

Photometric Test Report

Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77:2017

Prepared For

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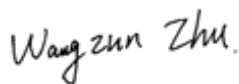
Test Date

2020/9/3

Issue Date

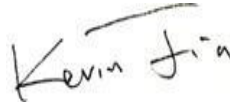
2020/9/4

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2 (0°-180° zones)	IES LM-79-2008	300		4171
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2) (0°-180° zones)	IES LM-79-2008	Standard 105	Premium 120	125.1
Luminaire Output (lm) (Goniophotometer - Section 4.2) (0°-90° zones)	IES LM-79-2008	300		4064
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard 105	Premium 120	121.9
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		33.3
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.26%
		20.00%	277V	3.56%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
		0.9	277V	0.939
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	5029±355	5006
		4 step	5029±220	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		84
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		12
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		98
IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (80°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≤10%		2.55%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		120
(Goniophotometer - Section 4.2)		Non-Worst Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		0.279
(Goniophotometer - Section 4.2)		Non-Worst Case		0.126
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		33.3
(Goniophotometer - Section 4.2)		Non-Worst Case		32.8

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2020/9/3	W34-35L-850	M1
2	Goniophotometer Test	2020/9/3	W34-35L-850	M1
3	THD and PF Test	2020/9/3	W34-35L-850	M1

Remark(If any)

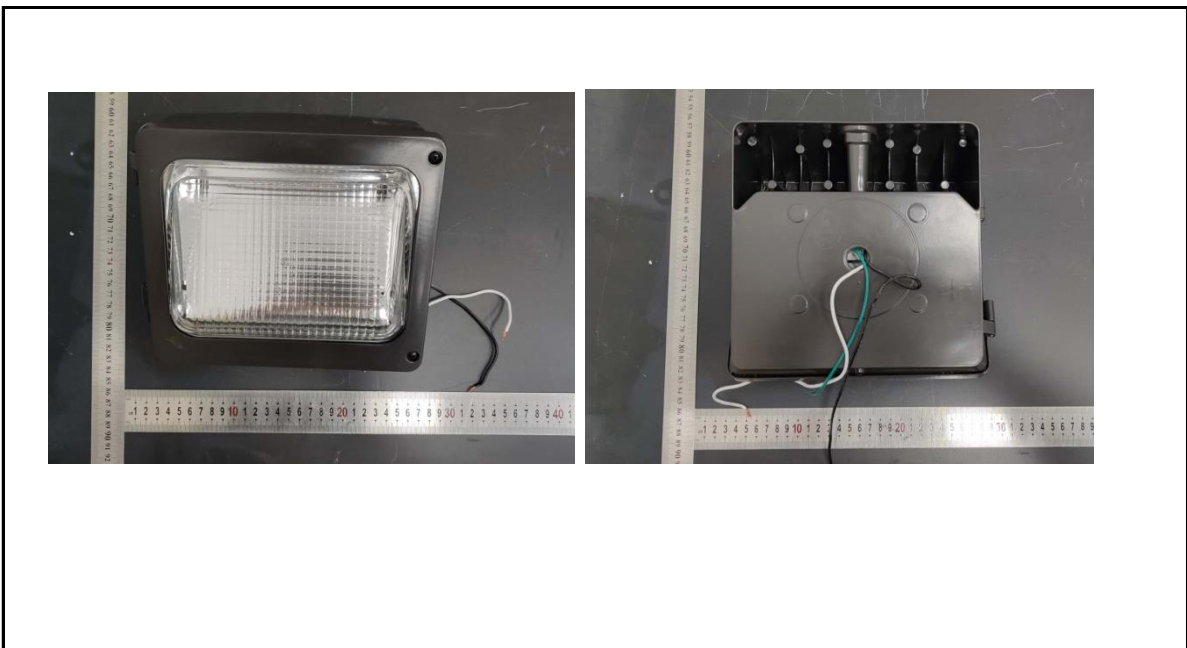
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3.0 Production Description

Luminaire Description: W34-35L-850

Electrical Specification: 120V-277V,50/60HZ

Photos of Luminaire Characteristics



4.0 LM-79 Measurement and Test Results

4.1 Integrating Sphere Test

Model No.	W34-35L-850	Sample ID.	M1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.1	Humidity (%RH)	57.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.01	60	0.280	33.5	0.995
277.04	60	0.127	33.0	0.939

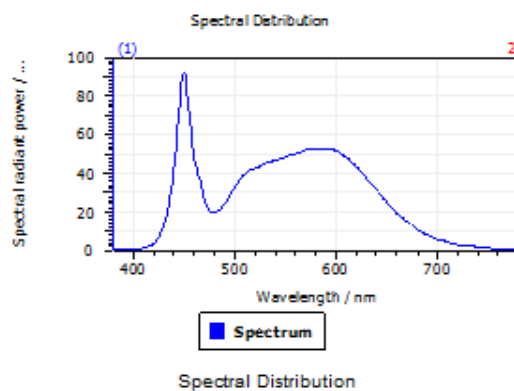
Test Result

CCT (K)	CRI	R9	Duv
5006	84	12	0.00014

Rf	Rg	IES Rcs,h1
84	98	-12%

4.1 Integrating Sphere Test

Results

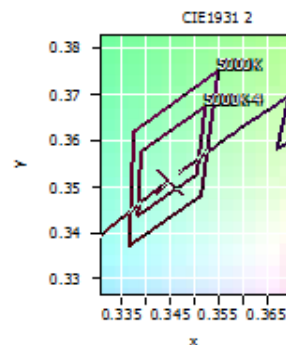


Spectral values

DominantWavelength 572.90 nm
Purity 0.089
PeakWavelength 449.58 nm
Radiant Power 10.5 W
Width50%:

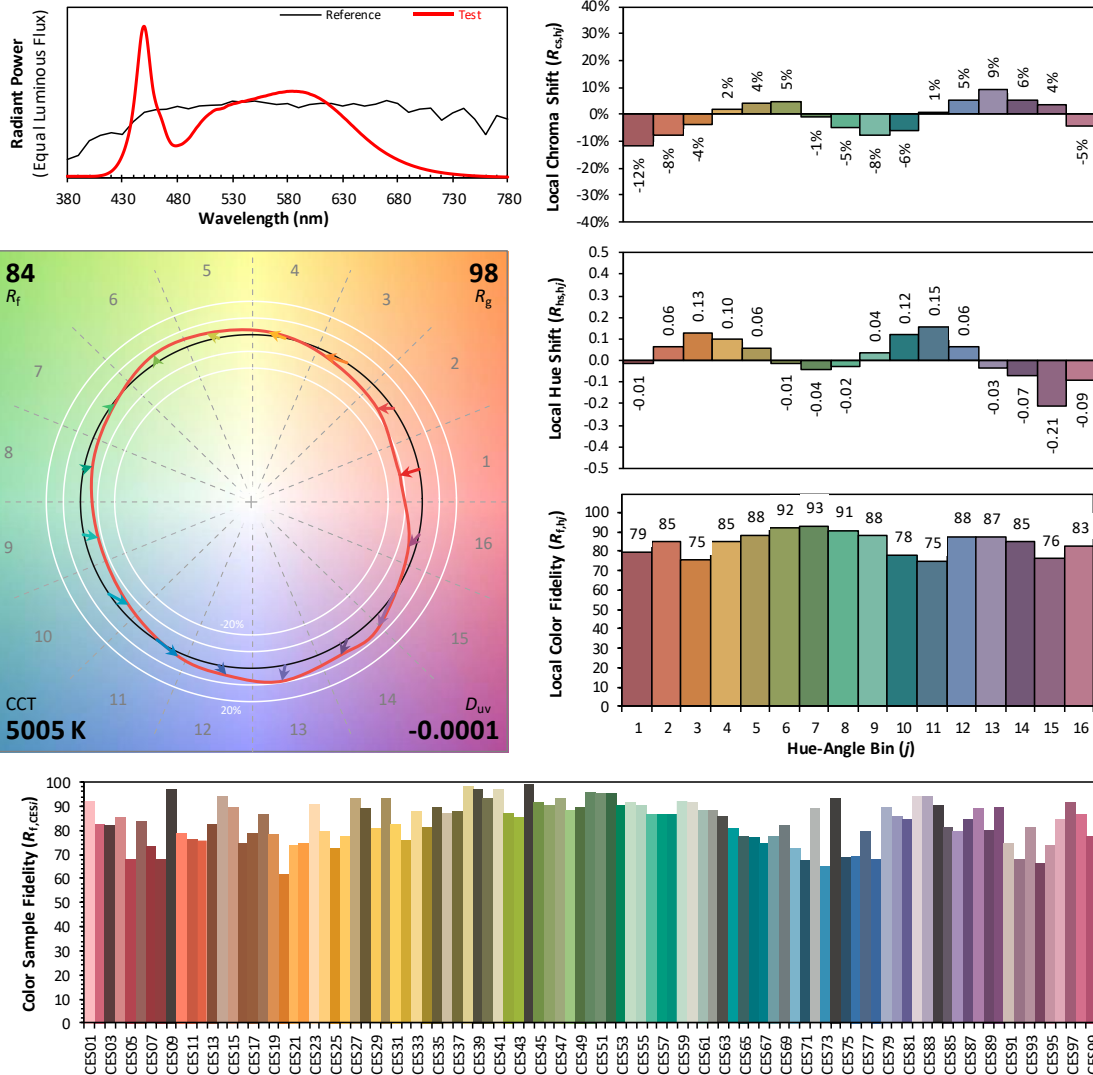
Color Coordinates

Correlated Color Temperatu 5006 K
x: 0.3449 u: 0.2115 u': 0.2115
y: 0.3512 v: 0.3230 v': 0.4845
CRI01 82.6 CRI09 11.8
CRI02 88.3 CRI10 72.1
CRI03 91.9 CRI11 84.4
CRI04 84.4 CRI12 64.7
CRI05 83.7 CRI13 83.9
CRI06 83.7 CRI14 95.7
CRI07 86.5 CRI15 77.4
CRI08 68.6 CRI16 76.3
ResultsCRI 83.7



PlankDistance 1.4E-004

4.1 Integrating Sphere Test



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3449
 y 0.3512
 u' 0.2115
 v' 0.4845

CIE 13.3-1995
 (CRI)

R_a 84

R_g 12

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	W34-35L-850	Sample ID.	M1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

The samples were tested according to the IES LM-79-2008.

Photometric parameters were measured using a type C goniophotometer and software.

The ambient temperature shall be maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$, measured at a point not more than 1 m from the sample and at the same height as the sample.

The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ± 0.2 percent under load.

The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5° vertical intervals and 10° horizontal intervals.

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.04	60	0.279	33.3	0.994
NON-WORST CASE	277.02	60	0.126	32.8	0.938

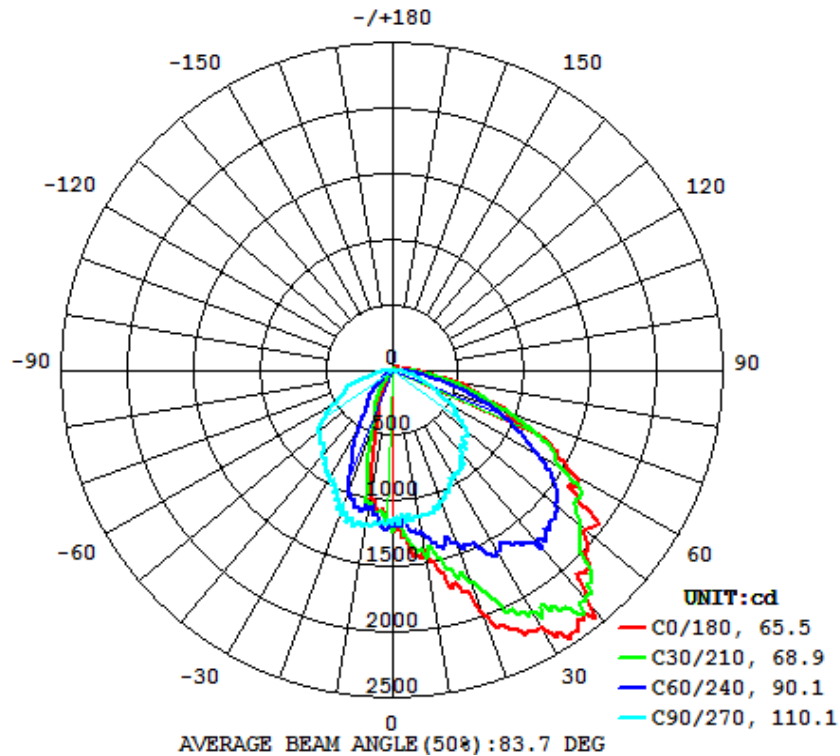
Test Result

Result type	Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
		C0-180	C90-270	C0-180	C90-270	
0° - 180° zones	4171	109.2	159.5	65.5	110.1	125.1
0° - 90° zones	4064	109.2	159.5	65.5	110.1	121.9

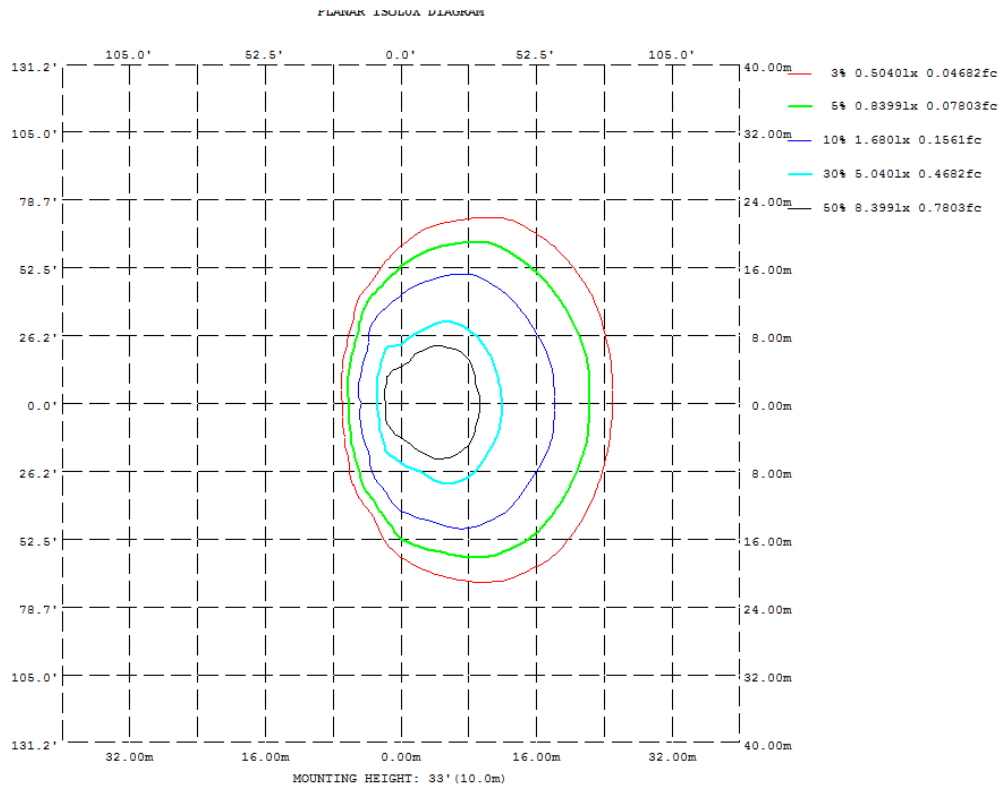
Zonal Lumen Requirement (80° - 90°)	BUG rating
2.55%	B1-U3-G2

4.2 Goniophotometer Test

Light Distribution Curve



Isolux Plot



4.2 Goniophotometer Test

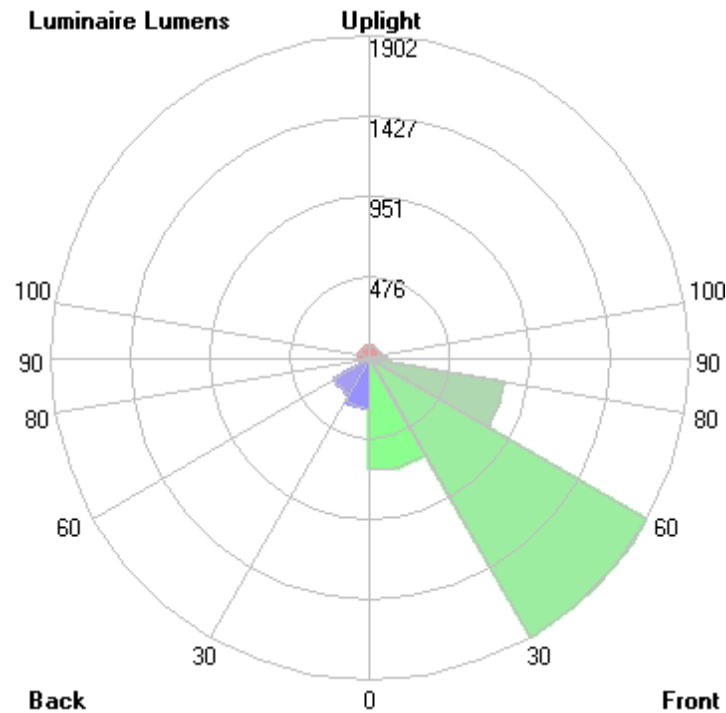
Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	1385	1408	1142	1013	998.8	1064	1179	1387
20	1973	1586	1063	577.5	303.5	655.5	1141	1630
30	2268	1944	921.5	293.2	162.7	299.4	956.3	2005
40	2274	1940	804.4	141.4	54.12	166.5	829.6	2012
50	1899	1878	762.2	41.22	22.63	40.01	734.0	1899
60	1578	1469	483.2	9.206	0.1174	9.065	516.5	1497
70	933.4	921.5	278.1	0.1681	0.2109	0.1075	354.5	995.6
80	464.1	357.9	111.5	0.4224	0.2269	0.4971	126.9	392.0
90	153.8	92.53	12.61	0.6230	0.3074	0.4967	20.65	107.9
100	100.6	39.49	9.385	0.8303	0.8001	0.8608	9.274	49.91
110	52.72	30.30	8.328	0.9995	1.353	1.144	9.311	29.51
120	51.23	27.37	6.508	1.285	1.899	1.544	7.984	26.34
130	55.13	22.36	2.706	1.496	2.419	1.930	4.065	23.47
140	37.38	15.25	2.068	1.649	2.774	2.275	2.708	18.59
150	18.06	6.711	1.364	1.656	2.773	2.459	2.021	8.942
160	3.850	1.169	1.351	1.510	2.425	2.295	2.120	1.966
170	1.283	1.382	1.518	1.720	1.958	1.876	1.941	2.080
180	1.601	1.556	1.697	1.939	1.597	1.553	1.622	1.876
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	112.97	0 - 10	112.97	2.71%
10-20	324.36	0 - 20	437.33	10.48%
20-30	522.90	0 - 30	960.23	23.02%
30-40	688.66	0 - 40	1648.89	39.53%
40-50	751.96	0 - 50	2400.85	57.56%
50-60	708.13	0 - 60	3108.98	74.54%
60-70	548.63	0 - 70	3657.61	87.69%
70-80	299.78	0 - 80	3957.39	94.88%
80-90	106.21	0 - 90	4063.60	97.42%
90-100	41.77	0 - 100	4105.37	98.43%
100-110	19.37	0 - 110	4124.74	98.89%
110-120	16.12	0 - 120	4140.86	99.28%
120-130	12.79	0 - 130	4153.65	99.58%
130-140	10.14	0 - 140	4163.79	99.83%
140-150	4.85	0 - 150	4168.64	99.94%
150-160	1.71	0 - 160	4170.35	99.98%
160-170	0.49	0 - 170	4170.84	100.00%
170-180	0.17	0 - 180	4171.01	100.00%

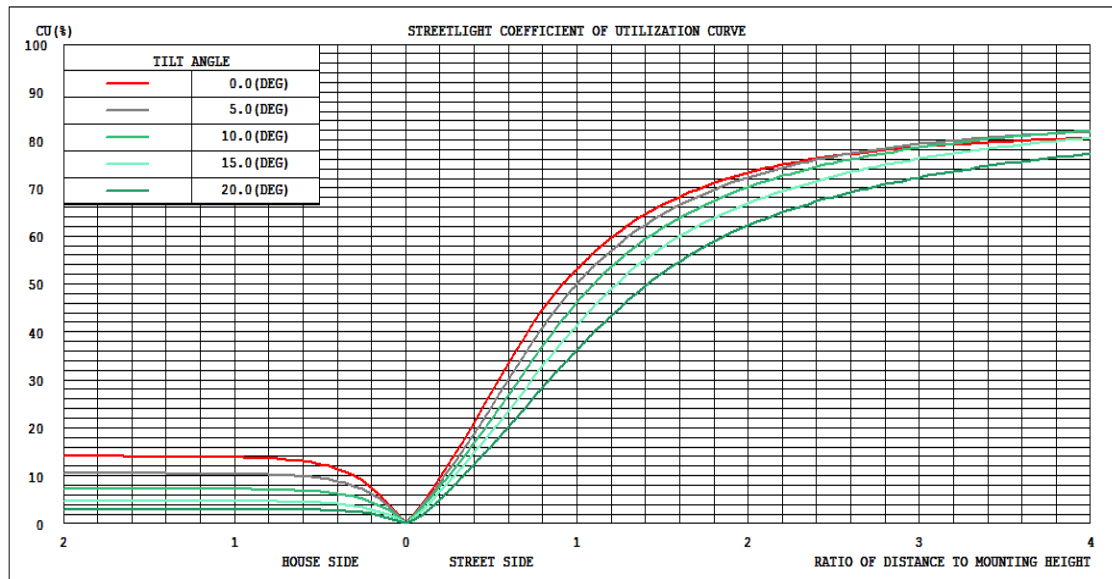
4.2 Goniophotometer Test

LCS/BUG

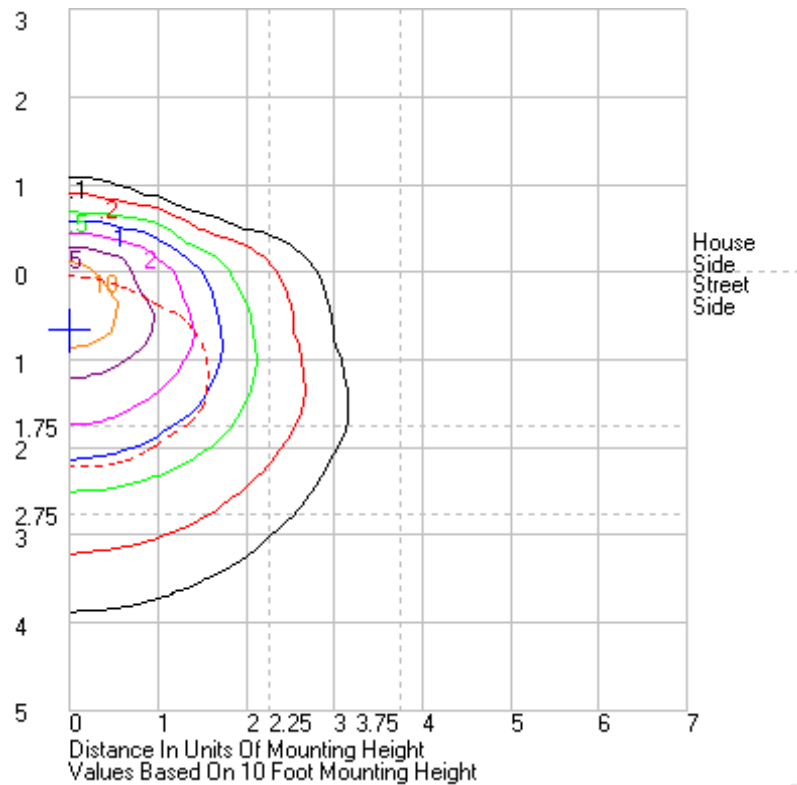


	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	663.0	N.A.	15.9
FM - Front-Medium (30-60)	1902.2	N.A.	45.6
FH - Front-High (60-80)	810.1	N.A.	19.4
FVH - Front-Very High (80-90)	102.5	N.A.	2.5
BL - Back-Low (0-30)	297.2	N.A.	7.1
BM - Back-Medium (30-60)	246.5	N.A.	5.9
BH - Back-High (60-80)	38.3	N.A.	0.9
BVH - Back-Very High (80-90)	3.7	N.A.	0.1
UL - Uplight-Low (90-100)	41.8	N.A.	1.0
UH - Uplight-High (100-180)	65.6	N.A.	1.6
Total	4170.9	N.A.	100.0
BUG Rating	B1-U3-G2		

Coefficients of Utilization



Isolines



	0	15	30	45	60	75	90	105	120	135
0	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743
1	1231.460	1224.290	1210.380	1195.060	1179.560	1156.480	1127.660	1118.360	1130.940	1163.070
2	1178.380	1169.500	1147.840	1147.910	1175.100	1189.640	1157.090	1153.150	1156.500	1146.380
3	1228.170	1196.850	1153.640	1164.620	1189.520	1217.770	1159.900	1194.950	1195.460	1190.700
4	1279.900	1251.940	1262.670	1197.930	1151.170	1139.590	1094.780	1152.280	1166.720	1124.050
5	1319.560	1264.040	1273.470	1249.340	1140.190	1171.870	1163.120	1161.070	1099.750	1055.160
6	1398.290	1319.680	1319.070	1241.450	1205.430	1172.790	1133.800	1178.100	1101.560	981.090
7	1419.290	1375.900	1359.710	1304.450	1241.170	1133.760	1112.610	1123.350	1065.840	1047.610
8	1401.950	1383.580	1400.350	1338.420	1234.410	1173.160	1159.390	1151.410	996.360	1085.030
9	1449.740	1433.030	1377.520	1371.960	1272.480	1158.020	1132.300	1118.510	1034.490	1018.500
10	1384.630	1432.970	1430.140	1408.360	1251.530	1143.720	1142.150	1084.460	1037.100	1013.230
11	1442.900	1395.840	1440.070	1386.730	1267.440	1155.310	1133.200	1083.850	1033.380	1000.660
12	1486.230	1480.950	1360.290	1423.960	1309.040	1152.680	1117.310	1080.270	1035.400	997.040
13	1564.490	1482.280	1432.390	1387.520	1350.640	1166.100	1135.260	1040.200	1054.950	962.280
14	1603.460	1574.330	1465.780	1380.840	1362.130	1168.500	1145.480	1059.600	1050.240	917.560
15	1707.700	1629.490	1556.810	1398.210	1389.420	1152.860	1113.450	1016.510	1021.170	832.730
16	1689.110	1724.450	1575.540	1438.450	1415.280	1123.330	1136.420	1012.960	1029.820	790.680
17	1731.570	1684.800	1631.020	1433.290	1373.730	1163.330	1110.680	1030.260	980.220	736.130
18	1779.020	1778.290	1659.590	1515.540	1335.150	1136.500	1090.700	1006.510	976.370	663.840
19	1807.850	1792.520	1622.250	1593.570	1396.700	1157.920	1097.800	1033.320	934.180	620.490
20	1973.140	1872.210	1702.870	1585.860	1399.030	1164.390	1063.230	1007.910	841.460	577.530
21	2013.060	1998.900	1743.510	1643.130	1440.560	1144.430	1072.330	1037.750	805.220	527.210
22	2113.980	2003.160	1788.180	1678.090	1455.630	1178.820	1047.530	1006.360	776.860	481.830
23	2110.250	2102.310	1872.800	1643.070	1453.750	1138.960	1047.950	1012.520	739.050	435.090
24	2152.080	2095.240	1915.770	1681.010	1446.970	1162.420	1007.880	989.040	680.550	385.640
25	2175.560	2147.590	2041.520	1726.440	1456.650	1101.590	1031.680	958.480	651.380	352.330
26	2219.560	2166.730	2031.180	1716.440	1494.090	1198.220	970.310	927.130	622.740	332.770
27	2235.920	2176.290	2090.380	1823.170	1563.110	1138.550	987.770	905.370	563.370	320.660
28	2256.090	2187.130	2086.430	1896.190	1590.460	1218.290	934.760	897.810	513.240	309.970
29	2264.240	2177.880	2142.030	1882.180	1631.480	1172.260	961.920	862.100	479.270	303.540
30	2268.180	2188.410	2122.890	1944.460	1584.600	1207.440	921.540	889.630	441.170	293.150
31	2349.180	2200.750	2202.680	1941.690	1588.870	1170.970	942.970	824.900	411.130	281.260
32	2349.720	2258.580	2123.500	1914.710	1548.730	1148.980	934.290	817.420	359.330	270.030
33	2445.550	2292.250	2191.280	1887.100	1572.190	1170.160	921.400	756.910	337.070	255.660
34	2418.270	2362.290	2166.480	1919.950	1598.130	1139.440	918.070	750.850	324.880	237.700
35	2438.480	2338.130	2241.190	1891.210	1618.470	1195.570	893.010	735.650	313.170	221.850
36	2399.150	2335.180	2231.530	1893.420	1638.360	1146.430	922.080	733.940	300.660	207.190
37	2379.180	2332.990	2333.450	1924.250	1646.930	1157.030	865.440	736.860	294.510	191.790
38	2351.140	2329.500	2344.350	1919.610	1683.220	1129.160	852.860	681.890	283.000	177.740
39	2443.930	2288.740	2267.280	1946.630	1708.330	1086.330	861.770	614.320	274.500	160.440
40	2274.220	2362.990	2276.010	1940.380	1758.520	1058.370	804.380	588.050	264.610	141.390
41	2200.630	2261.420	2262.510	1958.720	1702.480	1003.450	774.380	569.420	254.830	123.380
42	2083.400	2168.170	2211.490	1967.660	1748.360	1002.630	799.780	531.680	245.360	107.920
43	2122.430	2066.120	2208.080	1975.380	1699.790	1011.520	822.540	502.240	232.390	93.910
44	2117.080	2082.690	2148.730	1968.270	1676.750	1032.960	784.530	483.070	219.370	81.700
45	2108.280	2087.700	2069.650	1941.940	1682.710	1022.700	742.690	459.360	207.510	71.300
46	2041.040	2077.870	1974.040	1966.030	1651.720	976.860	750.730	417.120	198.860	62.860
47	2015.950	2028.960	1948.360	1947.310	1668.560	974.100	751.330	388.660	188.160	56.320
48	1982.610	2006.890	1909.440	1940.780	1642.210	996.760	751.330	371.950	172.990	49.780
49	1942.220	1982.110	1883.410	1906.340	1639.850	1006.990	759.060	349.710	151.490	45.270
50	1898.780	1917.990	1864.180	1878.500	1618.470	991.370	762.160	325.210	130.030	41.220
51	1908.190	1871.380	1822.110	1814.880	1601.900	973.450	722.470	300.840	112.510	37.050
52	1935.690	1895.150	1776.550	1733.520	1579.860	982.240	688.810	272.760	95.950	33.080
53	1955.730	1918.430	1742.980	1669.970	1563.700	966.710	662.000	242.410	81.150	28.960
54	1822.730	1966.840	1711.910	1620.510	1522.690	946.460	619.380	213.760	67.640	25.060
55	1710.240	1840.370	1706.730	1575.580	1491.000	902.670	591.010	187.650	57.490	21.740
56	1628.800	1725.610	1708.620	1553.260	1462.230	867.970	590.150	166.480	47.450	18.310

57	1607.000	1606.030	1712.940	1527.550	1415.020	869.230	580.710	147.700	38.670	15.570
58	1658.440	1587.230	1637.440	1505.990	1364.770	836.130	556.200	140.000	32.230	13.570
59	1637.210	1621.170	1533.880	1493.380	1306.400	804.290	521.630	130.870	27.060	11.360
60	1577.570	1612.100	1438.700	1469.120	1250.400	779.570	483.250	124.930	23.070	9.210
61	1505.610	1534.500	1411.500	1434.310	1195.820	740.400	446.370	120.510	19.240	7.270
62	1409.850	1454.370	1400.200	1395.490	1157.290	700.380	429.290	114.430	16.580	5.200
63	1401.480	1361.260	1376.470	1334.180	1114.040	679.420	409.780	106.330	14.070	3.130
64	1349.920	1335.980	1327.540	1279.590	1061.240	662.880	396.900	100.370	12.070	1.500
65	1301.460	1281.450	1257.090	1229.560	1017.680	643.270	380.320	94.260	9.750	0.270
66	1211.400	1229.030	1187.920	1183.020	975.580	599.530	357.310	87.120	7.730	0.140
67	1077.980	1122.850	1123.710	1131.540	923.970	557.250	334.770	79.590	6.160	0.140
68	981.890	997.010	1057.280	1072.400	873.700	504.810	318.320	72.460	4.710	0.150
69	931.080	924.490	987.290	1007.120	824.070	450.790	291.230	66.340	3.370	0.160
70	933.410	881.840	912.480	921.530	775.580	409.150	278.140	61.820	2.040	0.170
71	865.160	850.040	828.960	825.840	720.330	370.890	255.130	57.320	1.280	0.180
72	799.940	794.410	764.670	745.730	667.280	347.710	239.000	52.100	1.130	0.190
73	733.550	720.170	717.210	680.980	612.200	319.510	220.940	45.970	1.060	0.200
74	695.240	671.000	673.320	630.560	557.020	292.820	205.570	39.750	1.000	0.220
75	657.560	642.290	627.700	579.140	499.640	271.900	199.240	34.770	0.980	0.230
76	627.390	613.950	582.080	526.240	446.220	246.410	184.690	30.790	0.970	0.250
77	597.220	583.340	548.850	479.440	402.270	224.300	177.960	27.740	0.950	0.310
78	572.040	543.670	512.710	437.650	358.190	202.970	162.490	25.460	0.920	0.330
79	530.880	499.980	469.070	396.490	311.500	180.450	129.310	23.060	0.890	0.340
80	464.060	445.710	421.970	357.880	270.810	160.600	111.460	20.410	0.860	0.420
81	389.850	379.720	359.380	325.960	232.830	138.820	89.320	18.240	0.820	0.490
82	334.420	323.860	304.710	285.850	203.880	117.950	69.640	16.070	0.780	0.480
83	301.460	289.320	256.200	243.990	180.020	101.460	55.760	13.450	0.750	0.470
84	270.240	264.010	227.870	202.370	159.200	85.720	42.000	11.190	0.720	0.470
85	244.870	240.030	212.440	172.700	139.530	72.290	30.060	9.470	0.700	0.470
86	227.940	220.610	192.140	153.980	116.880	62.180	23.030	8.210	0.700	0.490
87	209.460	200.470	173.030	138.580	98.430	53.720	18.040	7.240	0.720	0.510
88	187.480	178.210	154.000	123.900	85.560	45.260	14.910	6.560	0.730	0.540
89	170.300	157.900	134.300	108.390	75.800	39.830	13.410	5.880	0.750	0.580
90	153.830	143.480	118.320	92.530	68.020	35.360	12.610	5.380	0.760	0.620
91	143.180	132.490	105.960	78.180	61.060	31.510	11.050	5.120	0.780	0.670
92	135.500	126.610	98.480	67.480	53.500	28.950	10.130	5.060	0.770	0.720
93	136.330	129.130	98.560	65.540	46.500	26.790	9.750	4.920	0.760	0.760
94	141.420	132.410	100.120	63.710	41.700	24.830	9.330	4.570	0.750	0.760
95	144.010	134.860	102.300	61.890	38.930	23.220	9.080	4.300	0.750	0.760
96	148.830	137.620	101.880	59.780	36.790	21.780	9.000	4.080	0.740	0.760
97	153.300	138.890	98.670	56.420	34.670	20.540	9.060	3.940	0.640	0.780
98	148.280	130.430	89.620	51.870	32.550	19.760	9.150	3.790	0.610	0.790
99	129.570	110.480	72.400	45.910	30.900	18.930	9.340	3.610	0.610	0.810
100	100.610	83.240	57.840	39.490	29.450	18.480	9.390	3.460	0.630	0.830
101	77.050	64.280	46.720	34.500	27.890	17.700	9.450	3.380	0.650	0.770
102	65.650	57.060	39.210	31.810	26.880	17.340	9.450	3.350	0.680	0.770
103	60.250	49.860	37.100	30.370	26.080	16.830	9.420	3.320	0.700	0.770
104	54.850	47.630	36.600	29.610	25.420	16.110	9.230	3.270	0.720	0.800
105	53.390	47.360	37.020	29.490	24.990	15.750	9.080	3.240	0.740	0.840
106	53.840	47.440	37.640	29.300	24.810	15.250	8.860	3.220	0.770	0.870
107	53.210	48.450	38.160	29.660	24.680	14.600	8.730	3.140	0.790	0.910
108	53.140	48.580	39.170	30.010	24.750	14.070	8.580	3.090	0.810	0.940
109	52.850	49.480	40.530	30.460	25.020	13.650	8.420	3.060	0.840	0.970
110	52.720	48.660	41.410	30.300	25.080	12.980	8.330	2.970	0.860	1.000
111	52.280	48.690	41.210	30.300	24.660	12.290	8.190	2.910	0.880	1.030
112	54.060	48.070	40.320	30.170	23.810	11.570	8.120	2.880	0.910	1.060
113	53.560	48.360	39.330	30.220	23.220	10.810	8.080	2.820	0.930	1.090
114	54.400	49.630	38.290	30.400	22.530	9.990	8.070	2.750	0.950	1.120
115	55.710	50.230	38.310	30.010	21.890	9.140	8.010	2.650	0.980	1.150
116	56.190	50.110	38.290	29.480	21.370	8.450	7.920	2.520	1.000	1.180

117	55.000	50.110	38.480	28.990	20.770	7.860	7.660	2.350	1.030	1.210
118	55.060	49.620	38.240	28.430	20.010	7.340	7.280	2.190	1.050	1.230
119	53.390	47.890	37.730	27.940	19.310	6.890	6.890	2.060	1.080	1.260
120	51.230	47.400	37.490	27.370	18.550	6.440	6.510	1.980	1.110	1.280
121	51.500	46.960	36.950	26.810	17.690	6.050	6.070	1.900	1.130	1.310
122	51.200	46.330	36.330	26.180	16.650	5.720	5.550	1.830	1.150	1.330
123	50.700	46.470	36.180	25.540	15.780	5.460	5.080	1.770	1.170	1.360
124	51.750	46.960	35.870	24.920	15.030	5.250	4.640	1.710	1.200	1.380
125	51.920	46.940	36.060	24.500	14.330	5.060	4.240	1.660	1.220	1.400
126	52.090	47.160	36.390	23.890	13.570	4.900	3.830	1.620	1.240	1.420
127	52.480	48.510	36.520	23.500	13.050	4.710	3.490	1.590	1.270	1.440
128	53.820	48.950	36.640	23.230	12.490	4.540	3.180	1.560	1.290	1.460
129	54.330	49.420	37.080	22.730	12.060	4.340	2.930	1.530	1.310	1.480
130	55.130	50.840	37.710	22.360	11.620	4.200	2.710	1.500	1.330	1.500
131	57.270	51.480	38.410	22.230	11.220	4.110	2.550	1.500	1.350	1.510
132	56.760	51.980	39.200	22.310	10.770	4.090	2.450	1.500	1.370	1.530
133	55.790	51.910	39.740	22.370	10.060	4.050	2.360	1.500	1.380	1.540
134	53.300	49.570	39.300	22.380	9.640	3.980	2.290	1.490	1.400	1.550
135	49.570	46.140	37.830	21.940	9.260	3.910	2.240	1.480	1.420	1.570
136	45.660	42.540	35.810	21.020	8.870	3.880	2.210	1.470	1.440	1.580
137	42.730	39.830	33.230	19.470	8.460	3.870	2.180	1.470	1.460	1.600
138	40.490	37.700	30.690	17.690	8.010	3.840	2.160	1.470	1.480	1.610
139	38.730	35.840	28.280	16.260	7.540	3.780	2.120	1.480	1.490	1.630
140	37.380	34.300	26.080	15.250	6.700	3.700	2.070	1.490	1.510	1.650
141	35.990	32.560	24.120	14.390	5.880	3.580	1.990	1.490	1.530	1.660
142	34.320	30.580	22.410	13.510	5.030	3.440	1.890	1.480	1.540	1.670
143	32.100	28.450	20.860	12.750	4.090	3.270	1.780	1.480	1.550	1.680
144	29.530	26.060	19.470	12.040	3.120	3.040	1.680	1.480	1.550	1.680
145	26.910	23.920	18.230	11.320	2.060	2.760	1.610	1.470	1.560	1.680
146	24.580	22.010	17.160	10.640	1.300	2.440	1.550	1.470	1.570	1.680
147	22.560	20.380	16.220	9.980	1.130	2.090	1.510	1.470	1.580	1.680
148	20.860	18.970	15.310	9.280	1.120	1.660	1.460	1.470	1.580	1.680
149	19.370	17.700	14.330	8.460	1.140	1.310	1.410	1.470	1.580	1.670
150	18.060	16.580	13.170	6.710	1.150	1.260	1.360	1.460	1.560	1.660
151	16.910	15.450	12.110	5.180	1.170	1.260	1.360	1.460	1.550	1.640
152	15.690	14.240	11.130	3.650	1.190	1.270	1.360	1.460	1.550	1.630
153	14.440	13.010	10.120	2.520	1.210	1.290	1.370	1.450	1.540	1.610
154	13.180	11.920	9.290	1.570	1.220	1.300	1.370	1.450	1.540	1.600
155	11.980	10.760	7.120	1.110	1.240	1.300	1.370	1.450	1.530	1.590
156	10.730	9.670	5.330	1.120	1.250	1.310	1.380	1.450	1.520	1.570
157	9.580	8.130	3.550	1.130	1.250	1.310	1.370	1.440	1.510	1.550
158	7.760	6.030	2.190	1.150	1.250	1.310	1.360	1.430	1.490	1.530
159	5.800	4.160	1.230	1.160	1.260	1.300	1.360	1.420	1.480	1.520
160	3.850	2.470	1.070	1.170	1.260	1.300	1.350	1.420	1.470	1.510
161	2.160	1.320	1.090	1.180	1.270	1.300	1.350	1.420	1.470	1.510
162	1.150	1.050	1.110	1.200	1.280	1.310	1.350	1.420	1.470	1.500
163	1.080	1.080	1.130	1.220	1.290	1.310	1.360	1.430	1.480	1.510
164	1.110	1.100	1.160	1.240	1.300	1.330	1.370	1.440	1.490	1.530
165	1.130	1.120	1.180	1.260	1.310	1.340	1.380	1.450	1.510	1.550
166	1.160	1.150	1.200	1.280	1.330	1.350	1.400	1.470	1.530	1.570
167	1.190	1.170	1.220	1.300	1.350	1.380	1.420	1.500	1.550	1.600
168	1.220	1.200	1.250	1.330	1.370	1.400	1.450	1.530	1.590	1.640
169	1.250	1.220	1.280	1.360	1.390	1.430	1.480	1.570	1.630	1.680
170	1.280	1.250	1.310	1.380	1.420	1.460	1.520	1.610	1.670	1.720
171	1.310	1.280	1.340	1.410	1.450	1.490	1.560	1.650	1.710	1.760
172	1.340	1.310	1.380	1.440	1.480	1.530	1.600	1.690	1.760	1.820
173	1.370	1.340	1.400	1.450	1.500	1.550	1.630	1.720	1.800	1.850
174	1.390	1.370	1.420	1.450	1.500	1.550	1.640	1.730	1.810	1.870
175	1.410	1.390	1.420	1.450	1.490	1.540	1.620	1.720	1.810	1.880
176	1.430	1.410	1.440	1.450	1.480	1.530	1.610	1.710	1.810	1.880

177	1.470	1.450	1.460	1.470	1.500	1.550	1.630	1.720	1.810	1.890
178	1.500	1.480	1.490	1.490	1.510	1.560	1.640	1.730	1.830	1.900
179	1.550	1.530	1.520	1.520	1.540	1.590	1.670	1.760	1.850	1.920
180	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600

Vert. Angles	Horizontal Angles									
	150	165	180	195	210	225	240	255	270	285
0	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743	1172.743
1	1184.360	1193.460	1212.050	1212.200	1192.140	1161.620	1138.100	1129.660	1148.490	1179.950
2	1158.580	1184.840	1207.790	1203.670	1176.000	1185.250	1187.840	1144.430	1157.680	1201.280
3	1089.020	1091.570	1115.950	1112.090	1153.070	1208.200	1223.830	1193.030	1183.150	1240.340
4	1074.490	1014.760	1073.760	1066.240	1107.390	1148.910	1206.470	1188.470	1152.620	1195.430
5	1061.780	1021.070	1075.540	1044.540	1066.310	1119.110	1169.670	1195.000	1166.160	1171.190
6	1072.930	1030.950	1093.550	1058.010	1088.370	1061.070	1117.150	1215.330	1187.890	1186.660
7	1047.900	1016.920	1062.570	1052.960	1104.030	1068.460	1114.240	1195.260	1162.540	1165.090
8	1009.130	1009.660	1015.420	1050.570	1078.480	1079.570	1079.390	1208.940	1199.700	1157.740
9	968.450	1013.110	1000.030	1033.500	1052.180	1102.170	1048.030	1215.580	1195.050	1182.840
10	983.890	1041.140	998.840	1047.090	1036.040	1063.920	1076.030	1170.870	1178.930	1190.890
11	1010.540	887.190	841.790	943.730	1024.740	1050.500	1052.650	1146.520	1212.100	1213.140
12	892.520	807.820	760.470	860.460	982.630	1026.440	1073.190	1115.770	1207.400	1238.410
13	799.410	727.400	675.000	778.420	867.630	1016.790	1101.580	1113.250	1183.040	1227.900
14	716.390	660.170	632.280	695.140	792.820	999.920	1084.270	1119.810	1215.940	1247.910
15	662.940	584.960	549.050	648.880	724.090	927.470	1084.290	1103.320	1210.120	1239.490
16	610.830	509.670	495.360	558.230	687.330	854.810	1051.560	1083.160	1171.090	1250.330
17	558.490	461.690	438.450	523.160	623.070	803.050	1034.330	1056.570	1216.300	1244.090
18	501.180	395.480	360.180	448.550	551.770	746.750	1027.230	1078.670	1153.000	1266.790
19	445.610	354.890	325.180	379.730	514.120	704.510	997.230	1053.800	1165.190	1257.620
20	389.640	330.520	303.490	354.170	450.160	655.550	1005.790	1081.110	1141.500	1284.630
21	355.750	315.620	293.410	330.560	387.280	609.220	939.570	1038.490	1099.990	1296.010
22	334.910	296.790	280.710	315.460	359.560	563.750	903.810	1065.050	1110.330	1277.770
23	318.070	279.740	260.240	295.600	337.450	516.740	836.620	1017.450	1058.410	1303.080
24	304.430	272.420	248.030	284.470	324.990	478.990	808.900	1027.610	1067.970	1264.430
25	290.880	267.180	230.770	277.920	310.160	426.390	740.810	1011.220	1017.440	1259.600
26	279.810	249.210	216.040	265.040	294.320	369.060	686.280	993.370	1032.220	1206.540
27	268.430	230.870	201.750	248.620	284.570	342.530	683.210	976.680	978.740	1244.470
28	255.760	213.900	195.350	227.800	276.970	325.540	632.580	964.450	987.340	1241.800
29	241.060	197.610	180.170	212.310	261.670	313.220	602.860	955.400	962.810	1288.720
30	226.160	177.100	162.670	193.750	244.990	299.440	530.120	942.100	956.260	1295.860
31	213.090	155.600	143.580	177.300	230.660	292.480	514.130	938.930	945.180	1306.380
32	196.300	135.180	125.770	155.360	214.010	281.180	477.640	915.560	926.650	1255.450
33	176.160	116.200	106.840	133.500	198.550	267.120	435.280	904.990	920.400	1257.220
34	155.810	100.240	91.510	114.540	183.950	259.330	397.790	905.310	902.480	1209.470
35	134.370	88.920	81.540	98.660	162.460	244.640	361.490	878.750	886.280	1215.510
36	114.780	79.920	72.610	86.420	140.960	229.330	341.940	877.700	888.530	1191.000
37	101.200	71.040	63.240	76.920	120.520	216.560	325.010	858.190	851.950	1212.940
38	89.210	63.530	57.730	68.370	103.690	204.570	310.630	839.470	855.260	1226.720
39	78.810	59.340	54.340	60.460	89.720	185.650	297.980	805.670	848.930	1195.790
40	69.620	55.150	54.120	56.700	78.610	166.510	285.500	796.170	829.620	1205.610
41	61.580	53.150	51.830	55.540	69.680	148.140	275.800	754.390	803.760	1193.760
42	56.730	50.420	49.170	53.270	60.590	129.780	264.230	710.920	791.080	1183.780
43	52.990	47.050	45.840	50.580	55.240	111.580	251.570	668.200	779.080	1149.000
44	49.770	43.180	42.030	46.820	51.650	95.270	238.100	637.420	776.090	1158.190
45	47.240	39.450	38.830	42.840	48.760	80.530	220.700	594.490	777.370	1142.940
46	44.630	36.590	35.910	38.660	45.510	68.290	204.920	570.790	764.890	1119.930
47	40.740	33.880	34.570	34.920	41.910	59.640	192.410	545.850	746.690	1117.640
48	36.850	31.030	28.540	32.630	37.970	51.810	176.240	509.580	741.980	1092.660
49	33.210	25.280	24.050	28.670	33.210	45.040	156.370	483.240	737.680	1067.930
50	30.500	22.580	22.630	23.480	29.270	40.010	136.500	459.400	734.020	1053.340
51	26.430	20.180	20.610	21.510	26.000	36.030	117.380	433.800	733.940	1058.470

52	21.850	18.750	19.580	19.330	23.460	32.140	100.820	411.240	712.740	1070.810
53	19.370	17.480	18.660	17.960	19.510	28.110	85.200	377.460	686.240	1080.710
54	16.840	15.360	15.220	16.740	16.900	24.040	71.600	332.060	664.940	1071.070
55	14.620	13.570	10.980	14.070	15.030	20.120	58.410	286.950	641.100	1053.870
56	12.540	7.190	6.790	10.320	13.230	17.200	47.170	249.990	617.900	1028.180
57	10.450	4.650	5.140	6.600	11.440	15.150	38.120	214.560	598.110	989.680
58	7.380	2.140	0.770	4.460	9.730	13.180	31.550	181.510	576.260	963.150
59	4.800	0.230	0.110	1.490	7.580	11.210	26.800	153.460	555.900	950.940
60	2.280	0.240	0.120	0.130	3.690	9.070	23.690	125.600	516.540	938.080
61	0.190	0.260	0.120	0.130	1.920	7.230	20.920	113.710	487.630	914.090
62	0.140	0.280	0.130	0.140	0.700	5.850	18.440	106.650	454.650	878.840
63	0.150	0.300	0.150	0.140	0.100	3.780	16.130	99.670	440.210	856.510
64	0.150	0.320	0.160	0.150	0.110	2.330	13.700	95.940	421.630	795.560
65	0.160	0.320	0.170	0.170	0.110	0.930	11.280	91.630	410.330	756.490
66	0.170	0.330	0.180	0.180	0.120	0.400	9.160	87.360	402.090	707.890
67	0.180	0.330	0.190	0.190	0.130	0.120	7.340	84.220	391.340	652.520
68	0.190	0.340	0.200	0.200	0.130	0.100	5.790	80.210	385.820	599.590
69	0.200	0.350	0.210	0.210	0.140	0.100	4.170	75.780	373.010	536.440
70	0.200	0.350	0.210	0.220	0.150	0.110	2.710	71.260	354.550	490.840
71	0.210	0.370	0.210	0.230	0.150	0.120	1.870	66.750	327.350	458.970
72	0.210	0.380	0.210	0.240	0.160	0.130	1.420	61.690	290.050	425.260
73	0.220	0.390	0.220	0.260	0.160	0.160	1.190	56.850	255.990	379.300
74	0.230	0.410	0.220	0.280	0.160	0.180	1.100	51.560	223.130	341.650
75	0.240	0.440	0.220	0.300	0.170	0.200	1.060	45.860	192.210	309.020
76	0.260	0.450	0.220	0.290	0.170	0.280	1.020	41.010	175.460	285.010
77	0.260	0.460	0.220	0.290	0.170	0.440	0.960	36.520	166.740	263.110
78	0.270	0.460	0.220	0.280	0.170	0.440	0.900	32.780	154.400	233.820
79	0.290	0.450	0.220	0.280	0.170	0.420	0.870	29.170	142.060	210.610
80	0.310	0.430	0.230	0.280	0.180	0.500	0.840	25.740	126.880	191.950
81	0.330	0.420	0.230	0.280	0.180	0.470	0.820	23.040	110.650	169.580
82	0.350	0.410	0.230	0.280	0.190	0.430	0.790	20.710	94.620	147.650
83	0.350	0.410	0.240	0.280	0.190	0.410	0.740	18.160	79.270	125.900
84	0.370	0.420	0.250	0.290	0.200	0.390	0.700	15.740	66.720	109.930
85	0.390	0.430	0.250	0.290	0.210	0.390	0.660	13.490	57.920	94.510
86	0.420	0.440	0.260	0.300	0.220	0.390	0.650	11.240	49.610	81.050
87	0.450	0.460	0.270	0.300	0.240	0.410	0.650	9.600	41.160	69.120
88	0.480	0.480	0.280	0.310	0.260	0.430	0.660	8.260	33.920	57.810
89	0.510	0.500	0.290	0.320	0.290	0.460	0.670	7.220	26.970	49.490
90	0.550	0.520	0.310	0.340	0.330	0.500	0.680	6.400	20.650	43.420
91	0.600	0.540	0.320	0.370	0.380	0.540	0.690	5.710	16.540	38.990
92	0.650	0.570	0.340	0.400	0.420	0.580	0.690	5.200	14.710	34.980
93	0.690	0.600	0.370	0.430	0.480	0.610	0.680	4.870	12.870	31.730
94	0.720	0.640	0.400	0.480	0.550	0.650	0.670	4.640	11.740	29.000
95	0.730	0.660	0.470	0.540	0.620	0.680	0.670	4.440	10.870	27.090
96	0.730	0.680	0.540	0.610	0.670	0.720	0.680	4.300	10.190	24.940
97	0.740	0.710	0.600	0.660	0.700	0.750	0.660	4.180	9.810	22.940
98	0.750	0.740	0.670	0.720	0.740	0.790	0.580	4.060	9.570	21.260
99	0.770	0.770	0.730	0.780	0.780	0.820	0.570	3.940	9.410	20.080
100	0.800	0.800	0.800	0.840	0.830	0.860	0.600	3.870	9.270	19.210
101	0.830	0.840	0.870	0.900	0.880	0.880	0.630	3.830	9.330	18.260
102	0.860	0.880	0.930	0.960	0.920	0.790	0.660	3.760	9.340	17.580
103	0.900	0.930	1.000	1.020	0.970	0.820	0.700	3.720	9.490	17.050
104	0.940	0.970	1.060	1.080	1.010	0.840	0.730	3.660	9.510	16.610
105	0.960	1.020	1.120	1.140	1.030	0.880	0.770	3.620	9.520	16.060
106	0.980	1.060	1.180	1.200	1.070	0.930	0.810	3.590	9.550	15.620
107	0.980	1.080	1.240	1.240	1.090	0.990	0.840	3.550	9.490	15.310
108	1.010	1.100	1.300	1.290	1.140	1.040	0.880	3.530	9.420	15.010
109	1.050	1.080	1.340	1.290	1.200	1.090	0.920	3.500	9.350	14.790
110	1.090	1.110	1.350	1.340	1.260	1.140	0.960	3.450	9.310	14.520
111	1.120	1.150	1.410	1.400	1.310	1.180	0.980	3.410	9.070	14.240

112	1.150	1.180	1.460	1.450	1.360	1.220	1.010	3.360	8.810	13.920
113	1.180	1.220	1.500	1.480	1.400	1.250	1.020	3.280	8.590	13.420
114	1.210	1.240	1.540	1.520	1.430	1.280	1.030	3.220	8.450	12.930
115	1.250	1.280	1.600	1.570	1.480	1.320	1.050	3.170	8.350	12.310
116	1.280	1.310	1.660	1.630	1.530	1.360	1.090	3.120	8.310	11.560
117	1.320	1.350	1.720	1.690	1.590	1.410	1.120	3.050	8.210	10.860
118	1.350	1.380	1.780	1.740	1.640	1.450	1.160	2.960	8.070	10.160
119	1.380	1.420	1.840	1.800	1.690	1.500	1.190	2.840	8.040	9.450
120	1.410	1.460	1.900	1.860	1.740	1.540	1.230	2.690	7.980	8.790
121	1.440	1.490	1.960	1.910	1.790	1.590	1.270	2.590	7.780	8.240
122	1.470	1.530	2.020	1.970	1.850	1.630	1.310	2.470	7.520	7.790
123	1.500	1.570	2.090	2.030	1.900	1.680	1.350	2.330	7.180	7.320
124	1.520	1.600	2.150	2.090	1.960	1.730	1.400	2.230	6.790	6.870
125	1.550	1.620	2.210	2.150	2.000	1.770	1.440	2.150	6.350	6.450
126	1.570	1.650	2.260	2.200	2.050	1.810	1.480	2.090	5.890	6.040
127	1.590	1.670	2.310	2.240	2.090	1.840	1.510	2.040	5.410	5.660
128	1.610	1.690	2.350	2.290	2.120	1.870	1.550	1.990	4.920	5.310
129	1.630	1.710	2.390	2.330	2.160	1.900	1.590	1.960	4.470	5.050
130	1.640	1.730	2.420	2.370	2.180	1.930	1.620	1.920	4.070	4.840
131	1.660	1.740	2.460	2.400	2.210	1.960	1.660	1.910	3.730	4.620
132	1.670	1.760	2.490	2.440	2.250	1.990	1.700	1.920	3.420	4.400
133	1.680	1.770	2.520	2.470	2.280	2.020	1.750	1.950	3.210	4.220
134	1.690	1.790	2.560	2.510	2.310	2.050	1.790	1.990	3.090	4.040
135	1.700	1.800	2.590	2.540	2.340	2.080	1.830	2.010	3.040	3.870
136	1.710	1.800	2.630	2.580	2.380	2.120	1.880	2.020	2.990	3.760
137	1.720	1.810	2.670	2.620	2.420	2.150	1.920	2.020	2.920	3.680
138	1.730	1.820	2.710	2.650	2.460	2.190	1.970	2.020	2.830	3.600
139	1.740	1.840	2.740	2.690	2.490	2.240	2.010	2.030	2.760	3.530
140	1.750	1.840	2.770	2.720	2.520	2.280	2.060	2.050	2.710	3.480
141	1.750	1.850	2.800	2.740	2.550	2.310	2.100	2.070	2.660	3.440
142	1.760	1.850	2.810	2.760	2.570	2.340	2.130	2.090	2.610	3.380
143	1.760	1.860	2.820	2.780	2.590	2.370	2.160	2.110	2.520	3.310
144	1.760	1.860	2.830	2.810	2.610	2.390	2.190	2.120	2.430	3.220
145	1.760	1.850	2.840	2.840	2.630	2.420	2.220	2.120	2.360	3.150
146	1.750	1.850	2.840	2.870	2.640	2.440	2.240	2.130	2.290	3.030
147	1.750	1.850	2.820	2.870	2.630	2.440	2.260	2.130	2.230	2.800
148	1.750	1.830	2.800	2.850	2.620	2.450	2.270	2.120	2.140	2.330
149	1.730	1.820	2.790	2.830	2.620	2.450	2.290	2.120	2.060	1.860
150	1.720	1.790	2.770	2.790	2.610	2.460	2.300	2.140	2.020	1.820
151	1.700	1.770	2.760	2.750	2.610	2.460	2.310	2.160	2.000	1.850
152	1.690	1.760	2.750	2.730	2.600	2.460	2.320	2.180	2.030	1.890
153	1.680	1.740	2.730	2.710	2.600	2.460	2.330	2.200	2.060	1.930
154	1.670	1.720	2.710	2.690	2.580	2.460	2.330	2.210	2.080	1.970
155	1.660	1.700	2.680	2.660	2.560	2.450	2.330	2.220	2.100	2.000
156	1.630	1.690	2.640	2.620	2.540	2.430	2.320	2.220	2.120	2.030
157	1.610	1.660	2.600	2.580	2.500	2.400	2.310	2.220	2.120	2.050
158	1.590	1.630	2.540	2.530	2.450	2.370	2.280	2.200	2.120	2.060
159	1.560	1.610	2.480	2.470	2.410	2.330	2.260	2.190	2.120	2.080
160	1.540	1.600	2.430	2.420	2.350	2.290	2.230	2.180	2.120	2.090
161	1.530	1.580	2.360	2.360	2.290	2.250	2.200	2.150	2.110	2.090
162	1.520	1.570	2.300	2.290	2.230	2.200	2.150	2.120	2.080	2.070
163	1.520	1.570	2.220	2.220	2.160	2.140	2.100	2.080	2.050	2.050
164	1.530	1.580	2.150	2.140	2.090	2.080	2.050	2.030	2.010	2.020
165	1.550	1.600	2.100	2.090	2.030	2.020	2.010	2.000	1.990	2.010
166	1.570	1.620	2.070	2.050	1.990	1.990	1.990	1.980	1.990	2.010
167	1.600	1.650	2.040	2.030	1.960	1.970	1.970	1.970	1.990	2.020
168	1.640	1.700	2.010	2.000	1.930	1.940	1.950	1.950	1.970	2.010
169	1.680	1.740	1.980	1.980	1.900	1.910	1.920	1.930	1.960	2.000
170	1.730	1.780	1.960	1.950	1.870	1.880	1.900	1.910	1.940	1.990
171	1.770	1.830	1.930	1.920	1.850	1.850	1.870	1.890	1.920	1.980

172	1.830	1.890	1.900	1.890	1.820	1.820	1.840	1.860	1.900	1.960
173	1.860	1.940	1.860	1.860	1.800	1.790	1.810	1.840	1.880	1.940
174	1.890	1.980	1.830	1.830	1.780	1.770	1.780	1.820	1.860	1.930
175	1.900	2.000	1.800	1.800	1.750	1.740	1.750	1.790	1.840	1.900
176	1.920	2.030	1.770	1.770	1.730	1.720	1.730	1.760	1.810	1.880
177	1.940	2.050	1.730	1.740	1.700	1.690	1.690	1.720	1.770	1.840
178	1.960	2.070	1.690	1.690	1.650	1.630	1.630	1.650	1.700	1.780
179	1.980	2.090	1.650	1.650	1.610	1.590	1.590	1.600	1.660	1.730
180	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600	1.600

Vert. Angles **Horizontal Angles**

	300	315	330	345	360
0	1172.743	1172.743	1172.743	1172.743	1172.743
1	1193.420	1208.910	1218.320	1222.590	1231.460
2	1184.070	1162.710	1166.770	1163.750	1178.380
3	1178.120	1156.250	1151.590	1185.720	1228.170
4	1167.480	1196.400	1255.320	1273.070	1279.900
5	1153.020	1266.860	1259.550	1272.160	1319.560
6	1224.540	1256.670	1304.230	1356.170	1398.290
7	1266.650	1274.400	1407.770	1415.460	1419.290
8	1253.220	1367.150	1414.400	1368.340	1401.950
9	1264.800	1422.190	1374.870	1431.010	1449.740
10	1297.140	1387.310	1429.720	1413.320	1384.630
11	1334.430	1370.950	1433.890	1394.420	1442.900
12	1379.970	1434.940	1404.050	1505.480	1486.230
13	1393.620	1442.280	1486.130	1539.310	1564.490
14	1349.580	1360.240	1521.490	1626.090	1603.460
15	1357.270	1384.640	1592.900	1653.610	1707.700
16	1409.420	1448.940	1588.390	1741.710	1689.110
17	1406.850	1502.310	1666.900	1714.170	1731.570
18	1440.210	1588.170	1715.500	1773.270	1779.020
19	1373.180	1632.740	1706.800	1787.030	1807.850
20	1401.900	1630.380	1749.870	1900.780	1973.140
21	1464.850	1699.120	1747.320	2009.620	2013.060
22	1470.140	1719.540	1856.440	2086.300	2113.980
23	1492.110	1710.820	1943.800	2144.110	2110.250
24	1545.820	1765.280	2010.270	2164.040	2152.080
25	1602.280	1842.000	2055.230	2185.700	2175.560
26	1609.570	1868.540	2079.990	2193.820	2219.560
27	1659.480	1942.670	2075.240	2263.590	2235.920
28	1680.510	2008.880	2142.110	2243.760	2256.090
29	1650.030	1978.130	2121.690	2283.900	2264.240
30	1643.960	2005.060	2218.200	2254.140	2268.180
31	1640.550	2007.530	2146.830	2305.870	2349.180
32	1679.410	1945.110	2181.130	2339.570	2349.720
33	1678.280	1976.690	2166.250	2366.660	2445.550
34	1675.790	1917.610	2227.070	2419.010	2418.270
35	1708.270	1980.840	2294.710	2410.330	2438.480
36	1747.250	1931.700	2320.750	2405.570	2399.150
37	1737.270	1999.130	2370.510	2342.290	2379.180
38	1760.340	1976.640	2400.590	2327.590	2351.140
39	1745.680	2002.980	2396.170	2282.490	2443.930
40	1742.410	2012.130	2348.850	2358.220	2274.220
41	1768.630	2051.550	2312.650	2206.450	2200.630
42	1746.530	2078.740	2325.060	2124.960	2083.400
43	1724.070	2057.490	2278.190	2051.220	2122.430
44	1738.540	2074.260	2183.630	2053.720	2117.080
45	1747.670	2108.510	2113.310	2045.040	2108.280
46	1713.930	2041.820	2059.590	2033.110	2041.040

47	1744.080	2008.830	2016.960	1985.330	2015.950
48	1703.610	1963.930	1976.940	1961.360	1982.610
49	1688.220	1978.000	1944.780	1917.150	1942.220
50	1685.710	1898.710	1926.180	1865.620	1898.780
51	1673.380	1857.130	1892.750	1811.600	1908.190
52	1698.180	1781.720	1842.210	1816.930	1935.690
53	1657.090	1724.860	1798.720	1834.080	1955.730
54	1635.590	1679.420	1765.640	1891.220	1822.730
55	1630.600	1634.670	1749.920	1781.480	1710.240
56	1618.870	1590.920	1751.920	1673.720	1628.800
57	1569.360	1557.720	1781.460	1580.830	1607.000
58	1504.450	1522.880	1708.940	1571.530	1658.440
59	1442.770	1508.410	1594.650	1605.630	1637.210
60	1385.250	1496.540	1486.240	1592.540	1577.570
61	1327.530	1449.960	1447.330	1540.100	1505.610
62	1274.350	1410.720	1460.540	1457.760	1409.850
63	1248.320	1358.220	1441.560	1378.020	1401.480
64	1222.470	1305.730	1385.100	1339.130	1349.920
65	1180.230	1251.660	1311.990	1317.010	1301.460
66	1126.950	1203.220	1235.240	1273.350	1211.400
67	1078.190	1160.120	1175.770	1174.930	1077.980
68	1020.730	1122.200	1130.030	1061.940	981.890
69	956.800	1071.430	1069.480	972.520	931.080
70	897.520	995.570	982.840	928.420	933.410
71	835.680	920.580	900.180	908.180	865.160
72	775.540	838.830	830.730	853.560	799.940
73	710.040	771.540	784.790	776.800	733.550
74	649.310	701.470	736.880	714.270	695.240
75	577.540	638.700	686.730	664.440	657.560
76	513.580	571.930	630.870	635.990	627.390
77	458.480	519.840	586.340	612.190	597.220
78	406.650	476.490	559.950	571.310	572.040
79	355.610	432.120	528.260	535.350	530.880
80	312.750	391.960	484.800	490.090	464.060
81	270.360	358.670	429.400	420.970	389.850
82	234.010	326.400	375.030	353.970	334.420
83	206.670	288.640	310.310	305.820	301.460
84	180.380	246.400	254.730	276.460	270.240
85	159.280	203.000	225.600	247.740	244.870
86	138.180	172.800	204.730	225.120	227.940
87	117.530	156.670	183.360	209.340	209.460
88	101.260	140.540	166.150	191.060	187.480
89	90.650	125.060	150.260	171.870	170.300
90	81.080	107.940	134.390	157.950	153.830
91	72.030	93.750	124.570	145.940	143.180
92	63.600	84.420	114.990	135.000	135.500
93	56.260	73.730	105.850	132.480	136.330
94	49.140	65.910	101.530	134.230	141.420
95	43.530	62.470	101.740	136.520	144.010
96	39.600	60.340	102.290	139.590	148.830
97	36.650	58.710	102.570	142.890	153.300
98	34.340	57.190	100.650	142.980	148.280
99	32.330	54.610	94.160	130.070	129.570
100	30.570	49.910	80.630	104.860	100.610
101	29.200	43.930	63.520	80.860	77.050
102	28.080	37.670	50.450	64.580	65.650
103	26.810	32.970	42.810	55.790	60.250
104	25.540	30.290	39.120	52.150	54.850
105	24.640	29.060	38.400	51.190	53.390
106	24.120	28.680	38.770	51.520	53.840

107	23.930	29.080	39.430	52.290	53.210
108	23.890	29.370	40.580	51.820	53.140
109	24.090	29.250	41.860	51.550	52.850
110	24.300	29.510	42.280	51.210	52.720
111	24.200	29.600	42.440	50.730	52.280
112	23.550	28.960	41.660	50.880	54.060
113	22.990	28.610	39.930	50.370	53.560
114	22.570	28.630	38.790	50.120	54.400
115	22.290	28.820	37.770	50.880	55.710
116	22.030	28.660	37.110	52.300	56.190
117	21.760	28.240	36.990	52.400	55.000
118	21.600	27.420	37.180	51.830	55.060
119	21.320	26.820	37.040	49.990	53.390
120	20.680	26.340	36.820	48.770	51.230
121	19.940	26.020	36.130	48.160	51.500
122	19.070	25.720	35.500	47.380	51.200
123	18.190	25.360	35.170	47.980	50.700
124	17.310	24.940	34.900	47.430	51.750
125	16.380	24.580	34.780	47.050	51.920
126	15.600	24.190	34.860	47.270	52.090
127	14.850	23.900	35.180	47.670	52.480
128	14.180	23.700	35.480	48.340	53.820
129	13.650	23.590	36.020	49.170	54.330
130	13.110	23.470	36.970	49.910	55.130
131	12.620	23.440	38.000	51.210	57.270
132	12.180	23.550	39.210	52.340	56.760
133	11.790	23.780	40.510	53.010	55.790
134	11.440	24.070	41.630	52.090	53.300
135	11.080	24.470	41.890	49.340	49.570
136	10.700	24.560	40.690	45.870	45.660
137	10.270	23.950	38.190	42.970	42.730
138	9.830	22.460	35.110	40.490	40.490
139	9.360	20.570	32.050	38.520	38.730
140	8.870	18.590	29.400	36.970	37.380
141	8.330	16.850	27.080	35.260	35.990
142	7.640	15.440	25.000	33.320	34.320
143	6.440	14.390	23.080	31.010	32.100
144	5.360	13.600	21.380	28.500	29.530
145	4.140	12.820	19.900	26.020	26.910
146	3.080	12.050	18.600	23.750	24.580
147	2.260	11.360	17.460	21.800	22.560
148	1.650	10.650	16.410	20.190	20.860
149	1.580	9.830	15.410	18.800	19.370
150	1.630	8.940	14.340	17.570	18.060
151	1.690	7.130	13.250	16.430	16.910
152	1.740	5.340	12.170	15.250	15.690
153	1.790	3.870	11.080	14.070	14.440
154	1.840	2.680	10.030	12.880	13.180
155	1.880	1.840	8.170	11.740	11.980
156	1.920	1.780	5.980	10.570	10.730
157	1.960	1.830	4.170	9.150	9.580
158	1.990	1.880	2.750	6.660	7.760
159	2.010	1.930	1.880	4.700	5.800
160	2.040	1.970	1.880	3.110	3.850
161	2.050	2.000	1.920	2.010	2.160
162	2.050	2.020	1.960	1.910	1.150
163	2.050	2.030	1.980	1.940	1.080
164	2.040	2.040	2.000	1.970	1.110
165	2.040	2.050	2.020	2.000	1.130
166	2.050	2.060	2.040	2.030	1.160

167	2.060	2.080	2.070	2.050	1.190
168	2.060	2.080	2.080	2.070	1.220
169	2.050	2.080	2.090	2.090	1.250
170	2.050	2.080	2.100	2.110	1.280
171	2.040	2.080	2.100	2.120	1.310
172	2.030	2.070	2.100	2.130	1.340
173	2.010	2.060	2.090	2.130	1.370
174	2.000	2.060	2.080	2.130	1.390
175	1.980	2.040	2.070	2.120	1.410
176	1.950	2.030	2.060	2.110	1.430
177	1.920	2.000	2.030	2.090	1.470
178	1.860	1.940	1.990	2.050	1.500
179	1.820	1.900	1.960	2.020	1.550
180	1.600	1.600	1.600	1.600	1.600

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	W34-35L-850	Sample ID.	M1
Temperature (°C)	25.1	Humidity (%RH)	57.0

Test Method

The samples were tested according to the ANSI C82.77:2002.

The total harmonic distortion shall be measured to the 40th order.

The ambient temperature condition was maintained at $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion were calculated.

Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	THD
120.01	60	0.280	33.5	0.995	5.26%
277.04	60	0.127	33.0	0.939	3.56%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2019/12/26	2020/12/25
DLF108	Auxiliary Lamp	2019/12/26	2020/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF116	AC Power Source	2019/12/26	2020/12/25
DLF113	Power Meter	2019/12/26	2020/12/25
DLF112	Temperature Recorder	2019/12/26	2020/12/25
DLF114	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF101	Goniophotometer	2019/12/26	2020/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2019/12/26	2020/12/25
DLF104	AC Power Source	2019/12/26	2020/12/25
DLF507	DC Power Source	2019/12/26	2020/12/25
DLF102	Power Meter	2019/12/26	2020/12/25
DLF111	Temperature & Humidity Datalogger	2019/12/26	2020/12/25
DLF119	Power Meter	2019/12/26	2020/12/25
DLF031	Temperature data logger	2019/12/26	2020/12/25
DLF022	Digital power meter	2019/12/26	2020/12/25
DLF003	Temperature & Humidity Datalogger	2019/12/26	2020/12/25

***** End of Test Report*****