12	39.03
R13	67.21
R14	87.38



*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: 12*



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

Photometric Test Report

IES ROAD REPORT
PHOTOMETRIC FILENAME : L111708103.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L111708103
 [TESTLAB] LIGHT LABORATORY, INC. (www.lightlaboratory.com)
 [ISSUEDATE] 12/13/2017
 [MANUFAC] CAST Lighting LLC.
 [LUMCAT] CPL316
 [LUMINAIRE] Gen 3 Perimeter 16 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, 15.74W
 [TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

IES Classification	Type IV
Longitudinal Classification	Medium
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1562
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	99
Total Luminaire Watts	15.74
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	787.82
Maximum Candela Angle	55H 75V
Maximum Candela (<90 Degrees Vertical)	787.82
Maximum Candela Angle (<90 Degrees Vertical)	55H 75V
Maximum Candela At 90 Degrees Vertical	0 (0.0% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	329.07 (21.1% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L111708103.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	85.8	N.A.	5.5
FM - Front-Medium (30-60)	226.3	N.A.	14.5
FH - Front-High (60-80)	425.8	N.A.	27.3
FVH - Front-Very High (80-90)	43.3	N.A.	2.8
BL - Back-Low (0-30)	85.8	N.A.	5.5
BM - Back-Medium (30-60)	226.3	N.A.	14.5
BH - Back-High (60-80)	425.8	N.A.	27.3
BVH - Back-Very High (80-90)	43.3	N.A.	2.8
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	1562.4	N.A.	100.0
BUG Rating	B1-U0-G1		

ZONAL LUMEN SUMMARY

Zone	%
0-20	4.7
0-30	11
0-40	18.5
0-60	39.9
0-80	94.5
0-90	100
10-90	99.1
20-40	13.8
20-50	22.9
40-70	42.3
60-80	54.5
70-80	33.6
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 : L111708103.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	110.58	110.58	110.58	110.58	110.58	110.58	110.58	110.58	110.58	110.58
5.0	115.05	115.96	118.14	120.57	123.36	126.18	129.01	131.63	135.70	137.96
10.0	152.73	155.15	159.32	162.08	167.86	172.74	176.07	180.75	187.34	193.23
15.0	196.79	197.00	195.11	195.11	197.47	200.87	207.32	212.81	217.21	222.66
20.0	206.82	208.20	208.94	207.86	204.50	205.31	208.80	212.27	220.51	221.76
25.0	217.85	209.17	205.64	202.95	201.27	203.83	205.71	204.70	213.41	216.78
30.0	206.01	191.68	188.62	188.32	188.75	192.89	194.78	194.74	201.98	203.99
35.0	197.00	181.39	180.04	180.48	181.69	187.64	184.75	186.30	188.92	190.94
37.5	191.68	176.71	175.60	176.48	178.39	182.90	182.13	181.72	183.84	185.66
40.0	189.12	172.94	171.90	173.72	175.64	180.98	180.28	177.28	181.82	181.76
42.5	186.37	170.59	169.92	172.14	173.95	180.61	179.34	177.18	180.21	181.08
45.0	190.81	172.71	172.10	174.32	175.60	184.48	180.71	179.71	183.71	184.08
47.5	202.18	179.81	179.07	180.41	181.22	190.40	185.79	186.03	191.45	192.02
50.0	212.34	187.71	186.50	186.74	186.80	197.03	192.19	193.57	200.46	201.27
52.5	221.96	194.64	193.36	192.93	192.08	203.96	199.89	199.12	210.62	210.15
55.0	228.95	201.07	200.33	198.71	197.10	209.68	206.99	204.43	220.01	217.31
57.5	232.39	206.82	207.09	204.50	201.94	215.87	214.52	211.06	226.20	223.44
60.0	223.71	218.26	219.27	216.31	213.24	229.73	228.62	223.50	232.86	240.02
62.5	235.21	234.10	236.69	235.31	232.62	252.84	250.45	243.99	250.11	262.02
65.0	249.21	246.75	254.92	254.79	256.14	286.51	289.71	287.25	288.73	304.24
67.5	264.07	263.97	284.36	290.62	296.50	341.82	355.07	376.13	377.24	416.43
70.0	308.48	333.17	359.04	357.26	359.51	420.53	443.71	464.37	492.79	583.15
72.5	283.99	386.96	429.52	437.66	440.95	482.03	531.51	540.33	560.17	668.19
75.0	128.30	291.66	336.33	353.62	374.99	431.43	576.76	594.02	598.56	675.46
77.5	61.70	204.87	255.33	259.87	265.89	292.43	422.62	447.88	473.55	542.61
80.0	53.02	142.84	187.51	195.15	198.21	203.83	284.86	285.07	264.81	292.20
85.0	26.51	26.91	27.42	52.85	49.99	36.97	56.01	48.61	38.89	33.88
90.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

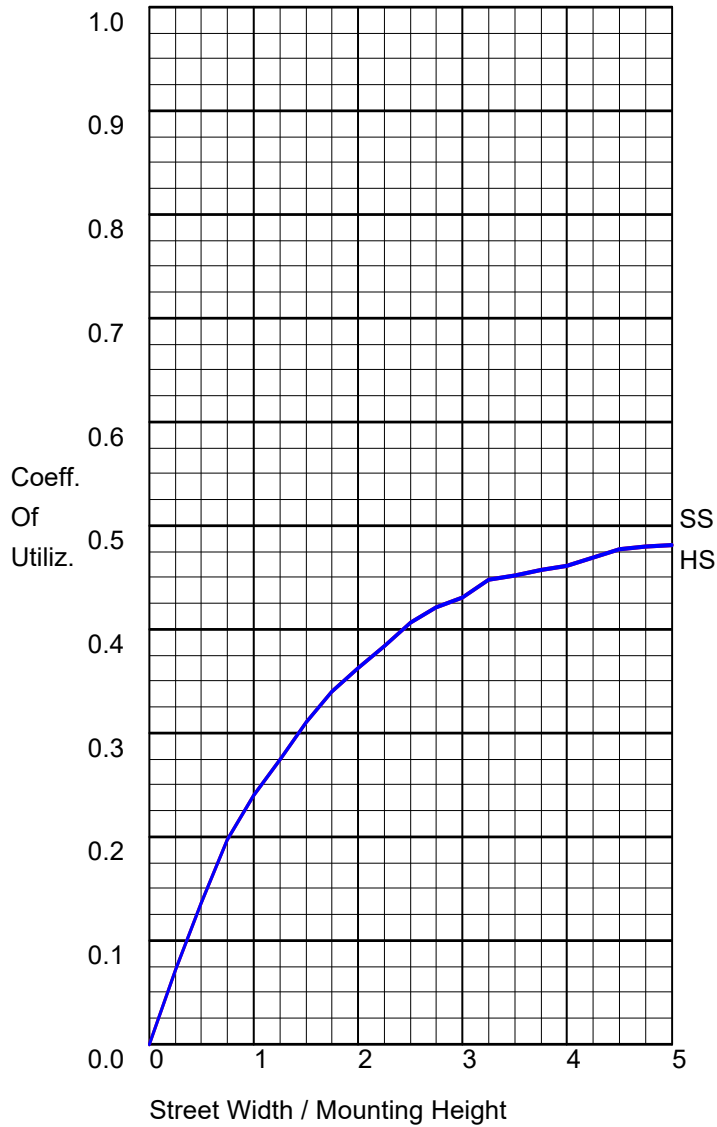
Vert. Angles	Horizontal Angles									
	<u>50</u>	<u>55</u>	<u>60</u>	<u>65</u>	<u>70</u>	<u>75</u>	<u>80</u>	<u>85</u>	<u>90</u>	
0.0	110.58	110.58	110.58	110.58	110.58	110.58	110.58	110.58	110.58	
5.0	140.28	143.24	145.66	147.61	149.53	152.83	153.43	153.30	151.52	
10.0	199.72	204.63	206.35	206.15	205.57	207.02	209.21	210.12	210.25	
15.0	225.96	225.86	224.98	223.03	220.81	218.63	216.61	215.70	214.83	
20.0	225.79	227.95	226.33	222.83	220.11	219.20	217.82	216.20	217.92	
25.0	220.24	222.02	224.41	225.86	223.47	223.10	222.80	222.70	224.92	
30.0	205.47	206.35	208.30	211.06	210.55	208.60	209.65	211.26	215.57	
35.0	190.84	189.19	189.53	191.85	190.94	189.39	187.44	187.41	190.13	
37.5	184.99	184.89	184.28	185.46	182.36	181.35	180.24	180.61	181.93	
40.0	181.49	181.29	179.77	180.55	177.05	176.17	174.46	175.26	176.95	
42.5	179.94	179.30	177.79	178.90	175.53	173.41	171.53	171.87	173.31	
45.0	183.37	182.26	181.56	183.17	179.54	177.22	175.50	175.77	177.69	
47.5	190.81	189.80	191.31	190.57	189.70	186.30	186.10	185.49	188.52	
50.0	200.90	199.18	203.05	201.40	203.25	199.52	200.29	200.70	203.86	
52.5	212.13	206.89	214.05	210.32	214.35	210.86	211.33	215.67	216.37	
55.0	219.97	214.39	223.24	218.26	220.14	222.13	221.86	226.87	226.60	
57.5	226.26	222.23	232.18	228.18	229.39	235.21	232.79	238.27	238.10	
60.0	240.56	238.00	248.20	244.63	245.34	254.02	250.62	254.96	254.39	
62.5	265.02	263.00	270.84	270.70	271.81	282.17	280.63	282.78	281.70	
65.0	310.50	310.97	316.28	321.50	319.11	329.98	334.42	332.70	330.75	
67.5	425.08	416.63	425.71	436.18	434.43	446.30	460.90	461.95	460.87	

IES ROAD REPORT
PHOTOMETRIC FILENAME : L111708103.IES

CANDELA TABULATION - (Cont.)

70.0	587.79	601.01	606.46	621.87	626.78	633.07	652.18	649.42	645.48
72.5	691.27	729.96	734.33	730.73	766.05	760.23	787.71	782.90	778.77
75.0	701.06	787.82	776.11	726.42	730.56	682.69	676.37	629.94	610.84
77.5	561.49	556.44	525.12	519.40	548.33	531.98	542.65	439.84	410.48
80.0	329.07	304.14	286.68	277.36	279.28	261.38	252.74	228.42	221.82
85.0	31.96	31.62	31.62	31.79	31.99	32.16	32.70	33.00	33.30
90.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

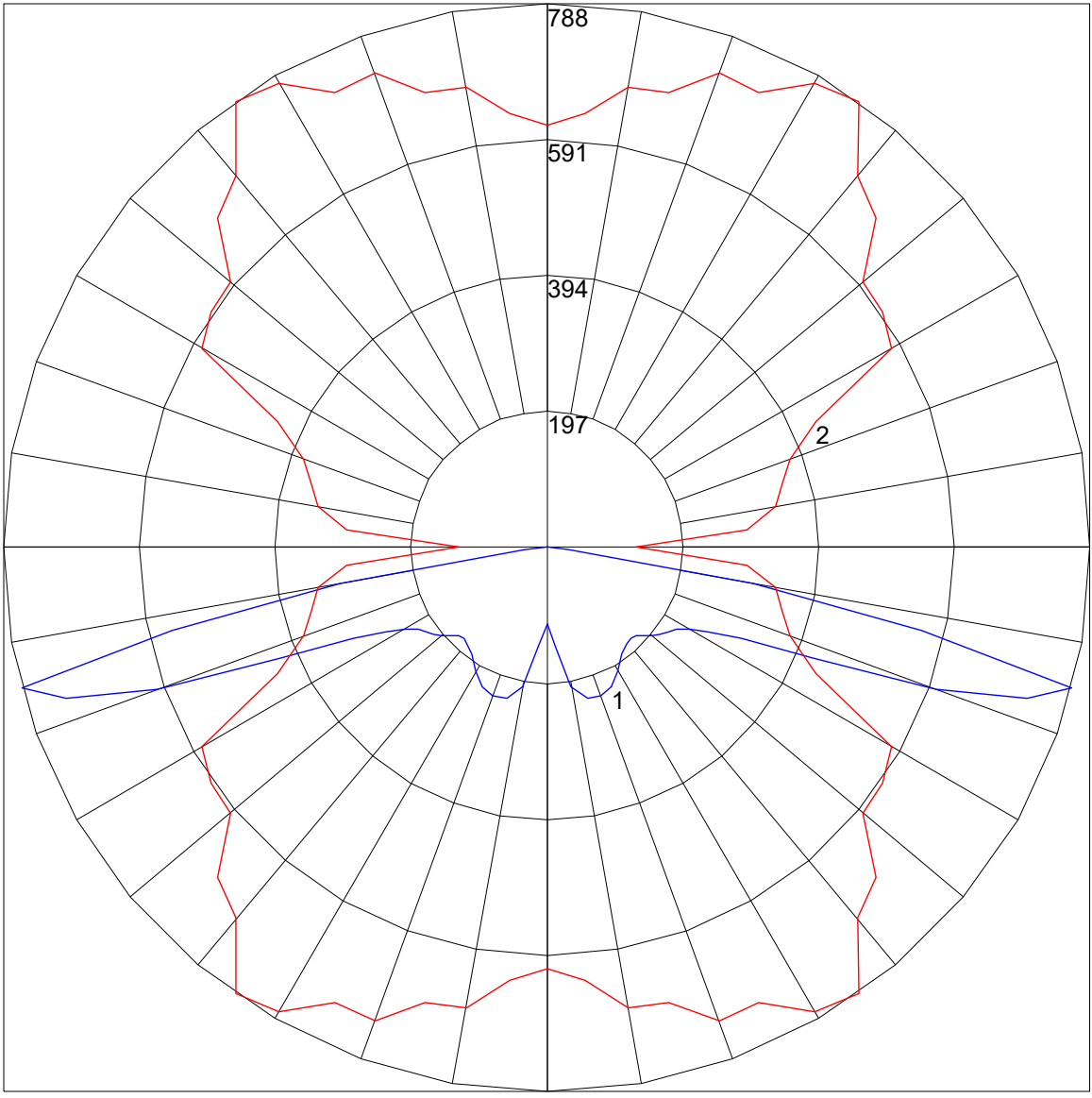
COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

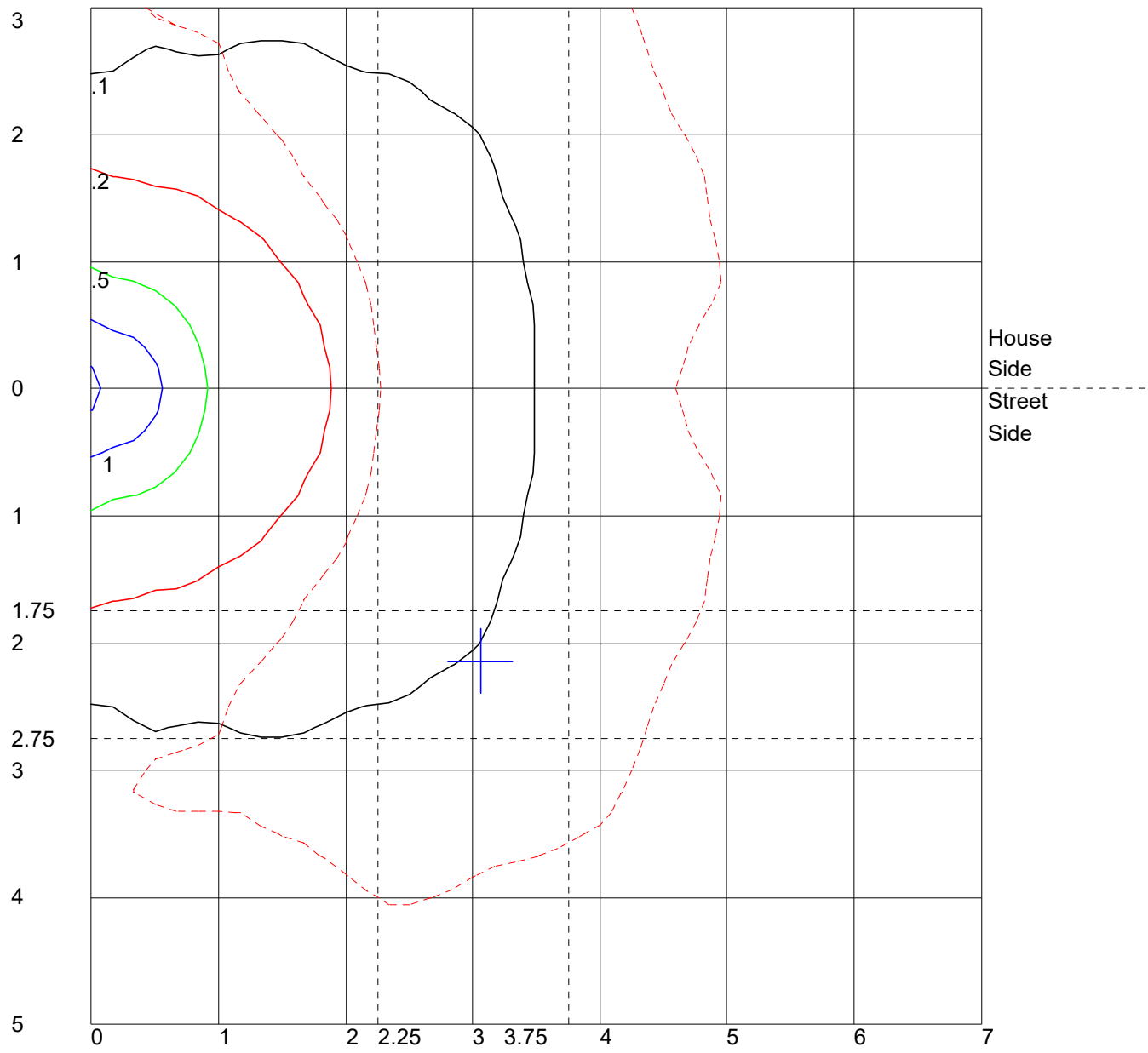
	Lumens	Percent Of Luminaire
Downward Street Side	781.0	50.0
Downward House Side	781.0	50.0
Downward Total	1562.0	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	1562.0	100.0

POLAR GRAPH



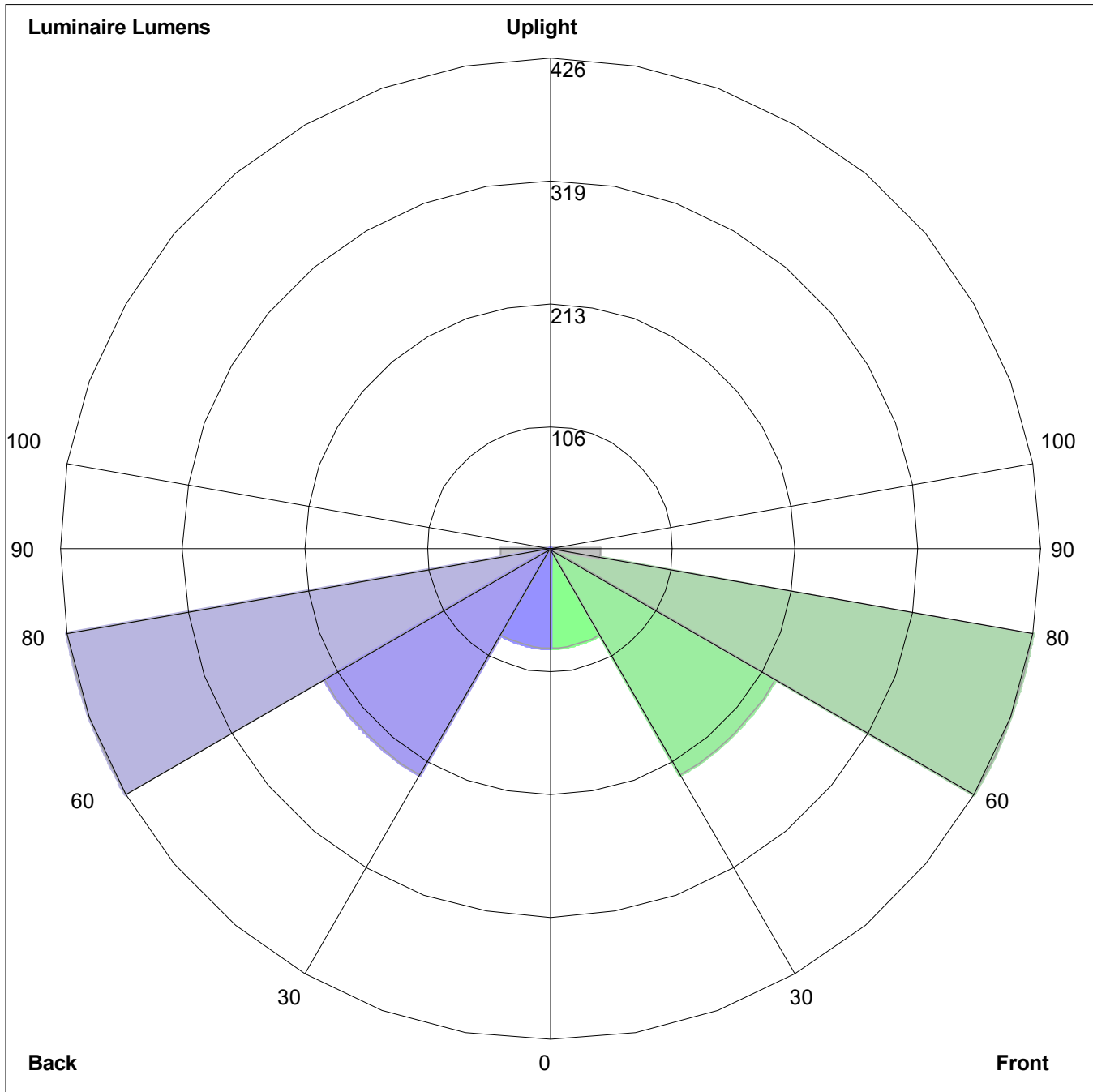
Maximum Candela = 787.82 Located At Horizontal Angle = 55, Vertical Angle = 75
1 - Vertical Plane Through Horizontal Angles (55 - 235) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (75) (Through Max. Cd.)

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=85.8, Medium=226.3, High=425.8, Very High=43.3
Back: Low=85.8, Medium=226.3, High=425.8, Very High=43.3
Uplight: Low=0.0, High=0.0

BUG Rating : B1-U0-G1