



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

Report No: L091604004R01

Date: 9/27/2016



NVLAP LAB CODE 200927-0

Report No: L091604004R01

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

Model Number: GCJ0-15H-MV-CW-3-XX-300

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-3-XX-300 . 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: 9/21/16 - 9/21/16

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

Manufacturer:	Leotek Electronics USA, LLC
Model Number:	GCJ0-15H-MV-CW-3-XX-300
Driver Model Number:	LITEON PA-1600-31SL
Total Lumens:	1950.10
Input Voltage (VAC/60Hz):	120.00
Input Current (Amp):	0.13
Input Power (W):	14.91
Input Power Factor:	0.95
Current ATHD @ 120V(%):	15%
Current ATHD @ 277V(%):	N/A
Efficacy:	131
Color Rendering Index (CRI):	72
Correlated Color Temperature (K):	4767
Chromaticity Coordinate x:	0.3537
Chromaticity Coordinate y:	0.3705
Ambient Temperature (°C):	25.0
Stabilization Time (Hours):	0:30
Total Operating Time (Hours):	1:25
Off State Power(W):	0.00

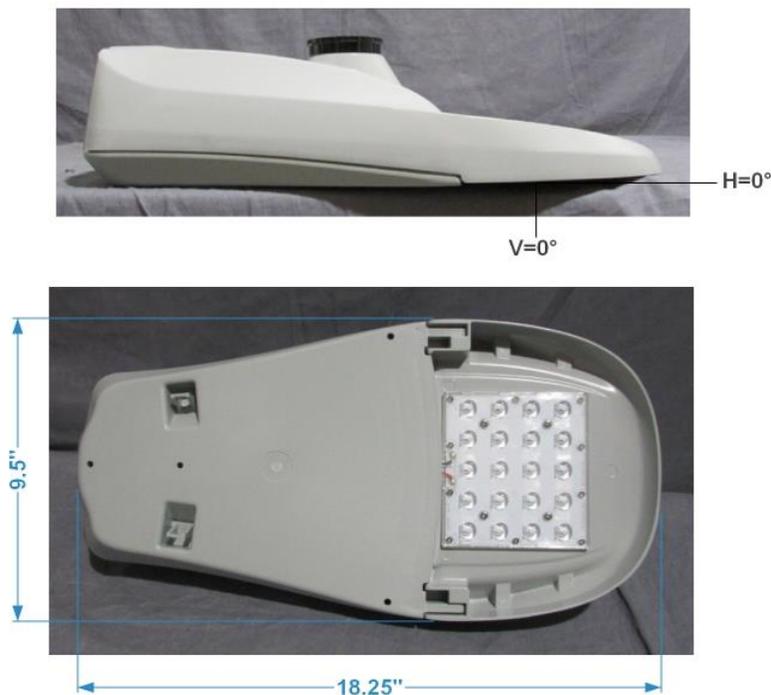
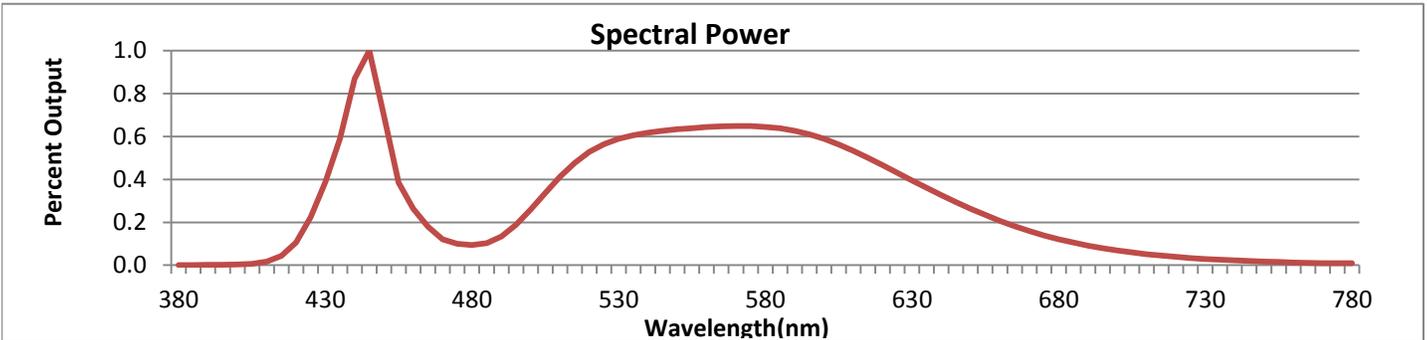


FIG. 1 LUMINAIRE

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



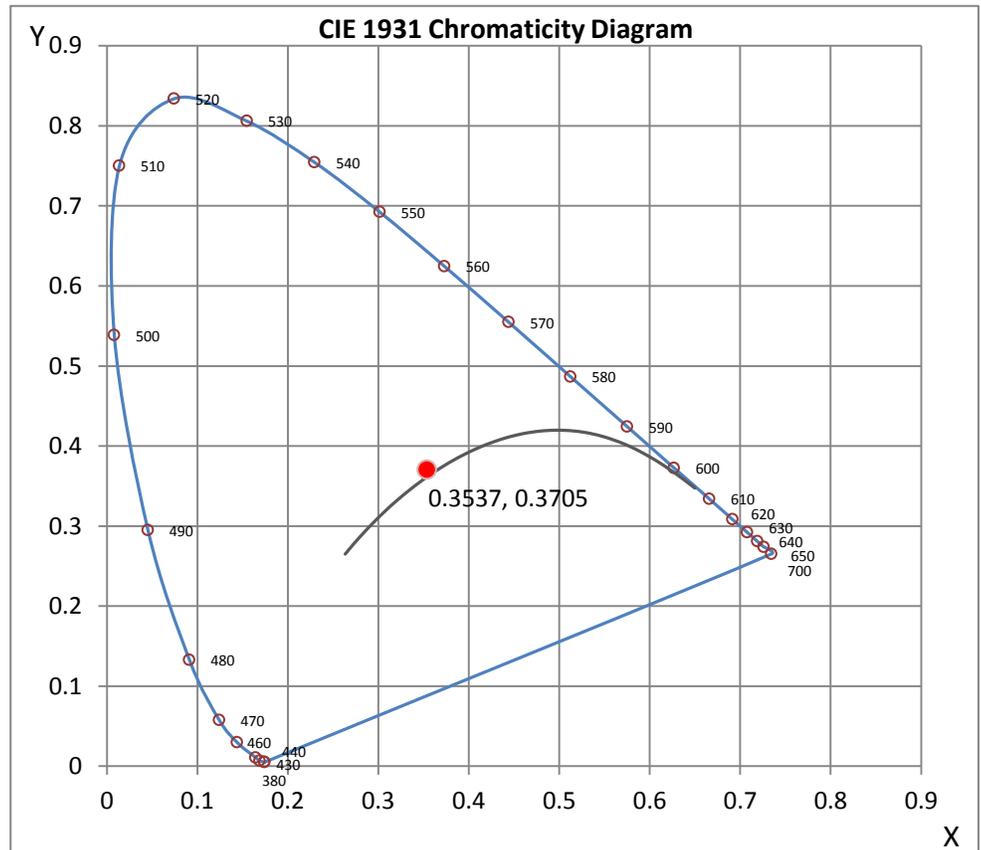
Wavelength	W/m ² nm	440	0.8702	510	0.4128	580	0.6442	650	0.2632	720	0.0389
380	0.0010	450	0.6966	520	0.5281	590	0.6266	660	0.2072	730	0.0293
390	0.0014	460	0.2636	530	0.5898	600	0.5895	670	0.1593	740	0.0222
400	0.0035	470	0.1212	540	0.6180	610	0.5331	680	0.1214	750	0.0169
410	0.0164	480	0.0943	550	0.6340	620	0.4671	690	0.0915	760	0.0129
420	0.1051	490	0.1340	560	0.6445	630	0.3954	700	0.0686	770	0.0098
430	0.3885	500	0.2601	570	0.6487	640	0.3266	710	0.0517	780	0.0087

CRI & CCT

x	0.3537
y	0.3705
u'	0.2100
v'	0.4948
CRI	71.60
CCT	4767
Duv	0.00594

R Values

R1	69.47
R2	74.92
R3	80.17
R4	73.54
R5	69.80
R6	66.50
R7	80.13
R8	58.08
R9	-25.90
R10	41.60
R11	71.93
R12	43.74
R13	69.46
R14	88.46



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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: 14*

*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 : L091604004R01.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
 [TEST] L091604004R01
 [TESTLAB] LIGHT LABORATORY, INC.
 [ISSUEDATE] 9/27/2016
 [MANUFAC] Leotek Electronics USA, LLC
 [LUMCAT] GCJ0-15H-MV-CW-3-XX-300
 [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, 14.91W
 [_TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

IES Classification	Type III
Longitudinal Classification	Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	1950
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	131
Total Luminaire Watts	14.91
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	1217
Maximum Candela Angle	45H 68V
Maximum Candela (<90 Degrees Vertical)	1217
Maximum Candela Angle (<90 Degrees Vertical)	45H 68V
Maximum Candela At 90 Degrees Vertical	0 (0.0% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	80 (4.1% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091604004R01.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	114.1	N.A.	5.9
FM - Front-Medium (30-60)	549.9	N.A.	28.2
FH - Front-High (60-80)	613.3	N.A.	31.5
FVH - Front-Very High (80-90)	7.4	N.A.	0.4
BL - Back-Low (0-30)	115.8	N.A.	5.9
BM - Back-Medium (30-60)	391.8	N.A.	20.1
BH - Back-High (60-80)	155.0	N.A.	7.9
BVH - Back-Very High (80-90)	2.7	N.A.	0.1
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	1950.0	N.A.	100.0
BUG Rating	B1-U0-G1		

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091604004R01.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	192	192	192	192	192	192	192	192	192	192
2.5	185	186	190	190	188	189	188	188	189	189
5.0	183	184	187	187	186	186	186	186	187	187
7.5	185	186	187	187	187	186	187	188	189	189
10.0	191	192	192	192	192	192	193	195	196	196
12.5	202	203	201	201	202	202	204	206	207	209
15.0	216	217	215	214	215	217	220	221	222	225
17.5	231	233	230	229	231	234	238	239	241	244
20.0	251	251	249	247	250	252	256	257	260	264
22.5	276	273	268	268	270	272	274	276	278	282
25.0	297	292	288	289	290	290	293	295	298	302
27.5	312	311	306	309	309	308	310	313	316	322
30.0	327	327	326	327	327	325	327	329	333	340
32.5	340	344	345	343	344	343	344	344	350	354
35.0	354	358	361	357	358	358	357	357	361	365
37.5	372	372	371	368	370	371	372	370	372	374
40.0	383	380	381	381	382	382	382	381	381	380
42.5	392	392	389	390	391	391	394	394	392	389
45.0	404	409	406	406	406	405	413	416	408	400
47.5	426	430	429	429	427	432	447	448	439	424
50.0	470	471	468	464	458	466	487	493	487	455
52.5	547	548	540	529	515	516	537	548	541	496
55.0	624	628	631	631	610	590	608	617	597	555
56.0	643	649	658	667	660	634	644	651	622	579
57.0	658	664	677	693	702	682	687	687	654	610
58.0	670	680	695	714	733	734	733	730	685	638
59.0	687	696	711	734	757	773	784	774	722	672
60.0	710	717	727	749	781	807	834	826	769	709
61.0	733	739	748	768	799	832	875	882	823	755
62.0	757	762	769	789	818	857	910	937	887	809
63.0	772	777	784	803	832	878	945	991	958	876
64.0	779	786	795	816	842	885	959	1036	1033	958
65.0	780	786	797	819	845	890	966	1070	1104	1046
66.0	765	769	785	810	837	886	969	1082	1156	1129
67.0	734	739	760	787	816	863	943	1062	1180	1191
68.0	655	663	694	738	777	827	907	1038	1173	1217
69.0	525	535	575	636	698	771	859	980	1121	1186
70.0	348	361	407	482	565	655	763	887	1036	1092
71.0	224	233	260	317	391	495	625	774	914	950
72.0	155	158	172	203	255	337	457	607	733	785
73.0	112	114	122	139	164	208	288	422	541	616
74.0	79	81	89	103	116	143	192	266	358	460
75.0	48	50	57	76	90	106	134	176	234	322
76.0	36	37	42	56	73	84	101	124	166	225
77.0	29	30	33	44	59	67	80	95	126	163
78.0	24	25	27	36	48	54	61	75	98	126
79.0	21	22	23	30	38	44	48	57	73	92
80.0	19	19	21	25	32	34	36	43	51	67
82.5	11	11	12	15	17	18	19	21	22	24
85.0	3	3	3	4	4	5	5	6	7	7
87.5	1	1	1	1	2	2	2	3	4	4
90.0	0	0	0	0	0	0	0	0	0	0

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091604004R01.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>	<u>95</u>
0.0	192	192	192	192	192	192	192	192	192	192
2.5	188	187	187	187	188	189	190	189	188	187
5.0	186	187	186	187	189	190	190	190	189	189
7.5	190	191	192	193	194	196	196	195	195	196
10.0	198	199	202	203	206	207	207	207	207	207
12.5	211	213	217	219	220	222	222	222	223	224
15.0	228	231	234	238	241	243	242	242	243	246
17.5	248	253	255	258	263	265	265	265	267	270
20.0	270	275	279	282	288	289	288	289	291	296
22.5	292	297	302	307	311	310	311	313	317	322
25.0	310	317	323	329	332	332	334	337	342	347
27.5	327	333	342	349	353	355	358	361	364	368
30.0	344	349	358	366	371	375	379	383	387	392
32.5	357	362	372	381	387	393	399	403	408	415
35.0	368	374	382	393	403	409	414	420	427	432
37.5	376	383	392	404	414	420	427	436	442	449
40.0	383	387	400	413	422	429	437	445	454	465
42.5	389	393	407	420	430	437	446	457	470	485
45.0	397	400	411	428	439	448	462	477	494	514
47.5	411	410	421	439	456	471	490	509	528	547
50.0	435	432	441	463	484	507	527	549	569	585
52.5	471	465	472	497	520	545	568	591	606	623
55.0	524	510	514	538	563	586	610	626	638	654
56.0	547	530	531	553	578	604	625	639	651	664
57.0	575	552	552	572	594	618	637	652	661	675
58.0	602	576	573	592	612	633	654	665	676	685
59.0	630	602	597	611	633	655	673	681	689	696
60.0	662	628	624	636	656	676	692	700	705	711
61.0	699	661	653	665	684	704	719	725	730	733
62.0	742	703	691	702	723	743	758	763	765	764
63.0	793	749	737	747	771	793	812	820	821	812
64.0	874	817	803	820	852	886	910	914	893	856
65.0	966	917	906	932	969	1001	1015	1001	959	890
66.0	1066	1028	1017	1022	1044	1071	1088	1070	1015	924
67.0	1165	1119	1070	1055	1069	1108	1126	1108	1037	928
68.0	1198	1119	1055	1035	1067	1115	1136	1109	1029	894
69.0	1118	1036	995	1007	1059	1121	1146	1110	1007	856
70.0	994	936	940	981	1057	1130	1149	1103	991	818
71.0	850	847	880	937	1019	1108	1126	1084	974	767
72.0	728	744	782	845	927	993	990	941	831	660
73.0	607	621	647	687	746	775	752	692	595	462
74.0	477	490	497	513	532	535	508	460	388	295
75.0	361	367	357	354	364	372	352	303	248	196
76.0	265	269	249	253	271	272	241	198	161	133
77.0	193	190	185	193	200	194	165	128	103	92
78.0	137	146	145	146	146	130	104	77	66	67
79.0	104	110	110	104	98	88	70	57	54	53
80.0	77	80	80	75	69	59	46	42	38	38
82.5	26	27	29	27	21	13	13	15	13	16
85.0	8	8	9	9	9	10	10	10	10	9
87.5	5	5	6	7	7	8	8	8	8	7
90.0	0	0	0	0	0	0	0	0	0	0

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091604004R01.IES

CANDELA TABULATION - (Cont.)

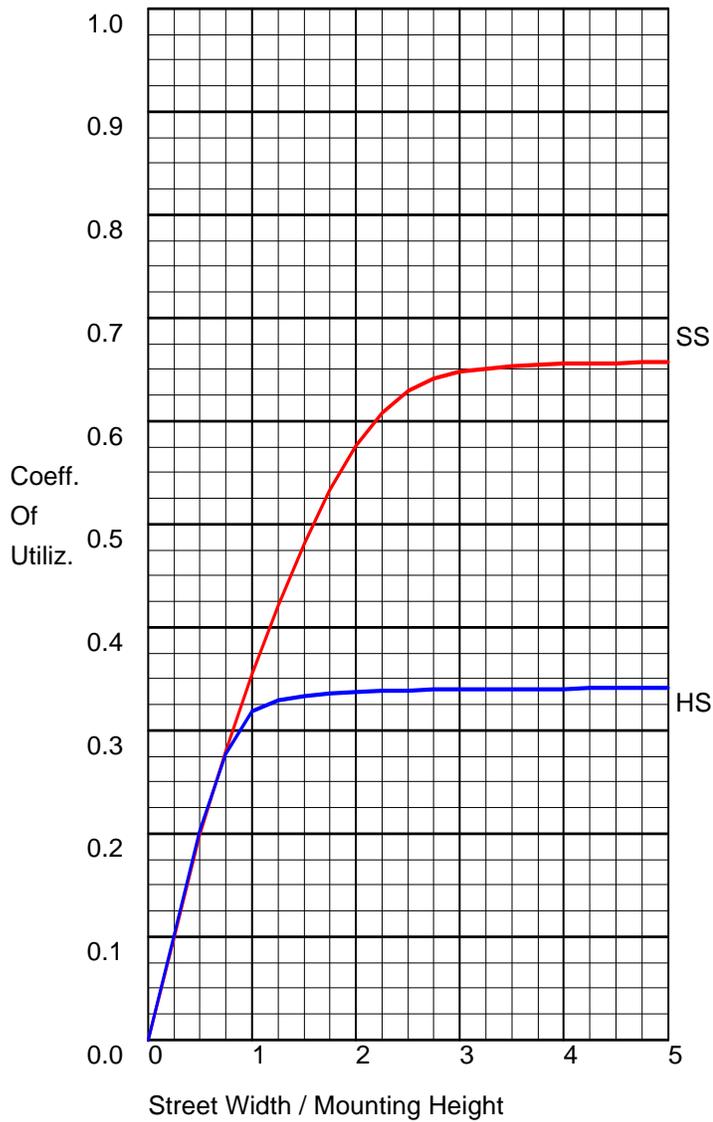
Vert. Angles	Horizontal Angles									
	<u>100</u>	<u>105</u>	<u>110</u>	<u>115</u>	<u>120</u>	<u>125</u>	<u>130</u>	<u>135</u>	<u>140</u>	<u>145</u>
0.0	192	192	192	192	192	192	192	192	192	192
2.5	187	189	190	192	192	191	190	190	191	192
5.0	190	192	193	195	195	194	194	193	194	195
7.5	197	200	201	202	201	201	200	198	198	198
10.0	210	212	214	212	211	210	208	206	204	204
12.5	227	228	229	226	224	222	220	217	215	214
15.0	248	249	248	244	243	240	237	233	229	226
17.5	273	273	271	267	264	261	256	252	247	242
20.0	298	299	294	292	289	284	279	274	266	257
22.5	324	324	320	318	313	309	304	298	288	276
25.0	350	349	346	343	339	334	330	321	307	296
27.5	373	372	371	367	364	360	356	346	332	322
30.0	394	394	394	392	389	387	383	375	364	354
32.5	417	417	417	417	416	416	413	407	398	384
35.0	435	438	441	444	445	446	444	437	426	405
37.5	455	460	465	470	476	476	470	458	438	409
40.0	475	483	490	496	499	499	487	464	434	393
42.5	500	509	517	521	522	512	489	455	416	373
45.0	530	542	544	545	539	515	474	428	381	331
47.5	564	575	572	565	542	499	447	392	331	258
50.0	599	603	595	575	532	471	402	330	245	160
52.5	629	629	611	576	510	431	342	243	143	74
55.0	657	651	624	562	472	372	260	139	69	50
56.0	665	656	622	552	457	362	222	104	58	46
57.0	675	661	622	543	439	327	185	78	51	42
58.0	683	667	624	531	419	289	151	62	46	39
59.0	692	674	614	519	402	279	122	54	42	37
60.0	705	681	614	508	382	239	102	48	39	35
61.0	721	690	609	495	359	199	87	44	37	33
62.0	746	704	614	489	343	191	75	40	35	32
63.0	784	727	614	463	306	158	71	37	33	30
64.0	807	732	598	443	290	139	61	35	31	28
65.0	811	708	582	430	261	121	51	33	29	27
66.0	817	704	541	372	217	102	47	31	28	25
67.0	803	671	489	331	185	82	43	29	26	24
68.0	757	612	450	279	142	66	37	27	24	22
69.0	700	556	401	229	107	51	33	25	22	21
70.0	638	475	321	186	84	45	30	23	21	19
71.0	570	406	247	127	61	37	26	22	19	18
72.0	472	313	186	88	48	31	24	20	18	17
73.0	337	202	115	69	40	27	22	18	17	15
74.0	215	138	86	51	32	24	19	17	15	13
75.0	143	101	71	40	28	21	18	15	13	12
76.0	104	78	52	34	24	19	16	13	11	10
77.0	78	62	42	27	20	17	13	11	10	9
78.0	63	51	33	22	17	13	11	10	9	7
79.0	50	40	26	19	15	11	10	8	7	6
80.0	36	30	21	16	12	10	8	7	6	5
82.5	16	12	11	9	8	6	5	4	4	3
85.0	8	7	7	6	5	5	4	3	3	3
87.5	7	6	6	5	5	4	3	3	2	2
90.0	0	0	0	0	0	0	0	0	0	0

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091604004R01.IES

CANDELA TABULATION - (Cont.)

Vert. Angles	Horizontal Angles						
	<u>150</u>	<u>155</u>	<u>160</u>	<u>165</u>	<u>170</u>	<u>175</u>	<u>180</u>
0.0	192	192	192	192	192	192	192
2.5	193	194	193	193	194	199	200
5.0	196	197	196	196	197	201	203
7.5	199	199	198	198	200	204	207
10.0	204	204	203	203	206	208	211
12.5	213	212	210	211	213	214	216
15.0	224	221	219	219	220	220	222
17.5	237	231	229	227	227	226	228
20.0	249	243	239	236	234	233	234
22.5	265	256	250	246	242	241	241
25.0	284	275	269	264	257	256	256
27.5	311	302	296	289	280	278	277
30.0	344	333	321	310	298	293	291
32.5	368	351	334	318	301	292	289
35.0	379	355	329	308	289	275	270
37.5	375	346	317	294	274	261	254
40.0	356	324	298	274	255	243	236
42.5	329	291	261	231	207	189	183
45.0	279	227	180	144	119	107	103
47.5	183	128	91	72	62	58	56
50.0	97	65	54	49	46	45	45
52.5	55	47	43	42	40	39	39
55.0	43	39	37	36	36	35	35
56.0	40	37	36	35	34	34	34
57.0	37	36	34	33	32	32	32
58.0	36	34	32	31	31	31	31
59.0	34	32	31	30	30	29	29
60.0	33	31	29	28	28	28	27
61.0	31	29	28	27	27	26	26
62.0	29	28	27	26	25	25	24
63.0	28	26	25	24	24	23	23
64.0	27	25	24	23	22	22	22
65.0	25	24	22	22	21	21	21
66.0	23	22	21	20	20	20	21
67.0	22	21	20	19	19	19	19
68.0	21	19	19	18	17	18	19
69.0	19	18	17	16	16	17	17
70.0	18	17	16	15	15	16	16
71.0	17	16	15	13	13	13	15
72.0	15	13	12	12	12	12	12
73.0	13	12	11	11	11	10	10
74.0	12	11	10	9	9	9	9
75.0	11	10	9	8	8	7	7
76.0	9	8	7	7	6	6	6
77.0	8	7	6	6	5	5	5
78.0	6	5	5	5	4	3	3
79.0	5	4	4	3	3	2	2
80.0	4	3	3	2	2	2	1
82.5	2	2	2	1	1	1	1
85.0	2	2	2	1	1	1	1
87.5	2	2	2	1	1	1	1
90.0	0	0	0	0	0	0	0

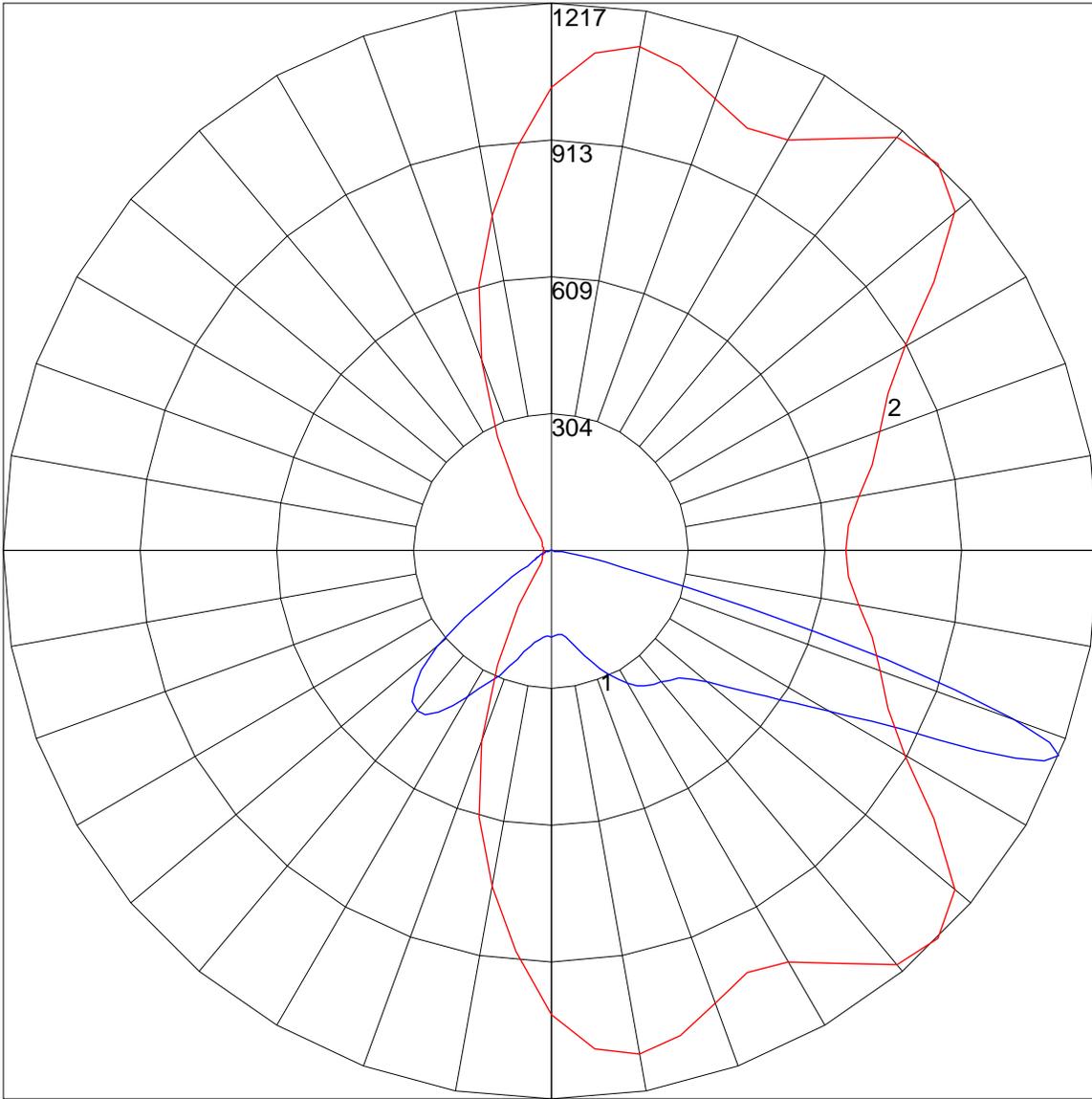
COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

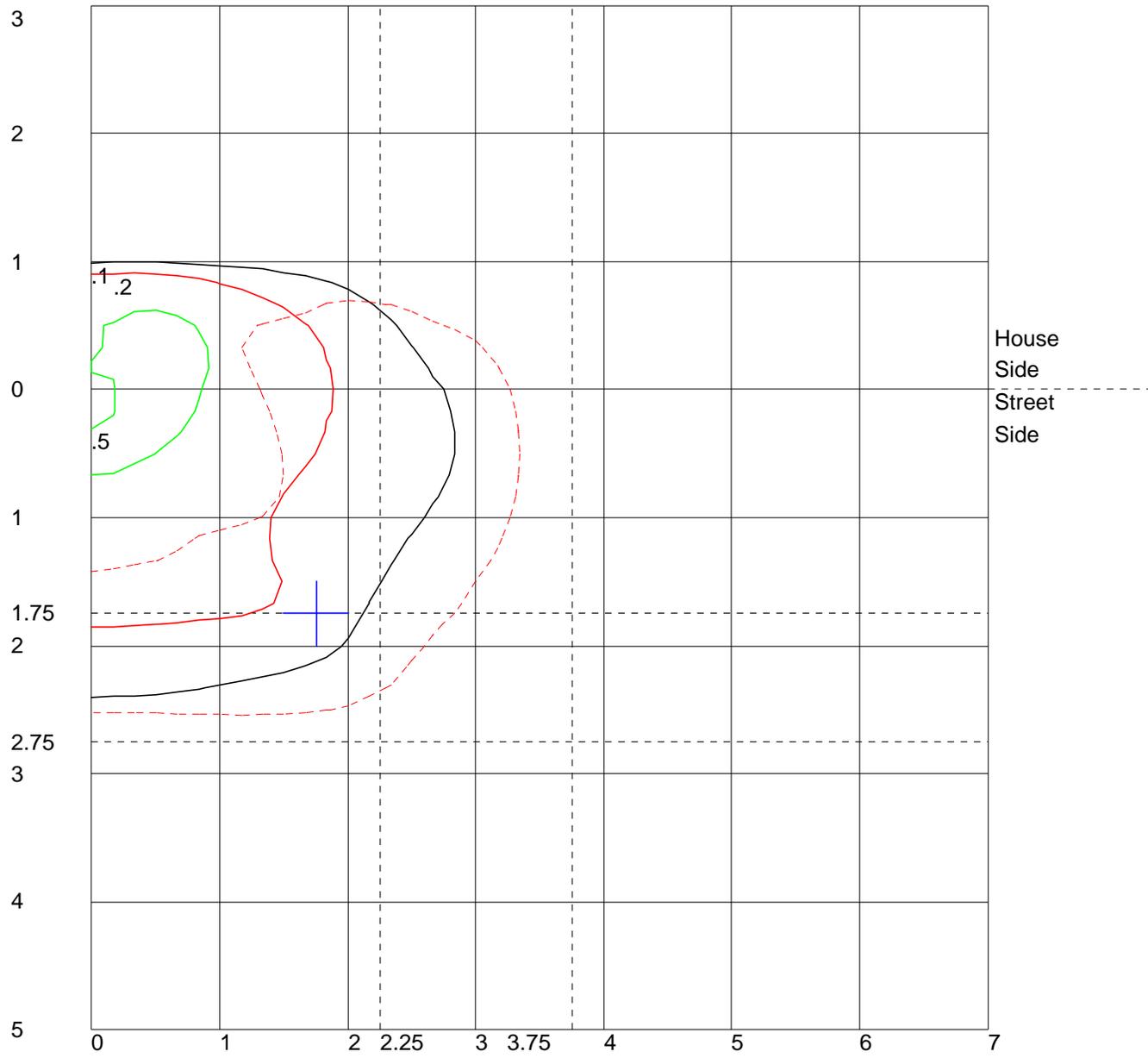
	Lumens	Percent Of Luminaire
Downward Street Side	1284.8	65.9
Downward House Side	665.3	34.1
Downward Total	1950.1	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	1950.1	100.0

POLAR GRAPH



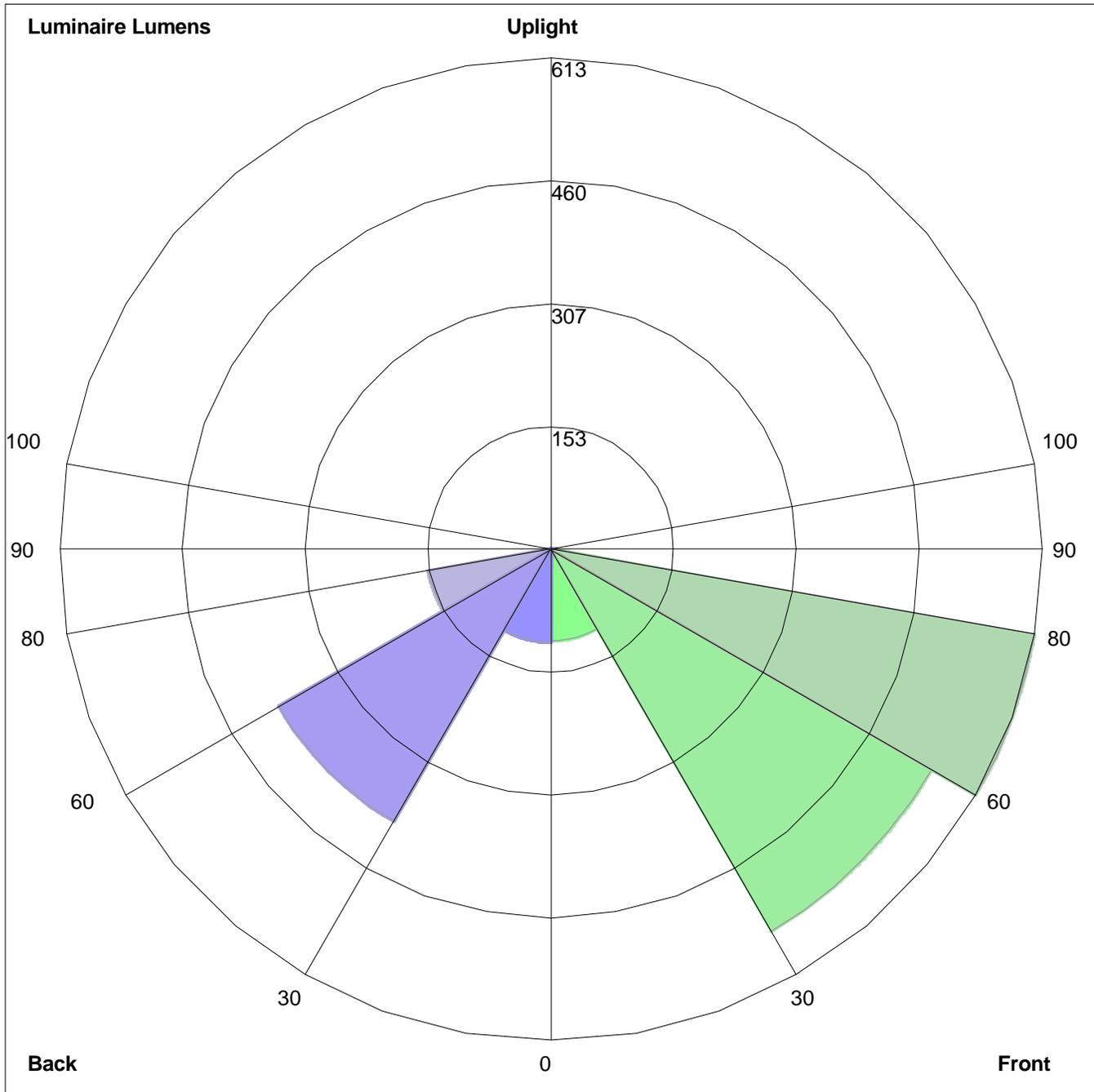
Maximum Candela = 1217 Located At Horizontal Angle = 45, Vertical Angle = 68
1 - Vertical Plane Through Horizontal Angles (45 - 225) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (68) (Through Max. Cd.)

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=114.1, Medium=549.9, High=613.3, Very High=7.4
 Back: Low=115.8, Medium=391.8, High=155.0, Very High=2.7
 Uplight: Low=0.0, High=0.0

BUG Rating : B1-U0-G1