



8165 E Kaiser Blvd. Anaheim, CA 92808
p. 714.282.2270
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Report No: L091603907

Date: 9/29/2016



NVLAP LAB CODE 200927-0

Report No: L091603907

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

Model Number: GCJ2-20H-MV-CW-3-XX-700

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 GCJ2-20H-MV-CW-3-XX-700 . 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: 9/28/16 - 9/28/16

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:	GCJ2-20H-MV-CW-3-XX-700	
Driver Model Number:	PHILIPS ADVANCE XI075C105V070CNY2	
Total Lumens:	5390.80	
Input Voltage (VAC/60Hz):	120.00	
Input Current (Amp):	0.37	
Input Power (W):	44.67	
Input Power Factor:	1.00	
Current ATHD @ 120V(%):	8%	
Current ATHD @ 277V(%):	9% (0.16A, 44.55W, 0.98PF)	
Efficacy:	121	
Color Rendering Index (CRI):	73	
Correlated Color Temperature (K):	4864	
Chromaticity Coordinate x:	0.3498	
Chromaticity Coordinate y:	0.3616	
Ambient Temperature (°C):	25.0	
Stabilization Time (Hours):	0:30	
Total Operating Time (Hours):	2:00	
Off State Power(W):	0.00	

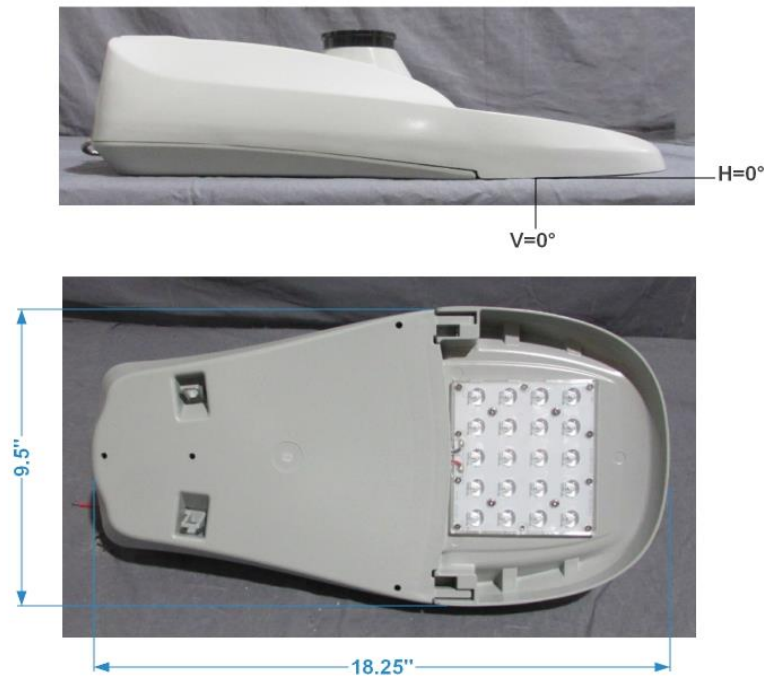
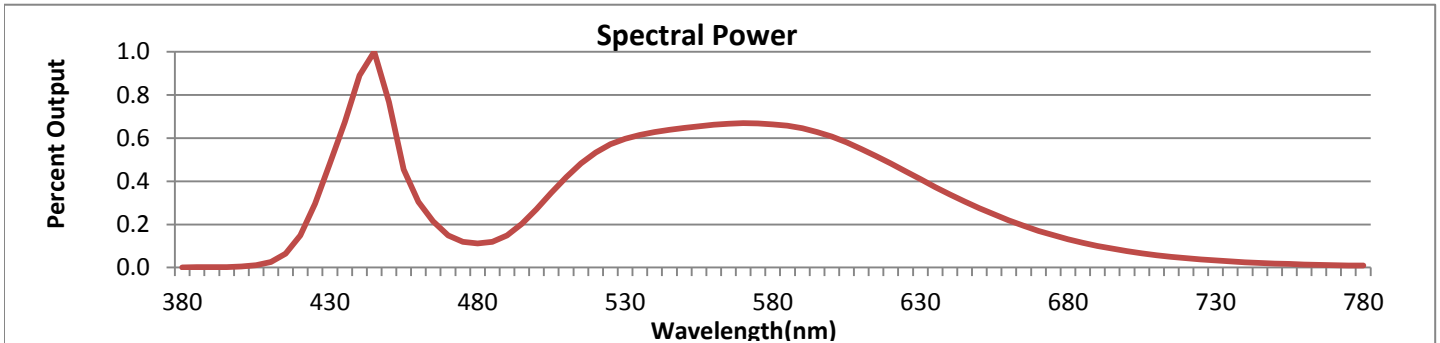


FIG. 1 LUMINAIRE



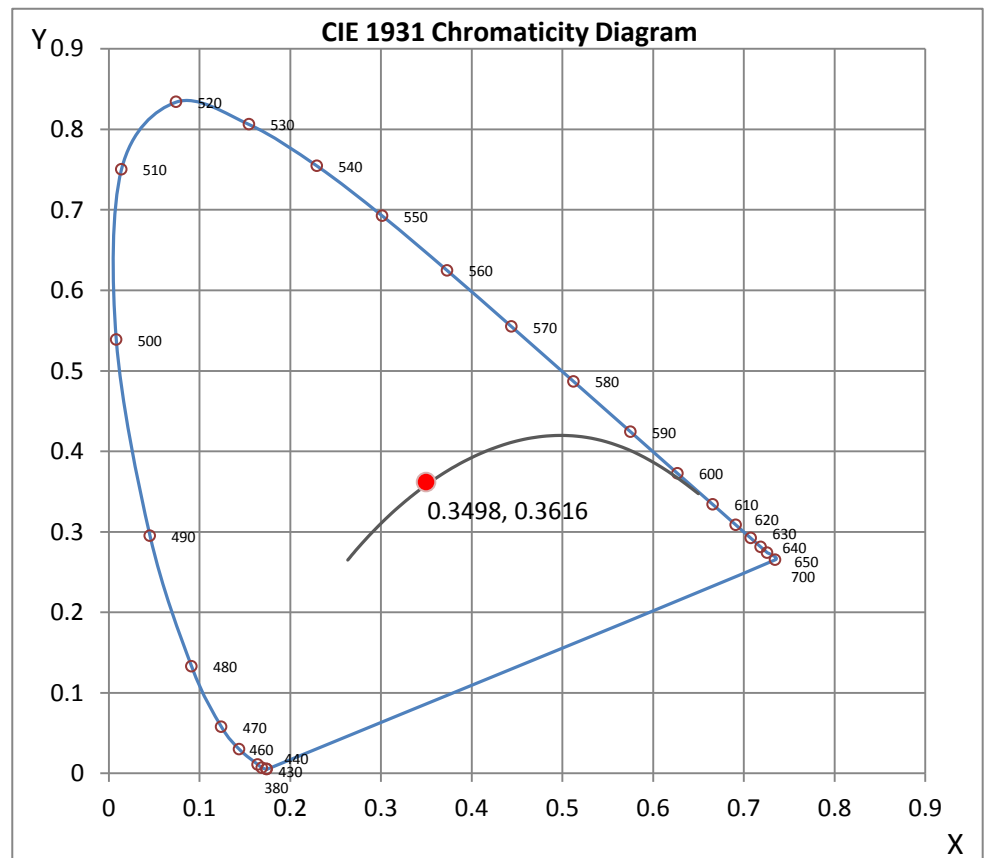
Wavelength	W/m ² nm	440	0.8906	510	0.4195	580	0.6639	650	0.2752	720	0.0432
380	0.0012	450	0.7676	520	0.5337	590	0.6455	660	0.2188	730	0.0327
390	0.0017	460	0.3046	530	0.5972	600	0.6075	670	0.1703	740	0.0246
400	0.0048	470	0.1487	540	0.6285	610	0.5498	680	0.1314	750	0.0187
410	0.0253	480	0.1113	550	0.6471	620	0.4829	690	0.1001	760	0.0142
420	0.1482	490	0.1483	560	0.6617	630	0.4099	700	0.0759	770	0.0109
430	0.4809	500	0.2706	570	0.6691	640	0.3394	710	0.0573	780	0.0094

CRI & CCT

x	0.3498
y	0.3616
u'	0.2107
v'	0.4902
CRI	72.60
CCT	4864
Duv	0.00312

R Values

R1	71.04
R2	75.94
R3	80.10
R4	74.48
R5	71.37
R6	67.68
R7	80.34
R8	59.89
R9	-20.21
R10	43.40
R11	73.06
R12	46.53
R13	70.93
R14	88.33





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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:

Jeff Ahn
Engineering Manager

Test Report Reviewed by:

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 : L091603907.IES

DESCRIPTIVE INFORMATION (From Photometric File)

IESNA:LM-63-2002
[TEST] L091603907
[TESTLAB] LIGHT LABORATORY, INC.
[ISSUEDATE] 9/29/2016
[MANUFAC] Leotek Electronics USA, LLC
[LUMCAT] GCJ2-20H-MV-CW-3-XX-700
[LUMINAIRE] 18.25"L. X 9.5"W. X 4.5"H. LED STREET LIGHT
[BALLASTCAT] PHILIPS ADVANCE XI075C105V070CNY2
[OTHER] INDICATING THE CANDELA VALUES ARE ABSOLUTE AND
[MORE] SHOULD NOT BE FACTORED FOR DIFFERENT LAMP RATINGS.
[_INPUT] 120VAC, 44.67W
[_TEST PROCEDURE] IESNA:LM-79-08

CHARACTERISTICS

IES Classification	Type III
Longitudinal Classification	Medium
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	5391
Downward Total Efficiency	N.A. (absolute)
Total Luminaire Efficiency	N.A. (absolute)
Luminaire Efficacy Rating (LER)	121
Total Luminaire Watts	44.67
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Maximum Candela	3544
Maximum Candela Angle	80H 70V
Maximum Candela (<90 Degrees Vertical)	3544
Maximum Candela Angle (<90 Degrees Vertical)	80H 70V
Maximum Candela At 90 Degrees Vertical	0 (0.0% Luminaire Lumens)
Maximum Candela from 80 to <90 Degrees Vertical	352 (6.5% Luminaire Lumens)
Cutoff Classification (deprecated)	N.A. (absolute)

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091603907.IES

LUMINAIRE CLASSIFICATION SYSTEM (LCS)

	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	305.6	N.A.	5.7
FM - Front-Medium (30-60)	1406.5	N.A.	26.1
FH - Front-High (60-80)	1754.2	N.A.	32.5
FVH - Front-Very High (80-90)	29.4	N.A.	0.5
BL - Back-Low (0-30)	315.5	N.A.	5.9
BM - Back-Medium (30-60)	1075.4	N.A.	19.9
BH - Back-High (60-80)	489.3	N.A.	9.1
BVH - Back-Very High (80-90)	15.0	N.A.	0.3
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	5390.9	N.A.	100.0
BUG Rating	B2-U0-G1		

ZONAL LUMEN SUMMARY

Zone	%
0-20	4.3
0-30	11.5
0-40	23.5
0-60	57.6
0-80	99.2
0-90	100
10-90	99
20-40	19.2
20-50	34.6
40-70	60.9
60-80	41.6
70-80	14.7
80-90	0.8
90-110	0
90-120	0
90-130	0
90-150	0
90-180	0
110-180	0
0-180	100

IES ROAD REPORT
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CANDELA TABULATION

Vert. Angles	Horizontal Angles									
	0	5	10	15	20	25	30	35	40	45
0.0	551	551	551	551	551	551	551	551	551	551
2.5	546	546	546	546	545	545	545	545	544	543
5.0	536	536	536	536	535	535	535	534	533	533
7.5	529	530	529	529	529	529	529	529	530	531
10.0	530	530	530	530	531	532	534	536	539	543
12.5	543	544	544	544	546	548	552	556	562	567
15.0	570	571	571	572	574	578	583	588	595	602
17.5	609	610	611	613	616	621	628	636	644	653
20.0	649	650	651	654	659	665	674	685	695	706
22.5	697	699	700	702	708	714	724	735	748	762
25.0	749	750	751	753	758	764	772	785	798	812
27.5	799	802	802	804	809	814	821	832	844	859
30.0	850	853	853	854	857	861	868	876	886	900
32.5	901	903	903	902	904	906	910	917	926	935
35.0	945	947	946	945	946	946	949	952	958	966
37.5	980	982	981	979	979	979	980	982	985	990
40.0	1005	1007	1006	1004	1004	1004	1005	1006	1007	1009
42.5	1024	1026	1025	1023	1023	1024	1029	1032	1030	1027
45.0	1052	1053	1052	1049	1048	1049	1065	1073	1063	1050
47.5	1103	1103	1100	1095	1088	1091	1127	1136	1121	1094
50.0	1197	1194	1185	1170	1156	1164	1215	1233	1220	1163
52.5	1381	1375	1351	1316	1275	1278	1331	1359	1355	1244
55.0	1592	1592	1584	1563	1499	1455	1504	1526	1493	1365
56.0	1647	1647	1653	1656	1616	1554	1588	1605	1553	1425
57.0	1680	1683	1700	1729	1724	1666	1685	1689	1616	1488
58.0	1713	1717	1738	1783	1810	1789	1792	1783	1690	1566
59.0	1736	1741	1771	1827	1872	1895	1904	1888	1773	1643
60.0	1770	1772	1799	1863	1923	1978	2020	2006	1874	1729
61.0	1811	1812	1836	1896	1967	2044	2127	2129	1991	1827
62.0	1856	1858	1881	1934	2005	2093	2217	2255	2127	1940
63.0	1896	1900	1926	1978	2040	2140	2290	2382	2281	2079
64.0	1927	1932	1963	2017	2077	2175	2349	2502	2444	2243
65.0	1949	1953	1986	2043	2098	2206	2388	2599	2622	2440
66.0	1949	1956	1989	2045	2106	2210	2414	2654	2781	2646
67.0	1909	1917	1951	2018	2085	2192	2385	2687	2905	2844
68.0	1795	1806	1856	1936	2019	2135	2333	2656	2958	2987
69.0	1608	1625	1686	1778	1892	2025	2240	2564	2917	3046
70.0	1311	1337	1421	1548	1684	1848	2086	2413	2795	2997
71.0	882	913	1022	1208	1382	1611	1863	2194	2584	2829
72.0	576	591	657	803	995	1252	1549	1879	2275	2544
73.0	402	409	444	522	650	863	1164	1508	1894	2150
74.0	289	293	315	358	416	543	780	1088	1448	1692
75.0	209	213	231	259	296	360	484	689	974	1222
76.0	135	137	161	188	222	261	328	441	607	765
77.0	99	102	111	140	176	204	247	312	403	551
78.0	76	79	85	107	139	169	188	234	298	400
79.0	63	64	69	85	108	122	141	176	230	297
80.0	55	56	60	71	87	94	105	131	169	223
82.5	38	39	41	45	50	50	53	57	62	72
85.0	23	24	25	25	26	27	27	27	25	24
87.5	14	14	14	15	15	14	14	14	13	13
90.0	0	0	0	0	0	0	0	0	0	0

IES ROAD REPORT
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CANDELA TABULATION - (Cont.)

Vert. Angles	Horizontal Angles									
	50	55	60	65	70	75	80	85	90	95
0.0	551	551	551	551	551	551	551	551	551	551
2.5	543	542	542	542	542	542	543	543	543	544
5.0	533	532	533	533	533	535	536	537	538	539
7.5	532	533	535	537	539	542	545	546	549	551
10.0	546	550	553	557	561	565	569	572	575	577
12.5	572	578	584	590	596	602	607	611	615	617
15.0	610	618	627	635	642	650	656	661	665	668
17.5	662	672	683	693	703	713	720	725	729	732
20.0	718	729	742	754	765	775	784	789	793	796
22.5	775	789	803	817	828	841	849	855	859	862
25.0	828	845	860	875	888	902	911	916	921	923
27.5	875	893	911	929	944	957	968	973	978	981
30.0	916	936	957	976	994	1010	1021	1027	1032	1037
32.5	951	973	995	1020	1040	1059	1073	1080	1086	1092
35.0	979	1000	1028	1056	1077	1097	1113	1122	1129	1138
37.5	1000	1022	1052	1082	1108	1131	1148	1159	1169	1182
40.0	1016	1038	1067	1103	1128	1151	1173	1189	1204	1224
42.5	1030	1047	1078	1114	1140	1166	1193	1217	1242	1274
45.0	1043	1052	1082	1119	1152	1185	1224	1259	1294	1334
47.5	1063	1065	1089	1137	1178	1221	1273	1322	1361	1403
50.0	1103	1095	1120	1177	1232	1284	1344	1399	1438	1485
52.5	1172	1156	1181	1245	1306	1367	1433	1488	1528	1574
55.0	1280	1252	1271	1336	1403	1471	1531	1578	1618	1660
56.0	1331	1298	1312	1375	1441	1505	1565	1614	1651	1692
57.0	1388	1347	1356	1415	1480	1539	1597	1645	1684	1721
58.0	1452	1400	1404	1457	1521	1573	1629	1677	1716	1749
59.0	1520	1458	1454	1501	1559	1609	1665	1711	1747	1776
60.0	1595	1523	1511	1551	1605	1653	1709	1753	1784	1808
61.0	1678	1594	1574	1608	1661	1710	1763	1805	1830	1846
62.0	1772	1674	1648	1678	1728	1781	1834	1872	1894	1898
63.0	1885	1773	1738	1766	1821	1879	1932	1971	1984	1976
64.0	2024	1898	1858	1889	1952	2020	2082	2115	2110	2075
65.0	2206	2074	2032	2080	2170	2265	2346	2367	2314	2214
66.0	2442	2299	2275	2346	2468	2598	2689	2696	2592	2418
67.0	2679	2566	2557	2651	2804	2943	3077	3058	2910	2626
68.0	2901	2823	2832	2927	3094	3248	3407	3354	3132	2794
69.0	3031	3006	3016	3078	3208	3354	3541	3456	3187	2804
70.0	3032	3005	2991	3033	3171	3347	3544	3462	3139	2695
71.0	2846	2808	2832	2914	3116	3341	3536	3443	3077	2534
72.0	2519	2505	2617	2759	3021	3277	3450	3372	2968	2363
73.0	2141	2155	2335	2510	2800	3047	3180	3113	2705	2105
74.0	1733	1796	1967	2172	2432	2636	2706	2658	2266	1726
75.0	1340	1421	1541	1727	1931	2069	2095	2054	1676	1253
76.0	975	1064	1141	1313	1451	1514	1463	1440	1125	995
77.0	703	785	837	954	1049	1059	968	877	638	524
78.0	506	573	592	669	750	740	621	498	385	339
79.0	367	400	428	474	531	490	377	298	257	253
80.0	252	291	316	338	352	305	232	220	201	198
82.5	88	102	111	120	117	117	112	116	109	105
85.0	22	19	19	25	32	37	48	48	51	50
87.5	13	13	13	12	12	12	12	12	12	12
90.0	0	0	0	0	0	0	0	0	0	0

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091603907.IES

CANDELA TABULATION - (Cont.)

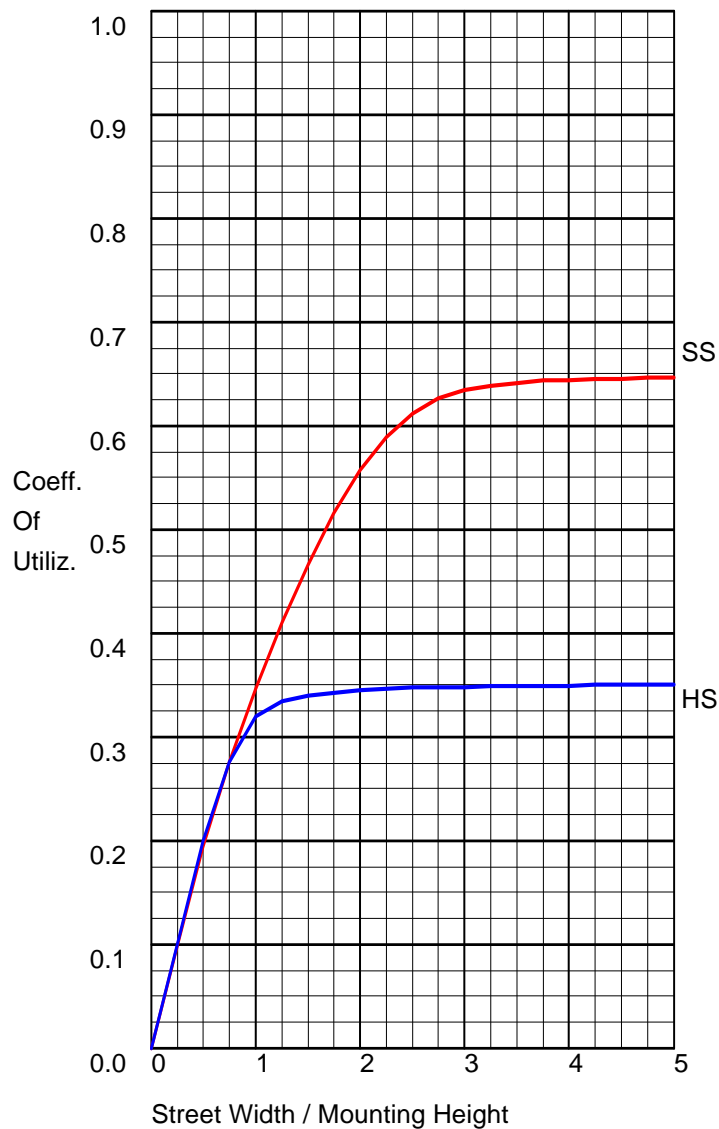
Vert. Angles	Horizontal Angles									
	<u>100</u>	<u>105</u>	<u>110</u>	<u>115</u>	<u>120</u>	<u>125</u>	<u>130</u>	<u>135</u>	<u>140</u>	<u>145</u>
0.0	551	551	551	551	551	551	551	551	551	551
2.5	544	545	545	546	547	549	550	551	552	554
5.0	540	541	543	544	546	548	549	551	553	555
7.5	552	554	555	556	556	557	558	558	558	559
10.0	579	580	581	580	579	578	575	573	571	570
12.5	619	619	618	614	611	607	602	598	595	592
15.0	668	668	665	660	654	648	642	635	628	622
17.5	732	731	727	720	713	706	696	685	674	664
20.0	796	795	791	784	776	767	754	738	721	705
22.5	861	861	858	851	844	833	817	798	774	751
25.0	924	925	924	918	910	899	880	856	830	803
27.5	984	987	988	984	977	963	944	920	893	867
30.0	1041	1048	1052	1051	1044	1030	1013	995	973	952
32.5	1099	1111	1117	1119	1114	1106	1096	1082	1064	1041
35.0	1151	1169	1183	1187	1188	1188	1182	1169	1144	1105
37.5	1200	1220	1239	1253	1264	1268	1260	1234	1188	1126
40.0	1251	1277	1297	1317	1333	1337	1316	1262	1188	1104
42.5	1307	1337	1365	1384	1394	1379	1334	1253	1149	1042
45.0	1373	1406	1432	1444	1434	1387	1306	1192	1071	956
47.5	1446	1477	1494	1487	1444	1357	1235	1095	956	812
50.0	1524	1545	1544	1505	1417	1278	1122	970	759	575
52.5	1602	1609	1580	1500	1357	1172	982	763	532	329
55.0	1676	1663	1599	1468	1269	1041	770	510	287	180
56.0	1703	1679	1602	1446	1227	1155	706	420	217	166
57.0	1727	1694	1601	1422	1183	841	597	326	176	137
58.0	1751	1709	1596	1394	1139	797	506	249	165	127
59.0	1774	1723	1590	1367	1093	770	422	198	146	119
60.0	1798	1737	1582	1337	1049	694	347	169	125	114
61.0	1830	1755	1575	1305	875	622	288	166	117	109
62.0	1872	1776	1567	1272	848	552	260	156	111	105
63.0	1928	1801	1570	1236	817	484	228	154	107	101
64.0	1993	1823	1557	1194	785	424	203	147	102	97
65.0	2073	1846	1539	1147	715	388	182	107	97	92
66.0	2177	1877	1494	1228	659	329	160	103	93	88
67.0	2304	1901	1454	904	585	287	155	97	88	84
68.0	2361	1879	1391	836	509	244	153	92	84	80
69.0	2315	1795	1319	772	434	205	146	87	79	75
70.0	2164	1641	1177	689	343	175	106	82	75	71
71.0	1976	1448	840	546	264	165	96	77	71	68
72.0	1768	1260	747	412	201	139	87	73	67	64
73.0	1509	1023	588	299	171	105	80	68	64	61
74.0	1190	696	413	219	155	91	73	64	60	58
75.0	715	501	297	176	107	80	68	60	56	54
76.0	552	354	229	163	92	72	62	56	53	50
77.0	367	259	185	116	80	65	57	52	49	47
78.0	269	210	165	94	69	59	53	48	45	43
79.0	217	180	119	77	59	52	47	43	41	39
80.0	172	141	95	63	50	44	41	38	37	35
82.5	89	73	49	39	34	30	28	26	25	25
85.0	47	34	26	22	19	19	18	16	16	16
87.5	12	12	12	12	12	13	13	13	14	14
90.0	0	0	0	0	0	0	0	0	0	0

IES ROAD REPORT
PHOTOMETRIC FILENAME : L091603907.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	551	551	551	551	551	551	551
2.5	555	556	557	557	558	558	558
5.0	556	558	559	560	561	562	562
7.5	561	563	564	565	567	568	569
10.0	570	571	574	576	578	580	581
12.5	590	589	590	593	596	598	600
15.0	617	613	611	613	616	618	620
17.5	653	644	639	637	640	642	645
20.0	688	674	664	659	659	661	664
22.5	729	708	692	683	682	683	686
25.0	776	750	733	722	719	721	723
27.5	841	818	799	787	782	782	784
30.0	927	901	876	855	843	838	838
32.5	1009	969	932	896	872	859	857
35.0	1056	995	934	880	845	824	820
37.5	1048	971	901	840	800	777	769
40.0	1009	924	850	795	754	733	726
42.5	948	855	779	718	673	644	636
45.0	838	726	622	538	475	440	429
47.5	649	505	393	316	269	249	242
50.0	404	280	209	180	164	158	156
52.5	211	172	146	138	135	133	133
55.0	143	131	125	123	121	121	121
56.0	132	124	120	118	117	117	117
57.0	124	119	115	114	113	112	112
58.0	118	114	111	109	108	107	107
59.0	114	110	107	105	104	103	103
60.0	109	106	103	100	100	100	99
61.0	105	101	98	97	97	96	95
62.0	101	97	94	93	93	92	91
63.0	97	93	91	89	89	88	88
64.0	92	89	87	85	85	85	85
65.0	88	85	83	82	81	82	82
66.0	84	81	79	78	78	80	79
67.0	80	78	76	75	74	77	77
68.0	76	74	72	71	71	74	75
69.0	73	70	69	68	68	71	72
70.0	69	67	66	65	65	68	69
71.0	66	64	62	61	61	65	66
72.0	62	60	59	58	58	61	62
73.0	59	57	56	55	55	57	57
74.0	55	54	52	51	52	53	52
75.0	52	50	49	48	49	49	48
76.0	48	47	46	45	45	44	44
77.0	45	43	42	41	41	40	39
78.0	41	40	38	38	37	36	36
79.0	38	36	35	34	33	32	32
80.0	34	33	31	31	29	28	28
82.5	23	23	22	22	21	21	20
85.0	16	16	16	16	16	15	15
87.5	14	15	15	15	15	15	15
90.0	0	0	0	0	0	0	0

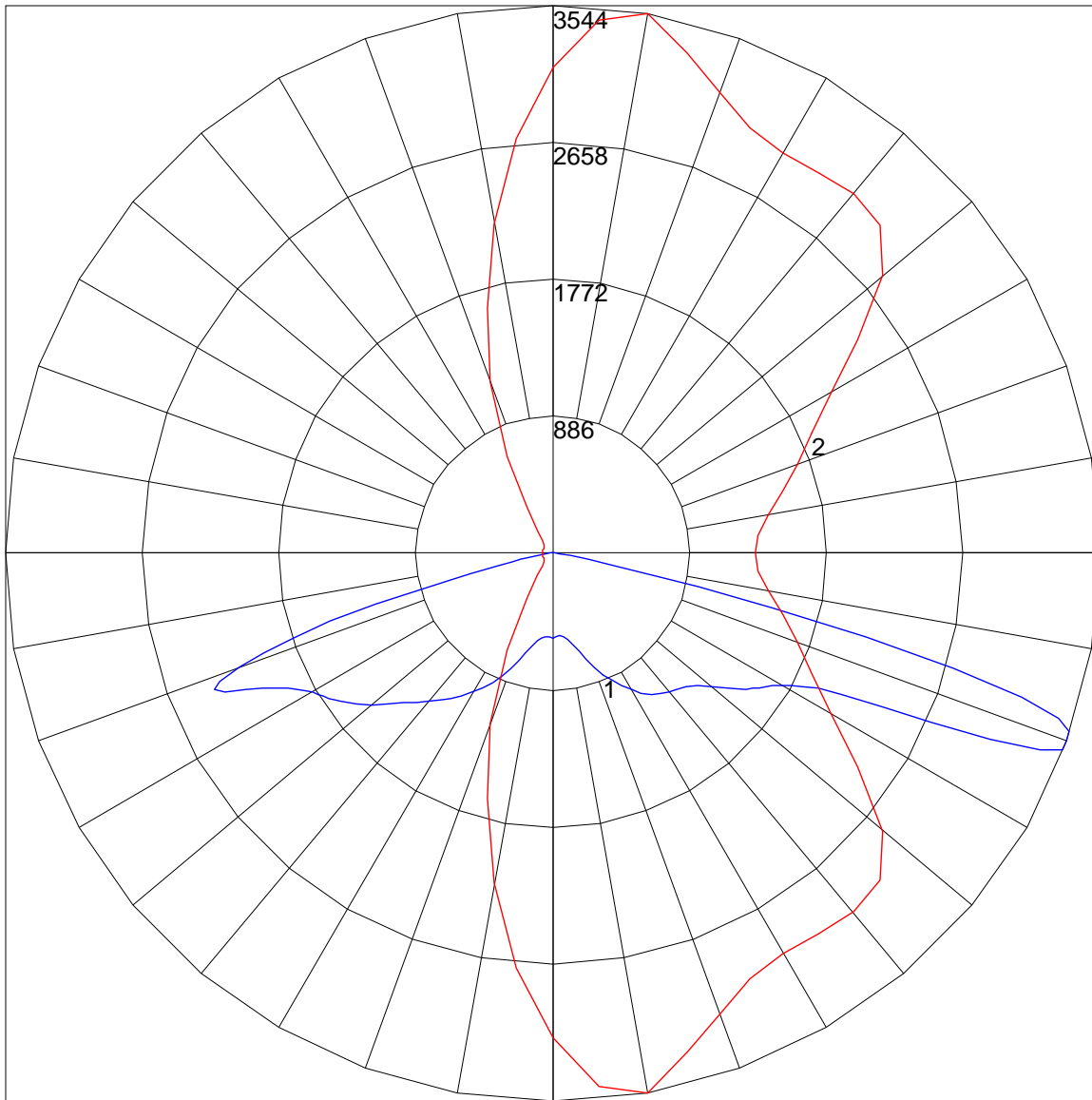
COEFFICIENTS OF UTILIZATION



FLUX DISTRIBUTION

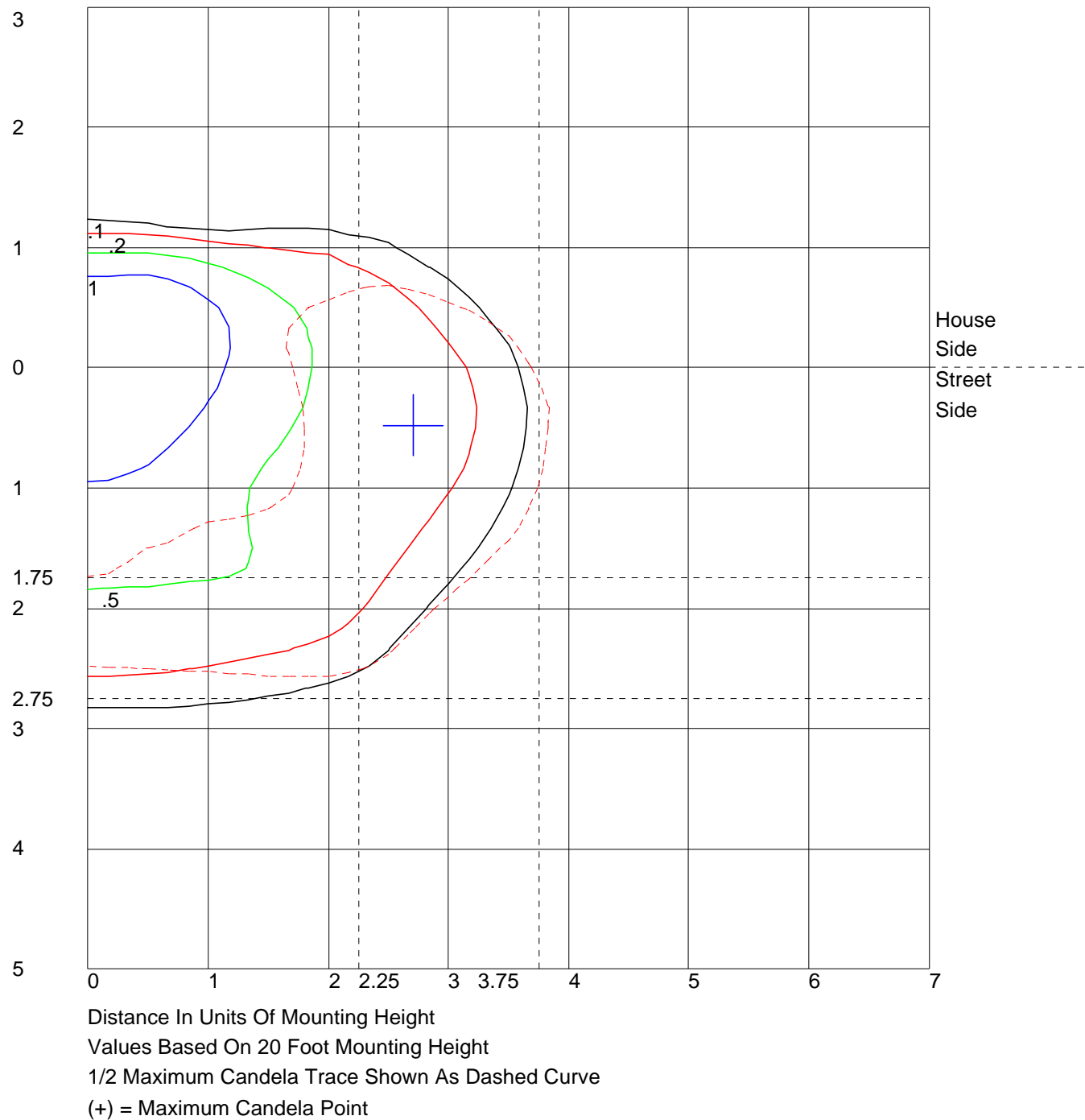
	Lumens	Percent Of Luminaire
Downward Street Side	3495.7	64.8
Downward House Side	1895.1	35.2
Downward Total	5390.8	100.0
Upward Street Side	0.0	0.0
Upward House Side	0.0	0.0
Upward Total	0.0	0.0
Total Flux	5390.8	100.0

POLAR GRAPH

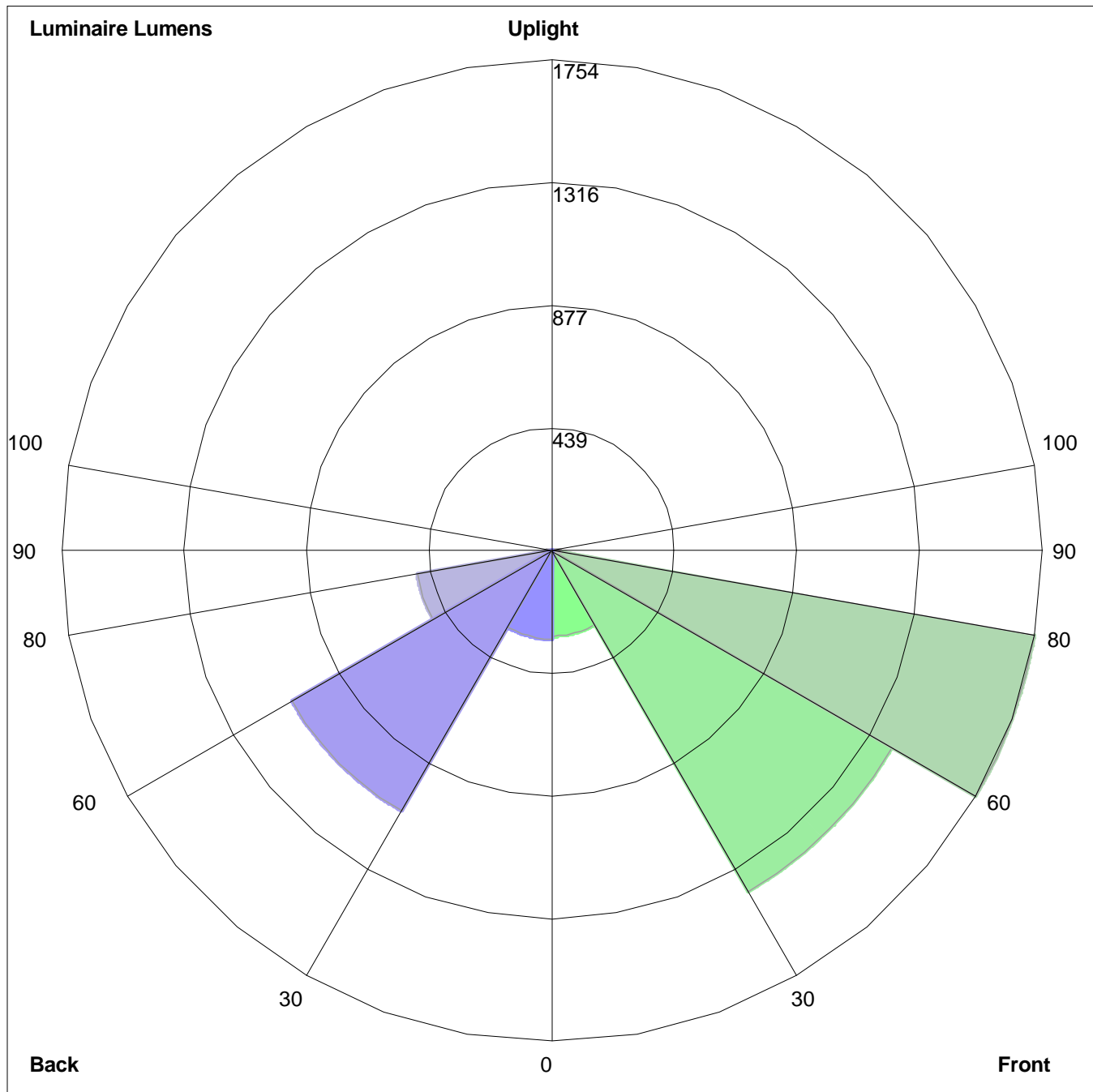


Maximum Candela = 3544 Located At Horizontal Angle = 80, Vertical Angle = 70
1 - Vertical Plane Through Horizontal Angles (80 - 260) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (70) (Through Max. Cd.)

ISOFOOTCANDLE LINES OF HORIZONTAL ILLUMINANCE



LUMINAIRE CLASSIFICATION SYSTEM (LCS) GRAPH



Luminaire Lumens:
Front: Low=305.6, Medium=1406.5, High=1754.2, Very High=29.4
Back: Low=315.5, Medium=1075.4, High=489.3, Very High=15.0
Uplight: Low=0.0, High=0.0

BUG Rating : B2-U0-G1