



8165 E Kaiser Blvd. Anaheim, CA 92808  
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Report No: L091604010R01

Date: 11/3/2016



NVLAP LAB CODE 200927-0

**Report No:** L091604010R01

**Report Prepared For:** Leotek Electronics USA, LLC  
 1955 Lundy Ave, San Jose, 95131

**Model Number:** GCJ0-15H-MV-CW-5-XX-490

**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 GCJ0-15H-MV-CW-5-XX-490 . Received in working and undamaged condition. No modifications were necessary.

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

**Sample Arrival Date:** 9/12/16

**Date of Tests:** 9/24/16 - 9/24/16

**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.

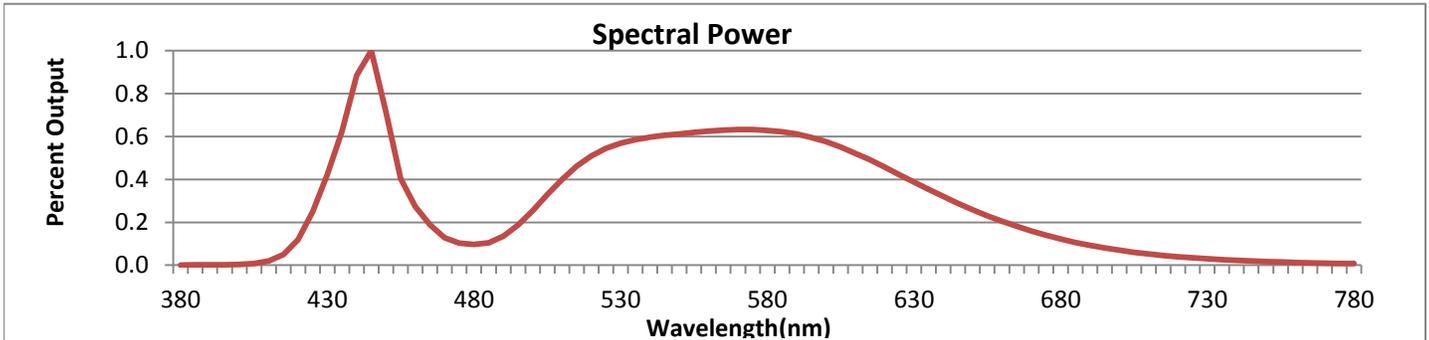
**Test Summary**

<b>Manufacturer:</b>	Leotek Electronics USA, LLC	
<b>Model Number:</b>	GCJ0-15H-MV-CW-5-XX-490	
<b>Driver Model Number:</b>	LITEON PA-1600-31SL	
<b>Total Lumens:</b>	3079.00	
<b>Input Voltage (VAC/60Hz):</b>	120.00	
<b>Input Current (Amp):</b>	0.21	
<b>Input Power (W):</b>	24.27	
<b>Input Power Factor:</b>	0.98	
<b>Current ATHD @ 120V(%):</b>	13%	
<b>Current ATHD @ 240V(%):</b>	17% (0.11A, 23.69W, 0.93PF)	
<b>Efficacy:</b>	127	
<b>Color Rendering Index (CRI):</b>	72	
<b>Correlated Color Temperature (K):</b>	4844	
<b>Chromaticity Coordinate x:</b>	0.3506	
<b>Chromaticity Coordinate y:</b>	0.3631	
<b>Ambient Temperature (°C):</b>	25.0	
<b>Stabilization Time (Hours):</b>	0:35	
<b>Total Operating Time (Hours):</b>	1:25	
<b>Off State Power(W):</b>	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.



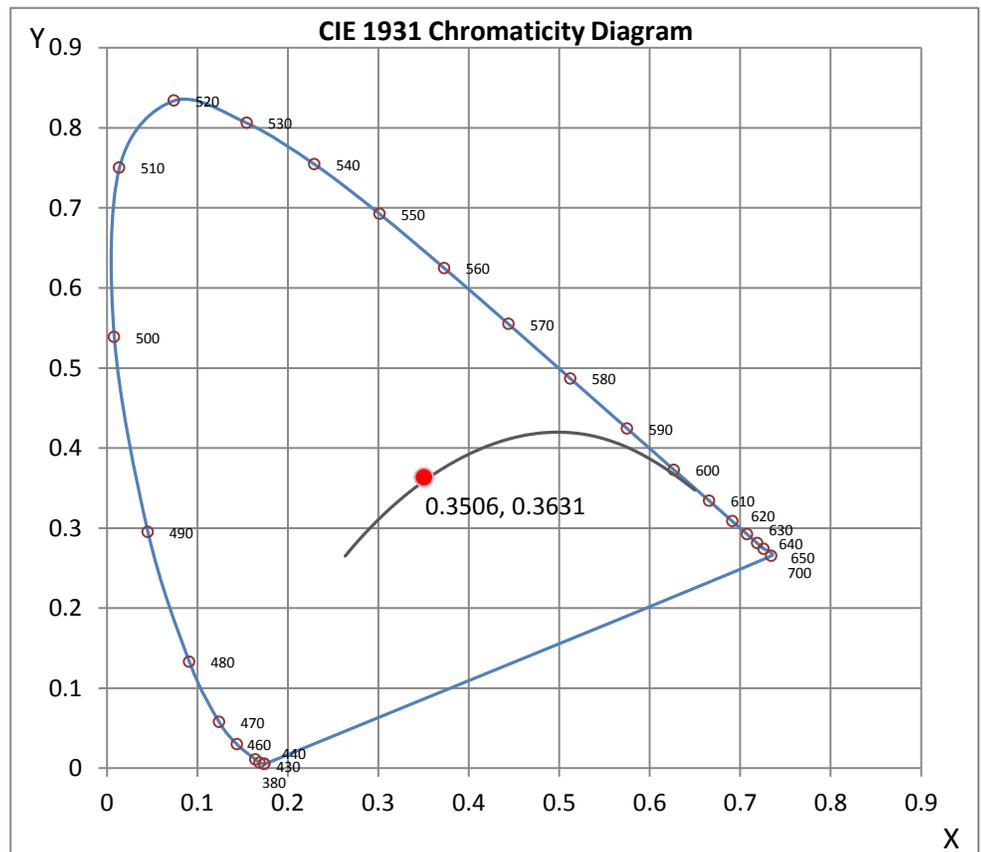
Wavelength	W/m <sup>2</sup> nm	440	0.8842	510	0.4004	580	0.6286	650	0.2589	720	0.0394
380	0.0011	450	0.7143	520	0.5102	590	0.6116	660	0.2050	730	0.0296
390	0.0016	460	0.2736	530	0.5690	600	0.5757	670	0.1590	740	0.0222
400	0.0039	470	0.1278	540	0.5970	610	0.5217	680	0.1218	750	0.0169
410	0.0192	480	0.0973	550	0.6122	620	0.4576	690	0.0928	760	0.0127
420	0.1193	490	0.1349	560	0.6256	630	0.3878	700	0.0698	770	0.0097
430	0.4233	500	0.2549	570	0.6323	640	0.3204	710	0.0523	780	0.0085

**CRI & CCT**

x	0.3506
y	0.3631
u'	0.2107
v'	0.4910
CRI	72.30
CCT	4844
Duv	0.00354

**R Values**

R1	70.79
R2	75.60
R3	79.86
R4	74.29
R5	71.10
R6	67.30
R7	80.08
R8	59.54
R9	-21.38
R10	42.79
R11	73.05
R12	45.57
R13	70.63
R14	88.22



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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 : JEFF AHN

Test Report Released by:

Test Report Reviewed by:

Jeff Ahn  
 Engineering Manager

Steve Kang  
 Quality Assurance

*\*Attached are photometric data reports. Total number of pages: 12*

*\*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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# Photometric Test Report

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L091604010.IES**

**DESCRIPTIVE INFORMATION (From Photometric File)**

IESNA:LM-63-2002  
 [TEST] L091604010  
 [TESTLAB] LIGHT LABORATORY, INC.  
 [ISSUEDATE] 9/26/2016  
 [MANUFAC] Leotek Electronics USA, LLC  
 [LUMCAT] GCJ0-15H-MV-CW-5-XX-490  
 [LUMINAIRE] 18.25"L. X 9.5"W. X 4.5"H. LED STREET LIGHT  
 [BALLASTCAT] LITEON PA-1600-31SL  
 [OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND  
 [MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.  
 [\_INPUT] 120VAC, 24.27W  
 [\_TEST PROCEDURE] IESNA:LM-79-08

**CHARACTERISTICS**

IES Classification	Type VS
Longitudinal Classification	Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	3079
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	127
Total Luminaire Watts	24.27
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	1314
Maximum Candela Angle	50H 65V
Maximum Candela (<90 Degrees Vertical)	1314
Maximum Candela Angle (<90 Degrees Vertical)	50H 65V
Maximum Candela At 90 Degrees Vertical	0 (0.0% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	39 (1.3% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L091604010.IES**

**LUMINAIRE CLASSIFICATION SYSTEM (LCS)**

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	172.9	N.A.	5.6
FM - Front-Medium (30-60)	758.6	N.A.	24.6
FH - Front-High (60-80)	602.7	N.A.	19.6
FVH - Front-Very High (80-90)	5.2	N.A.	0.2
BL - Back-Low (0-30)	172.9	N.A.	5.6
BM - Back-Medium (30-60)	758.6	N.A.	24.6
BH - Back-High (60-80)	602.7	N.A.	19.6
BVH - Back-Very High (80-90)	5.2	N.A.	0.2
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>3078.8</b>	<b>N.A.</b>	<b>100.0</b>
<b>BUG Rating</b>	<b>B2-U0-G0</b>		

**ZONAL LUMEN SUMMARY**

Zone	%
0-20	4.4
0-30	11.2
0-40	21.7
0-60	60.5
0-80	99.7
0-90	100
10-90	99
20-40	17.3
20-50	32.2
40-70	69.4
60-80	39.1
70-80	8.5
80-90	0.3
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 : L091604010.IES**

**CANDELA TABULATION**

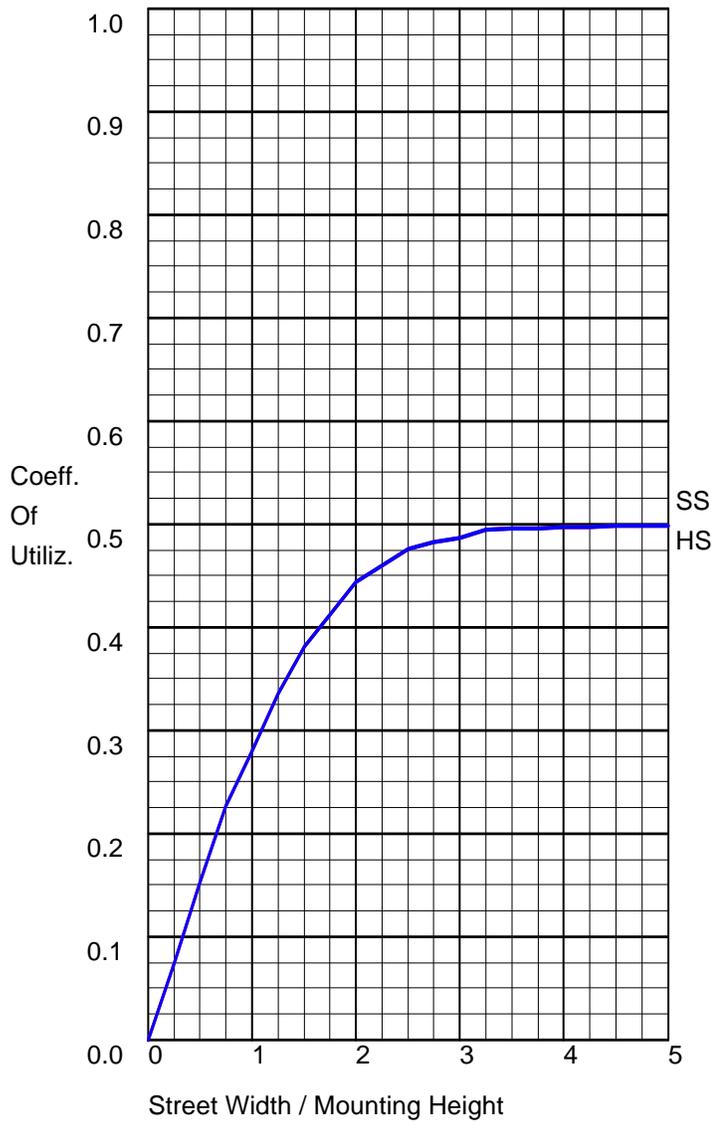
Vert. Angles	Horizontal Angles									
	<u>0</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>
0.0	291	291	291	291	291	291	291	291	291	291
2.5	296	295	295	294	294	295	296	296	295	295
5.0	305	306	305	304	304	304	305	306	304	305
7.5	317	318	317	317	317	318	318	318	318	319
10.0	330	331	332	331	331	333	334	334	335	337
12.5	344	345	346	346	347	349	352	353	355	356
15.0	363	362	362	363	364	367	371	374	376	376
17.5	377	378	378	379	383	387	390	394	398	398
20.0	396	396	396	398	404	406	410	416	421	420
22.5	415	415	417	421	426	430	435	440	444	444
25.0	433	433	435	440	447	454	461	470	476	478
27.5	450	449	451	456	465	472	484	498	512	521
30.0	463	462	463	471	481	489	503	518	533	542
32.5	472	471	474	480	493	504	516	529	541	550
35.0	480	481	486	492	503	513	526	538	549	554
37.5	489	492	498	502	514	524	537	549	559	561
40.0	505	507	511	516	529	538	548	561	570	573
42.5	527	526	530	533	547	555	564	576	585	590
45.0	559	557	558	562	575	580	588	600	609	612
47.5	592	592	594	600	613	621	628	640	647	648
50.0	628	630	635	642	657	671	682	697	707	709
52.5	681	683	690	701	717	736	756	772	790	797
55.0	738	741	751	772	794	821	849	876	898	909
56.0	751	754	765	792	823	858	891	924	949	960
57.0	758	760	773	806	841	888	935	974	1000	1012
58.0	757	759	776	812	855	917	975	1022	1052	1064
59.0	752	755	777	812	863	929	1007	1070	1105	1118
60.0	754	758	778	809	860	933	1019	1104	1156	1169
61.0	763	767	788	813	860	933	1026	1123	1196	1215
62.0	779	783	803	826	868	930	1024	1128	1222	1257
63.0	800	805	822	842	879	929	1015	1123	1225	1285
64.0	809	816	833	853	891	939	1015	1112	1217	1296
65.0	802	809	826	852	894	945	1013	1100	1201	1286
66.0	784	792	806	833	874	933	1008	1094	1186	1261
67.0	753	760	776	802	841	898	984	1074	1163	1237
68.0	712	719	734	758	797	855	946	1034	1125	1186
69.0	662	671	687	713	746	804	893	988	1082	1127
70.0	561	570	593	634	679	742	829	928	1027	1047
71.0	427	438	465	507	557	639	746	854	947	945
72.0	303	311	328	363	414	500	606	746	833	840
73.0	208	216	234	258	292	352	456	585	670	709
74.0	120	129	152	175	199	242	310	402	492	540
75.0	59	63	80	104	125	155	197	252	321	381
76.0	37	38	46	60	71	89	114	151	192	234
77.0	29	29	33	39	44	52	62	83	110	125
78.0	23	23	25	29	32	36	40	48	58	69
79.0	19	19	21	24	26	28	30	34	41	48
80.0	17	17	18	20	23	23	24	26	31	39
82.5	12	13	13	14	14	15	15	15	16	16
85.0	9	9	10	10	10	10	9	9	9	8
87.5	7	7	7	7	7	7	7	6	6	5
90.0	0	0	0	0	0	0	0	0	0	0

**IES ROAD REPORT**  
**PHOTOMETRIC FILENAME : L091604010.IES**

**CANDELA TABULATION - (Cont.)**

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	291	291	291	291	291	291	291	291	291
2.5	296	297	296	295	296	296	296	296	296
5.0	306	307	306	305	305	304	306	305	305
7.5	319	320	319	318	317	317	317	317	316
10.0	336	335	333	332	331	331	330	331	330
12.5	356	353	352	350	348	346	345	345	346
15.0	376	373	371	368	365	363	361	361	361
17.5	397	395	390	386	384	381	380	378	378
20.0	418	418	413	407	403	400	399	396	395
22.5	444	442	438	432	427	422	419	416	415
25.0	477	472	466	458	449	442	437	435	433
27.5	514	500	488	478	467	458	454	451	451
30.0	536	519	505	494	484	474	467	464	463
32.5	546	531	519	507	498	487	479	475	473
35.0	552	542	530	519	510	497	489	483	482
37.5	562	554	543	531	522	510	502	495	492
40.0	572	566	556	546	536	524	515	510	508
42.5	587	580	571	560	552	541	534	531	530
45.0	609	603	596	587	579	567	561	559	560
47.5	645	639	633	625	614	604	596	592	591
50.0	703	695	686	677	662	649	637	632	630
52.5	790	773	756	742	723	707	694	686	685
55.0	902	876	848	823	798	777	761	751	751
56.0	952	923	888	859	831	807	789	778	778
57.0	1005	974	933	899	865	838	818	807	806
58.0	1057	1022	976	935	898	870	848	835	834
59.0	1106	1071	1019	973	933	902	878	864	861
60.0	1156	1118	1063	1010	964	932	907	892	890
61.0	1201	1159	1100	1043	993	960	935	920	919
62.0	1240	1193	1130	1074	1021	987	958	940	937
63.0	1273	1222	1156	1095	1040	997	963	938	933
64.0	1302	1246	1176	1104	1034	975	927	894	887
65.0	1314	1255	1174	1082	987	909	858	828	822
66.0	1301	1248	1137	1011	901	832	794	772	768
67.0	1262	1201	1054	918	827	775	750	733	731
68.0	1177	1073	949	843	761	722	697	679	677
69.0	1063	934	861	774	702	660	636	619	617
70.0	941	823	772	694	626	584	556	538	534
71.0	825	719	656	603	529	479	441	415	409
72.0	734	619	532	473	403	348	307	284	277
73.0	616	494	396	329	277	235	199	182	176
74.0	472	376	269	212	187	163	133	112	107
75.0	331	247	174	138	120	100	71	57	55
76.0	199	151	106	80	67	57	43	36	34
77.0	110	87	63	48	42	37	30	26	26
78.0	63	54	42	34	29	27	22	20	20
79.0	44	38	32	27	23	21	17	16	15
80.0	35	30	26	22	19	16	14	13	13
82.5	16	15	13	11	10	9	9	9	9
85.0	8	7	7	7	7	7	7	7	7
87.5	5	5	5	5	6	5	5	5	5
90.0	0	0	0	0	0	0	0	0	0

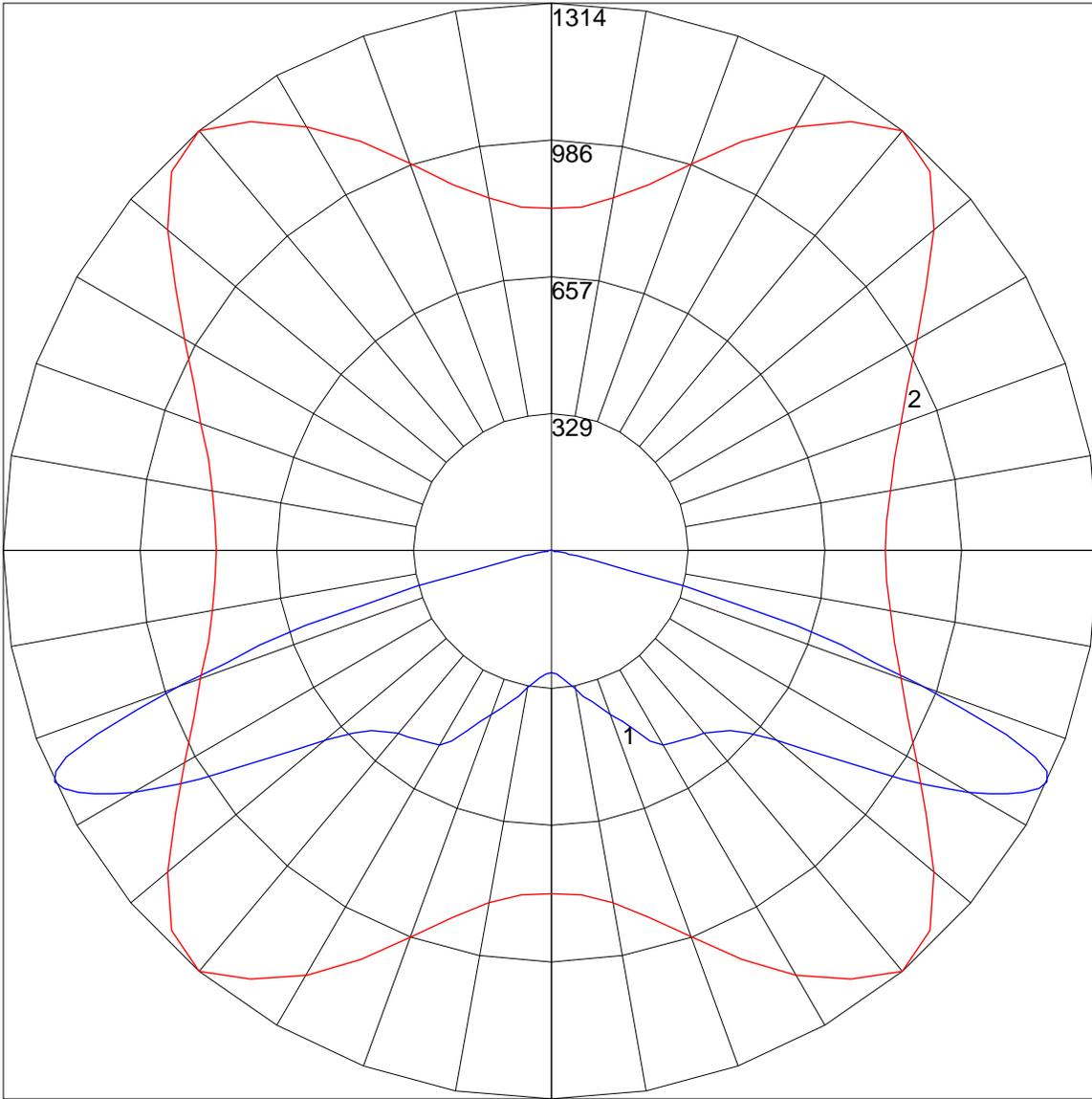
**COEFFICIENTS OF UTILIZATION**



**FLUX DISTRIBUTION**

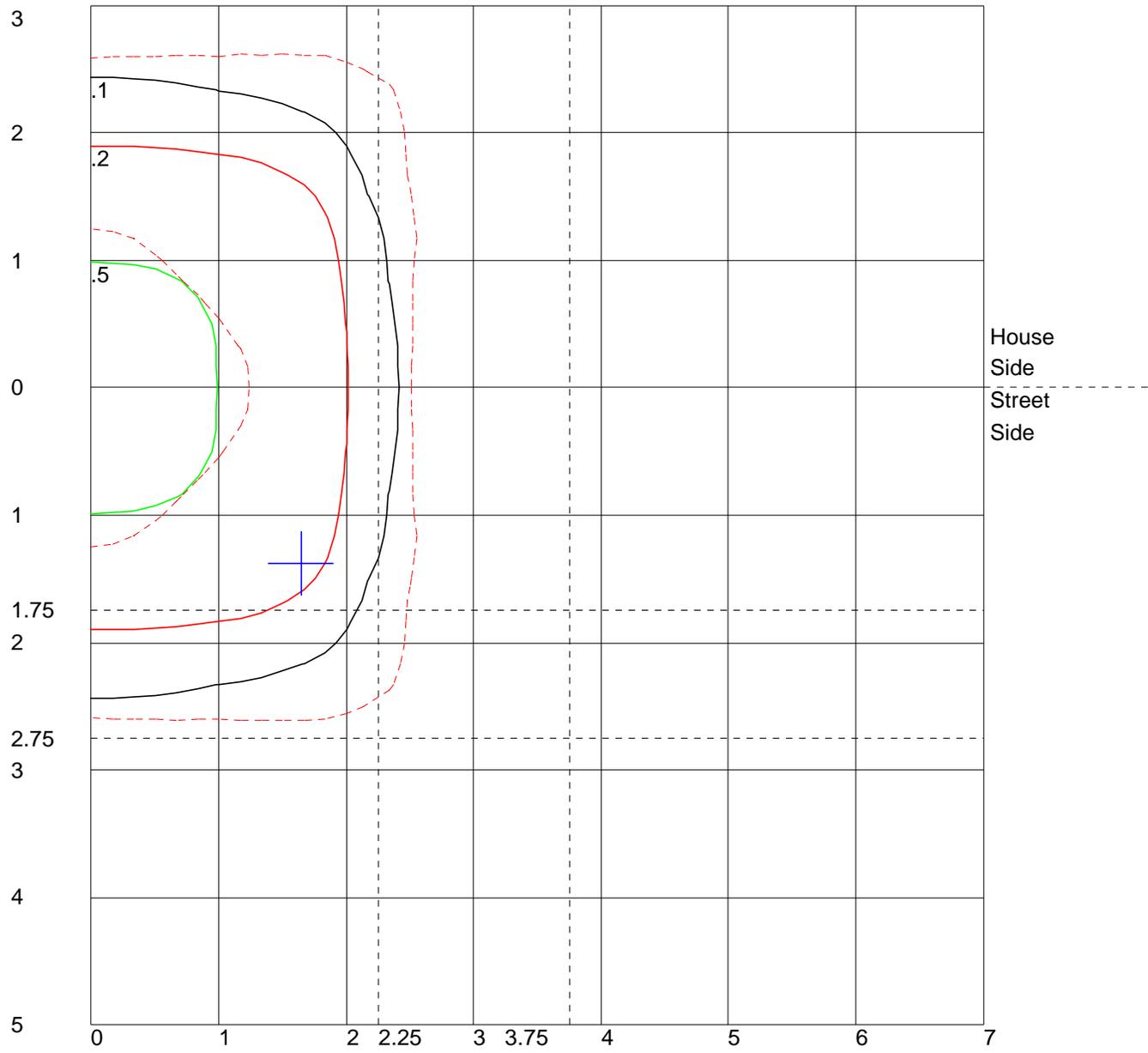
	Lumens	Percent Of Luminaire
Downward Street Side	1539.5	50.0
Downward House Side	1539.5	50.0
Downward Total	3079.0	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
<b>Total Flux</b>	<b>3079.0</b>	<b>100.0</b>

POLAR GRAPH



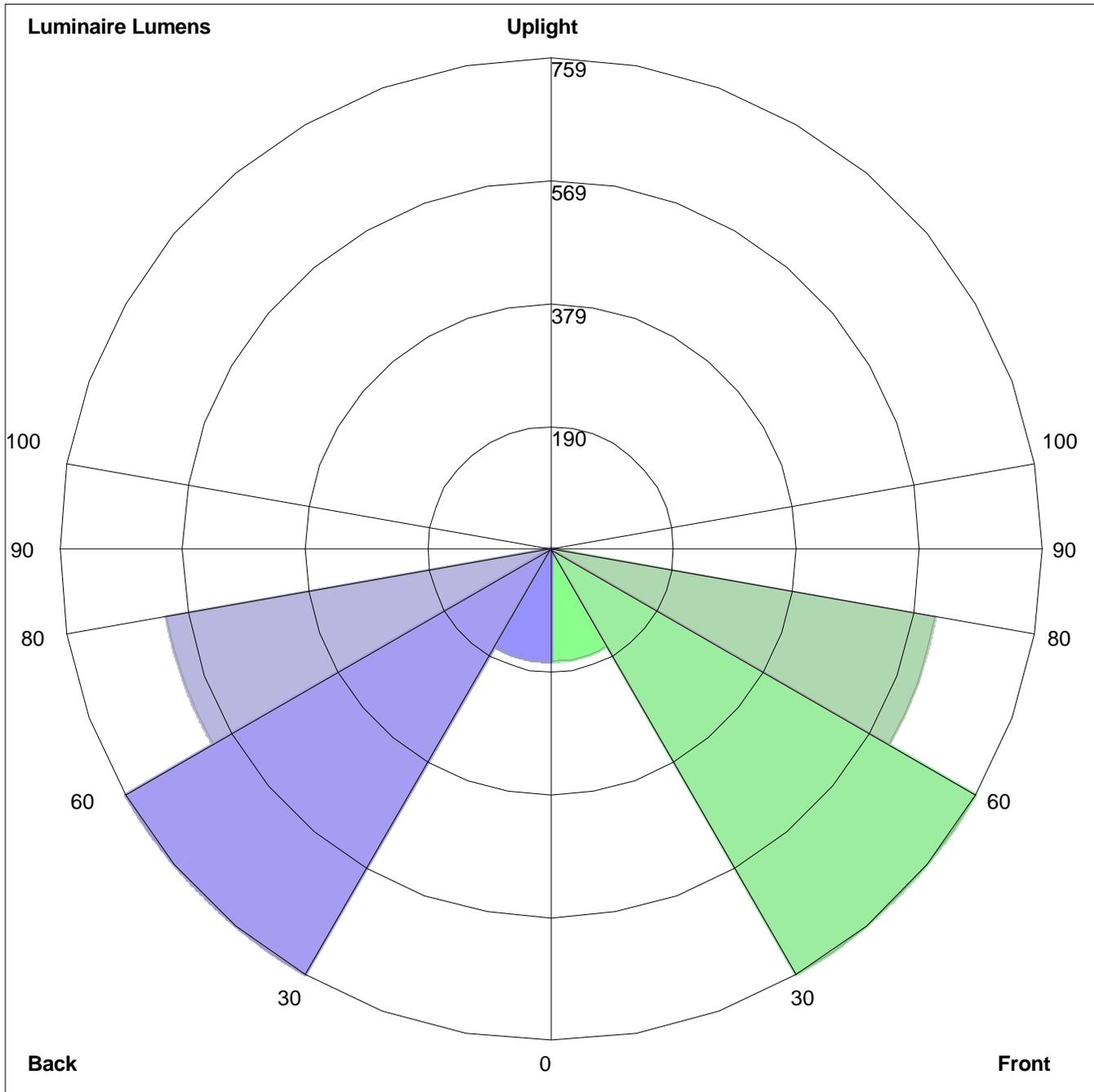
Maximum Candela = 1314 Located At Horizontal Angle = 50, Vertical Angle = 65  
# 1 - Vertical Plane Through Horizontal Angles (50 - 230) (Through Max. Cd.)  
# 2 - Horizontal Cone Through Vertical Angle (65) (Through Max. Cd.)

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



Distance In Units Of Mounting Height  
 Values Based On 20 Foot Mounting Height  
 1/2 Maximum Candela Trace Shown As Dashed Curve  
 (+) = Maximum Candela Point

LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:  
Front: Low=172.9, Medium=758.6, High=602.7, Very High=5.2  
Back: Low=172.9, Medium=758.6, High=602.7, Very High=5.2  
Uplight: Low=0.0, High=0.0

BUG Rating : B2-U0-G0