

# Photometric Test Report

## Relevant Standards

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

## Prepared For

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## Project Number

**DLF2102103**

## Report Number

**DLF2102103-2aMOD40**

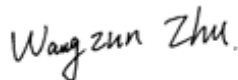
## Test Date

**2021/2/6**

## Issue Date

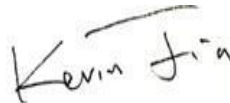
**2021/3/16**

### Prepared By



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Kevin Jia

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## 1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Pole/Arm-Mounted Decorative Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		6978
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	132.2
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		52.8
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	3.27%
		20.00%	277V	6.42%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.999
		0.9	277V	0.964
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	3832
		4 step	3985±154	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		70
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		-32
Minimum Rf (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥70		72
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		94
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18% ≤ IES Rcs,h1 ≤ +23%		-17%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≥65%		100.00%
Input Voltage (V)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		120
(Goniophotometer - Section 4.2)		Non-Wrost Case		277
Input Current (A)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		0.440
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.191
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		52.8
(Goniophotometer - Section 4.2)		Non-Wrost Case		51.1

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/2/6	ALED5T52N/D10	B1
2	Goniophotometer Test	2021/2/6	ALED5T52N/D10	B1
3	THD and PF Test	2021/2/6	ALED5T52N/D10	B1

### Remark(If any)

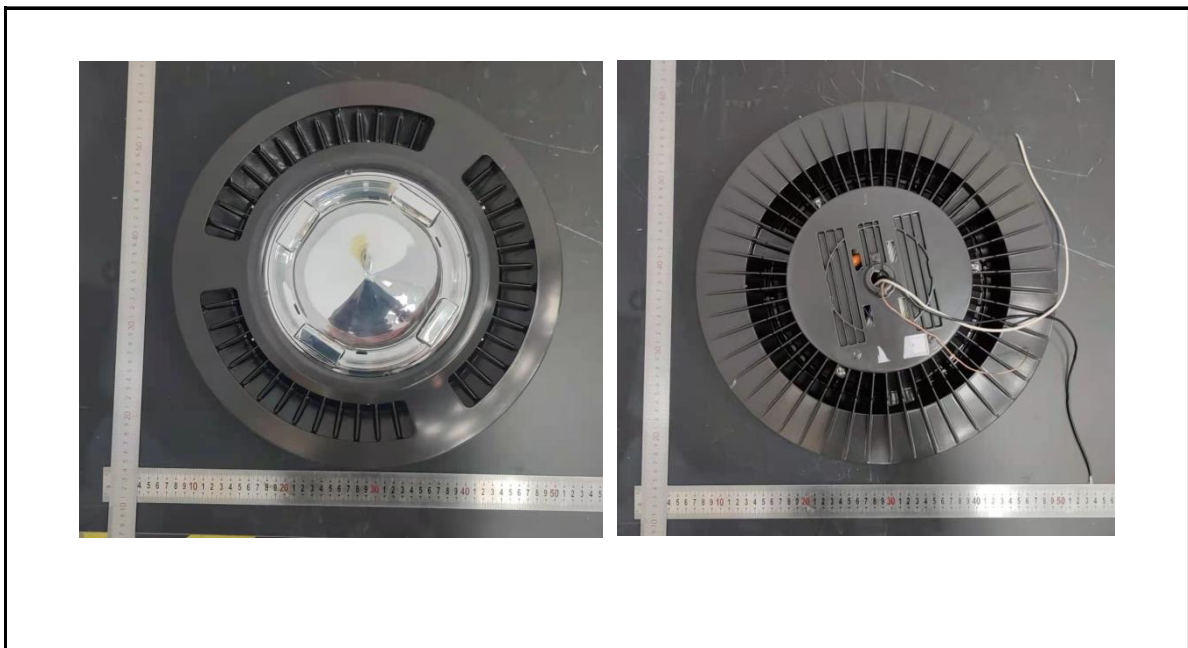
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## 3.0 Production Description

**Luminaire Description:** ALED5T52N/D10

**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.	ALED5T52N/D10	Sample ID.	B1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	56.0

#### 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  $\pm 0.2$  percent under load.

The sample was measured using  $4\pi$  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
120.00	60	0.440	52.8	0.999
277.00	60	0.191	51.1	0.964

#### Test Result

CCT (K)	CRI	R9	Duv
3832	70	-32	0.0039

Rf	Rg	IES Rcs,h1
72	94	-17%

## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	ALED5T52N/D10	Sample ID.	B1
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° C ± 1° 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
WROST CASE	120.00	60	0.440	52.8	0.999
NON-WROST CASE	277.00	60	0.191	51.1	0.964

#### Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
6978	174.0	173.5	169.2	168.7	132.2

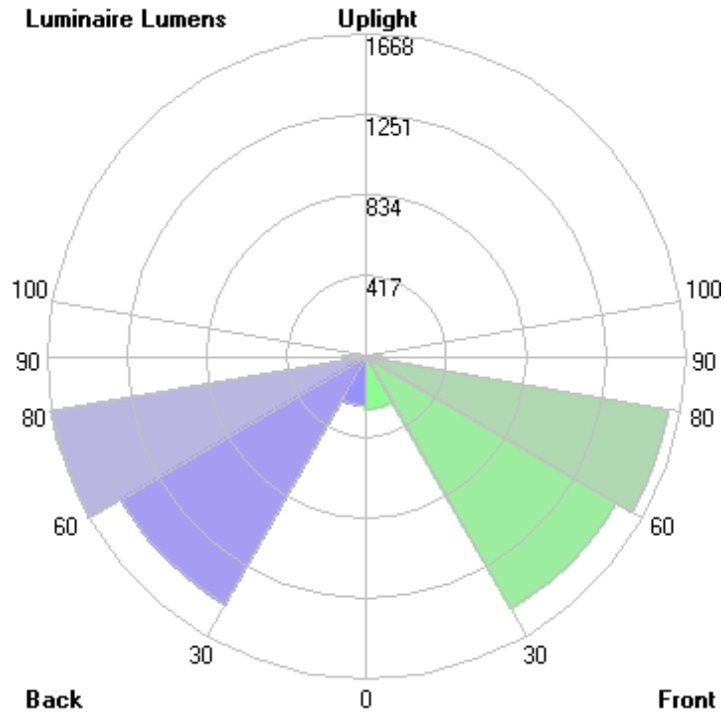
Zonal Lumen Requirement (0°-90°)	BUG rating
100.00%	B3-U0-G2

#### 4.2 Goniophotometer Test

	Zonal (lm)		Total (lm)	Percent
0-10	20.00	0 - 10	20.00	0.29%
10-20	149.18	0 - 20	169.18	2.42%
20-30	358.44	0 - 30	527.62	7.56%
30-40	590.81	0 - 40	1118.43	16.03%
40-50	945.26	0 - 50	2063.69	29.58%
50-60	1445.29	0 - 60	3508.98	50.29%
60-70	1869.38	0 - 70	5378.36	77.08%
70-80	1398.65	0 - 80	6777.01	97.12%
80-90	200.75	0 - 90	6977.76	100.00%
90-100	0.00	0 - 100	6977.76	100.00%
100-110	0.00	0 - 110	6977.76	100.00%
110-120	0.00	0 - 120	6977.76	100.00%
120-130	0.00	0 - 130	6977.76	100.00%
130-140	0.00	0 - 140	6977.76	100.00%
140-150	0.00	0 - 150	6977.76	100.00%
150-160	0.00	0 - 160	6977.76	100.00%
160-170	0.00	0 - 170	6977.76	100.00%
170-180	0.00	0 - 180	6977.76	100.00%

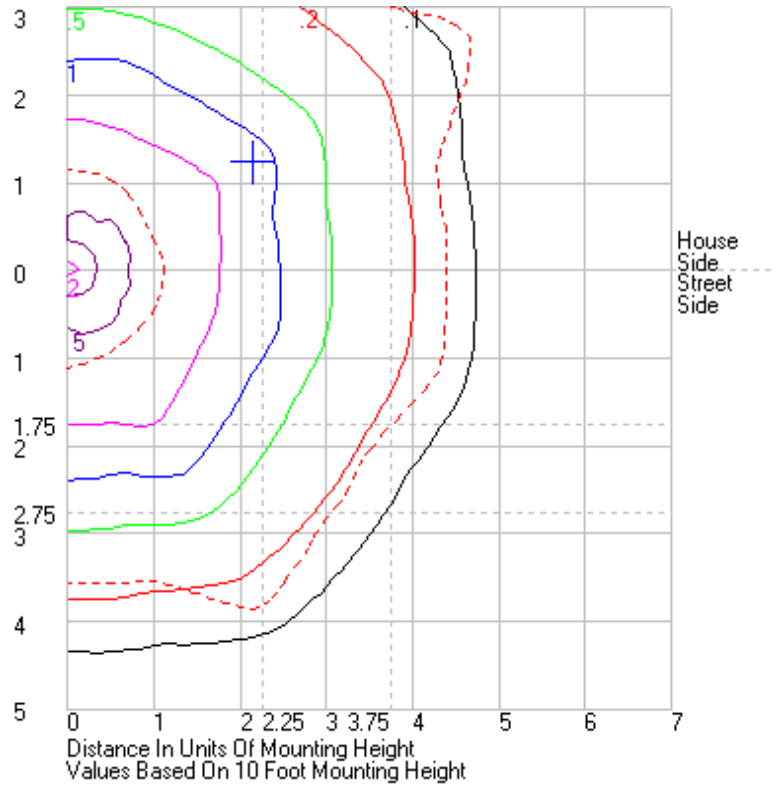
## 4.2 Goniophotometer Test

LCS/BUG



	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	271.3	N.A.	3.9
FM - Front-Medium (30-60)	1504.7	N.A.	21.6
FH - Front-High (60-80)	1599.9	N.A.	22.9
FVH - Front-Very High (80-90)	78.1	N.A.	1.1
BL - Back-Low (0-30)	256.4	N.A.	3.7
BM - Back-Medium (30-60)	1476.6	N.A.	21.2
BH - Back-High (60-80)	1668.2	N.A.	23.9
BVH - Back-Very High (80-90)	122.6	N.A.	1.8
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>6977.8</b>	<b>N.A.</b>	<b>100.0</b>
<b>BUG Rating</b>	<b>B3-U0-G2</b>		

Isolines



Vert. Angles	Horizontal Angles									
	0	15	30	45	60	75	90	105	120	135
0	138.773	138.773	138.773	138.773	138.773	138.773	138.773	138.773	138.773	138.773
1	149.209	149.167	148.168	146.192	143.894	141.617	139.351	137.084	134.916	132.360
2	157.371	158.402	155.921	149.467	143.034	139.705	136.078	133.391	133.058	134.389
3	165.383	165.393	160.625	155.728	150.423	145.666	138.889	137.235	139.104	140.543
4	177.937	175.456	167.391	165.286	160.206	151.572	145.129	146.031	144.813	146.836
5	193.798	185.454	176.734	174.930	170.505	159.154	154.536	156.319	156.211	157.908
6	210.551	197.954	186.259	182.146	177.969	170.355	167.896	163.804	167.853	169.614
7	232.427	214.138	197.460	191.092	187.462	182.125	181.524	172.320	176.369	177.282
8	262.454	243.413	220.088	209.338	201.488	203.968	199.501	185.132	185.927	183.585
9	310.114	282.514	264.730	243.435	231.847	230.365	220.711	196.773	192.477	192.230
10	362.617	330.003	321.272	285.629	283.513	269.681	244.831	219.218	204.935	205.805
11	408.763	375.730	388.509	350.783	338.637	318.566	289.377	261.219	236.819	235.627
12	465.198	415.884	439.939	415.132	391.312	355.573	335.437	317.180	282.192	288.453
13	511.580	468.699	487.825	462.513	427.127	411.899	381.626	377.384	346.981	351.717
14	542.466	517.175	515.210	496.502	466.594	465.681	438.307	424.249	389.444	419.857
15	569.195	544.119	540.844	527.485	509.131	500.400	487.309	480.469	436.707	472.038
16	579.075	561.828	577.250	565.104	530.620	538.804	518.346	534.830	487.417	519.301
17	619.025	598.054	601.327	600.822	554.279	563.643	557.393	563.879	524.811	559.874
18	653.336	622.547	621.183	612.979	562.913	590.416	587.269	581.535	573.330	577.604
19	674.374	635.971	638.688	612.828	583.822	613.473	597.375	587.344	612.130	589.825
20	690.084	651.414	657.997	624.727	619.111	626.285	624.255	588.537	646.678	601.724
21	711.478	672.710	686.327	644.487	655.119	644.842	661.337	612.098	677.424	608.404
22	722.529	699.074	709.556	664.559	685.156	661.455	699.848	639.075	703.230	622.376
23	737.338	734.857	738.680	696.755	715.899	690.011	722.486	663.345	720.703	655.785
24	764.690	764.830	758.859	740.055	733.687	728.714	729.595	687.970	735.222	689.474
25	790.636	801.236	784.655	765.009	755.820	747.680	743.534	709.148	754.381	720.155
26	812.855	828.105	801.472	821.339	778.769	759.181	771.198	745.414	760.416	743.620
27	827.096	860.913	827.557	858.755	805.370	765.367	799.603	782.968	771.961	769.781
28	841.604	890.607	852.021	897.512	838.726	782.077	827.955	814.885	796.736	813.865
29	843.151	905.448	881.457	931.888	862.943	816.292	845.202	856.070	822.091	856.628
30	840.401	918.402	903.945	950.220	870.621	845.170	858.926	888.824	845.148	882.112
31	859.356	927.560	924.457	964.524	867.099	902.377	873.317	920.472	873.983	910.796
32	879.470	914.168	945.666	973.738	883.916	976.541	888.684	950.402	902.903	951.025
33	858.937	900.884	951.798	976.058	912.955	1003.529	909.164	954.043	948.190	978.303
34	853.976	920.172	963.021	976.681	922.373	978.732	907.607	946.676	978.754	984.392
35	858.056	937.182	967.016	992.865	909.196	954.719	884.926	951.616	974.404	999.824
36	860.505	935.174	973.620	1018.778	907.134	920.848	878.697	969.346	967.886	1018.177
37	875.948	956.663	991.705	1031.934	911.838	900.852	887.138	976.122	967.660	1011.390
38	906.737	985.970	1002.530	1028.304	917.390	894.054	897.029	977.057	977.841	997.891
39	967.896	1011.551	1016.094	1042.716	944.689	924.177	931.201	988.634	988.891	1000.178
40	1022.698	1035.360	1055.796	1059.114	984.005	977.132	972.568	1005.730	1001.381	1019.047
41	1049.406	1065.322	1123.474	1074.020	1037.711	1030.871	1027.101	1028.175	1045.164	1038.184
42	1061.831	1104.047	1150.848	1109.996	1091.901	1066.052	1079.519	1056.215	1114.357	1068.275
43	1093.759	1154.499	1175.774	1163.220	1126.707	1093.770	1114.077	1093.823	1165.808	1120.274
44	1117.396	1205.768	1198.476	1218.376	1153.286	1125.847	1139.443	1148.485	1183.839	1175.430
45	1154.993	1237.921	1222.564	1266.949	1174.195	1151.535	1158.612	1197.467	1206.380	1228.331
46	1205.167	1263.523	1249.530	1317.874	1199.572	1198.014	1185.707	1254.653	1243.065	1267.035
47	1247.425	1287.890	1289.136	1356.191	1236.471	1257.133	1224.486	1298.790	1281.414	1295.751
48	1297.706	1306.179	1338.837	1381.933	1286.805	1298.103	1275.422	1318.443	1323.941	1317.476
49	1333.091	1346.322	1396.366	1408.598	1336.710	1355.729	1328.645	1345.602	1379.205	1347.976
50	1378.571	1374.845	1453.608	1444.263	1383.340	1393.881	1379.162	1369.626	1434.748	1374.984
51	1412.346	1425.201	1520.006	1489.668	1426.199	1421.206	1413.216	1403.669	1490.291	1409.049
52	1445.616	1475.578	1598.885	1557.926	1469.059	1448.719	1447.098	1443.425	1551.257	1457.053
53	1467.062	1525.064	1666.724	1599.067	1493.426	1476.448	1476.931	1486.145	1611.653	1505.680
54	1520.145	1571.994	1726.261	1625.840	1527.824	1517.761	1509.668	1559.783	1693.980	1570.673
55	1538.068	1596.662	1780.655	1661.816	1556.433	1545.447	1542.397	1621.437	1759.381	1605.060
56	1538.251	1609.516	1814.387	1698.060	1587.555	1558.011	1585.740	1660.431	1821.754	1629.631

57	1557.346	1622.597	1861.091	1721.504	1594.911	1571.296	1608.982	1702.539	1865.655	1664.808
58	1582.722	1649.144	1920.973	1739.548	1606.853	1587.297	1618.408	1711.377	1879.068	1679.149
59	1621.426	1674.284	2010.097	1798.895	1613.221	1625.926	1618.720	1731.781	1898.689	1700.402
60	1613.232	1705.728	2088.320	1834.072	1633.110	1665.811	1632.627	1755.064	1959.365	1743.927
61	1623.671	1710.013	2168.134	1856.871	1645.449	1699.156	1659.024	1771.881	2025.174	1788.763
62	1642.120	1728.474	2273.485	1864.248	1665.371	1752.229	1683.359	1793.939	2118.207	1826.436
63	1637.438	1720.946	2317.708	1893.588	1668.861	1822.119	1696.084	1806.246	2225.309	1839.377
64	1671.535	1724.371	2348.250	1918.288	1679.718	1885.705	1718.916	1809.973	2333.183	1855.088
65	1774.169	1733.253	2370.867	1950.011	1705.406	1972.145	1743.412	1814.580	2431.854	1864.077
66	1811.680	1748.223	2419.322	1969.589	1773.320	2065.908	1823.204	1826.157	2482.404	1891.988
67	1745.291	1727.153	2472.663	2009.656	1842.418	2120.506	1908.937	1837.734	2515.212	1945.383
68	1672.534	1694.807	2447.598	2005.543	1803.852	2031.156	1877.168	1860.576	2559.822	1966.881
69	1616.722	1674.477	2406.854	1926.686	1711.785	1949.517	1799.481	1841.170	2536.625	1953.791
70	1572.810	1641.390	2321.456	1857.730	1681.963	1842.491	1774.738	1809.576	2477.292	1927.244
71	1542.934	1582.840	2198.869	1820.508	1622.833	1765.191	1718.647	1792.962	2429.954	1879.079
72	1472.399	1517.042	2054.224	1737.602	1562.812	1698.737	1678.580	1727.776	2302.137	1793.564
73	1401.338	1460.049	1911.060	1691.843	1504.778	1691.628	1613.082	1642.625	2149.748	1719.163
74	1308.928	1385.487	1731.577	1636.450	1467.105	1663.899	1568.600	1589.939	1991.733	1647.415
75	1183.205	1218.139	1584.247	1511.618	1379.312	1543.718	1491.343	1536.082	1827.338	1588.435
76	1028.508	1076.340	1468.565	1346.311	1290.940	1443.908	1418.231	1468.555	1767.908	1498.474
77	888.373	947.245	1339.739	1188.360	1136.082	1328.785	1302.248	1320.086	1644.053	1330.911
78	756.561	802.653	1172.573	1042.168	970.109	1199.346	1137.317	1149.484	1510.963	1154.134
79	643.983	673.440	969.088	880.974	830.006	1110.490	973.395	1016.673	1391.544	1022.494
80	541.735	536.258	743.599	719.738	710.748	966.942	817.398	838.125	1167.547	890.424
81	422.445	399.045	551.615	551.830	596.730	811.266	703.112	707.365	971.676	759.020
82	248.987	246.399	349.666	383.655	482.713	662.690	576.079	565.523	740.742	610.917
83	119.430	125.594	180.729	230.548	357.581	497.394	448.649	423.175	529.031	445.728
84	61.933	52.965	108.497	113.577	219.014	332.204	305.743	283.094	318.157	278.348
85	36.599	32.024	68.011	57.970	89.425	162.247	152.249	134.926	129.772	136.484
86	11.255	11.974	45.180	34.526	42.216	67.968	62.384	54.512	69.160	52.096
87	5.778	6.948	22.799	11.083	21.156	47.864	37.533	33.753	48.906	33.001
88	2.610	3.963	7.431	6.089	8.001	28.480	13.907	13.864	28.867	13.939
89	0.816	0.967	4.102	2.953	4.618	15.217	8.849	8.559	13.617	7.367
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000





177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

**Vert. Angles**      **Horizontal Angles**

	150	165	180	195	210	225	240	255	270	285
0	138.773	138.773	138.773	138.773	138.773	138.773	138.773	138.773	138.773	138.773
1	130.395	129.235	131.490	132.628	134.142	136.537	138.943	141.853	142.508	143.636
2	134.271	132.338	131.941	133.154	136.290	139.673	144.033	147.781	151.830	153.355
3	139.072	136.247	137.139	140.951	145.388	148.769	151.314	157.543	162.397	165.554
4	148.297	144.688	148.179	151.443	156.512	162.268	163.729	166.940	169.496	172.717
5	161.474	157.893	161.388	166.607	164.577	173.158	179.558	178.023	178.935	178.731
6	171.407	170.151	173.705	179.880	176.433	187.097	198.502	195.463	195.270	190.405
7	179.612	181.416	182.522	190.781	193.895	206.524	223.116	218.616	221.312	218.649
8	190.566	197.192	192.800	199.748	214.664	237.206	253.776	258.405	264.483	268.059
9	206.408	216.318	212.044	221.205	251.156	276.833	293.135	305.109	317.631	325.353
10	228.067	244.079	241.630	262.829	305.979	324.236	334.621	353.500	364.980	388.091
11	264.763	280.313	289.935	319.296	366.118	364.357	391.323	415.991	423.884	444.428
12	310.082	321.830	340.130	381.508	430.682	416.002	448.047	444.503	473.016	501.088
13	354.692	369.469	381.024	448.316	466.078	469.064	478.417	485.645	513.760	556.416
14	412.587	428.223	429.372	488.848	488.061	502.312	521.943	532.521	541.703	567.252
15	467.055	475.164	480.501	508.154	525.552	535.163	556.974	574.588	548.737	580.514
16	492.099	524.166	512.708	546.804	583.006	561.034	596.290	613.956	556.631	580.407
17	524.102	557.962	538.020	583.285	624.115	571.816	617.339	637.657	586.099	585.175
18	551.723	605.528	558.403	587.892	628.099	577.529	626.532	647.945	626.048	602.143
19	577.046	633.222	600.414	591.705	630.011	595.700	664.108	663.904	662.626	628.475
20	615.320	635.542	625.823	589.696	647.591	629.195	701.351	683.470	699.085	653.401
21	648.729	637.238	644.724	618.123	665.160	665.311	724.709	703.295	723.796	680.603
22	671.947	662.218	673.805	653.240	692.201	701.211	746.294	727.630	736.930	709.964
23	687.476	686.861	691.460	688.357	723.764	727.866	754.413	739.905	753.565	742.665
24	697.829	710.297	709.051	728.521	736.296	743.588	771.027	756.357	775.236	780.327
25	713.787	731.410	723.742	779.349	744.759	766.140	786.577	768.052	795.673	818.730
26	737.682	741.064	751.481	813.736	758.483	797.101	801.128	786.835	814.789	863.115
27	759.665	737.091	775.258	843.569	779.457	838.566	814.166	835.601	832.089	906.748
28	778.802	752.179	791.839	870.331	810.246	886.870	833.646	874.863	841.550	938.847
29	790.046	785.288	809.258	882.338	842.603	927.367	851.398	948.222	855.715	956.051
30	802.342	824.142	817.914	900.154	884.034	939.277	892.336	970.839	886.988	960.787
31	811.975	890.317	820.491	924.210	909.132	941.027	894.709	956.824	882.585	959.144
32	849.197	948.201	837.813	944.378	929.343	945.462	875.282	924.768	869.021	967.596
33	883.562	950.349	857.809	947.556	940.093	966.790	875.067	897.748	869.998	995.056
34	877.978	927.861	843.698	948.995	945.645	972.310	884.034	871.878	876.889	983.672
35	862.911	896.052	835.225	962.430	958.994	953.452	889.866	871.126	889.318	981.395
36	855.780	872.597	831.380	981.331	967.982	957.597	905.319	890.016	924.134	998.492
37	858.142	871.233	838.833	975.897	978.786	965.459	935.872	934.315	961.453	1017.404
38	871.373	881.489	862.685	979.484	998.782	981.052	989.353	964.567	1014.483	1035.660
39	904.385	914.759	901.657	1000.200	1040.643	1011.078	1027.058	1002.648	1048.118	1069.467
40	967.123	944.270	959.885	1027.090	1066.471	1048.268	1056.322	1030.527	1072.420	1105.593
41	1014.182	964.599	1006.235	1055.291	1101.663	1097.314	1070.713	1071.808	1095.198	1154.252
42	1043.467	991.147	1045.068	1094.221	1153.157	1146.015	1103.446	1101.964	1130.852	1194.320
43	1053.047	1027.917	1060.414	1143.384	1183.173	1199.518	1125.901	1159.246	1154.929	1238.361
44	1081.237	1050.974	1084.287	1190.948	1207.948	1238.308	1174.957	1203.942	1209.580	1278.869
45	1096.626	1101.663	1100.138	1232.970	1239.714	1276.045	1225.689	1260.999	1249.831	1322.470
46	1136.726	1139.411	1143.374	1261.085	1280.770	1303.032	1278.998	1305.363	1308.166	1345.699
47	1175.731	1199.840	1179.264	1291.638	1326.680	1335.550	1339.395	1346.923	1348.341	1393.198
48	1228.116	1239.897	1234.968	1319.506	1383.909	1372.643	1385.015	1395.217	1383.307	1428.422
49	1281.189	1291.563	1280.008	1358.844	1440.869	1406.933	1440.117	1426.489	1438.732	1481.699
50	1320.870	1336.109	1322.008	1400.522	1511.747	1457.343	1477.522	1453.928	1475.374	1523.883
51	1382.942	1367.220	1365.985	1450.577	1579.253	1496.809	1510.953	1485.576	1495.660	1578.244

52	1412.808	1392.672	1393.058	1480.980	1657.381	1546.317	1531.948	1515.882	1529.283	1633.422
53	1442.083	1410.939	1422.247	1523.099	1721.848	1605.779	1578.008	1514.217	1580.718	1667.014
54	1470.702	1429.153	1450.985	1559.053	1789.558	1636.117	1584.999	1536.168	1565.078	1677.878
55	1500.278	1438.936	1489.410	1589.209	1816.373	1661.010	1586.717	1576.311	1578.416	1692.165
56	1517.481	1461.993	1497.357	1632.949	1863.013	1688.095	1607.744	1618.945	1595.641	1708.843
57	1526.696	1476.534	1520.371	1677.774	1911.737	1715.308	1624.478	1651.582	1627.827	1728.420
58	1523.646	1516.591	1531.260	1710.615	1965.196	1738.483	1665.779	1672.319	1653.869	1770.045
59	1528.812	1554.672	1557.013	1757.340	2038.480	1802.745	1681.651	1718.916	1678.376	1795.282
60	1553.544	1579.146	1592.130	1803.959	2135.454	1827.918	1685.506	1811.552	1694.517	1799.030
61	1576.300	1629.738	1603.127	1805.989	2247.077	1839.312	1708.800	1849.686	1715.350	1807.106
62	1594.739	1687.987	1623.134	1793.853	2348.873	1851.265	1729.225	1938.789	1717.391	1823.558
63	1608.034	1736.872	1630.017	1804.002	2413.072	1858.138	1790.299	2024.670	1778.969	1860.844
64	1624.573	1829.991	1643.484	1803.519	2452.237	1850.943	1873.398	2060.925	1819.209	1899.344
65	1647.630	1845.562	1669.161	1805.645	2450.530	1834.727	1929.285	2122.095	1806.526	1888.809
66	1689.136	1889.345	1695.086	1807.481	2432.767	1825.942	1940.657	2045.063	1797.333	1880.056
67	1764.396	1999.481	1761.411	1817.104	2443.496	1794.197	1863.486	1915.227	1724.307	1851.845
68	1776.166	1919.727	1747.525	1791.212	2424.090	1771.903	1737.376	1777.390	1666.337	1798.847
69	1755.010	1832.257	1662.492	1777.165	2371.898	1715.995	1644.172	1676.743	1617.356	1742.617
70	1701.712	1740.845	1611.815	1742.692	2257.129	1672.641	1614.832	1613.232	1564.176	1655.405
71	1641.132	1625.249	1578.072	1680.695	2135.165	1628.686	1546.778	1591.979	1489.367	1619.869
72	1577.890	1549.345	1535.502	1620.331	2017.303	1568.289	1502.737	1546.907	1411.132	1569.041
73	1493.684	1472.399	1471.293	1570.319	1899.441	1518.298	1434.039	1478.606	1331.878	1424.964
74	1422.945	1436.745	1410.628	1510.963	1820.938	1415.127	1365.330	1394.390	1202.664	1280.147
75	1335.873	1428.745	1349.812	1406.106	1735.100	1311.602	1269.558	1294.183	1007.395	1113.734
76	1251.141	1393.262	1253.471	1299.671	1616.615	1167.687	1066.374	1179.457	884.808	980.440
77	1152.427	1341.940	1146.563	1155.359	1440.740	1023.020	920.472	1073.204	759.793	825.635
78	999.330	1248.102	990.244	1020.754	1264.393	886.988	788.220	918.077	647.194	683.073
79	886.483	1117.074	871.631	883.787	1045.444	766.237	661.960	772.594	560.325	558.521
80	771.359	1008.909	767.354	738.648	814.176	626.875	566.178	624.298	445.985	382.292
81	663.442	855.866	654.786	600.672	590.137	459.774	432.153	447.951	315.322	252.466
82	554.902	686.596	544.001	446.479	398.400	312.423	296.497	292.405	184.992	122.641
83	446.361	512.890	413.199	306.344	272.312	187.763	174.071	148.737	57.036	36.094
84	299.922	339.056	271.526	186.292	146.224	64.778	52.493	52.385	28.899	24.614
85	161.753	195.076	142.938	86.733	68.108	36.019	28.953	30.531	18.751	13.145
86	63.125	95.363	49.379	35.794	48.047	21.575	15.056	20.426	8.688	5.176
87	40.282	49.432	32.701	21.425	30.714	7.217	5.907	10.782	2.867	1.901
88	19.245	27.020	16.012	7.099	13.370	2.996	1.879	1.192	0.612	0.548
89	6.873	12.318	5.015	2.599	1.793	0.945	0.494	0.301	0.301	0.301
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000





172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Vert. Angles	Horizontal Angles				
	300	315	330	345	360
0	138.773	138.773	138.773	138.773	138.773
1	144.559	144.516	145.558	146.084	149.209
2	155.578	156.630	155.384	155.481	157.371
3	164.998	163.310	160.539	159.777	165.383
4	173.072	169.743	168.196	166.585	177.937
5	179.032	178.463	179.644	179.784	193.798
6	190.383	189.610	192.692	195.216	210.551
7	210.723	214.074	218.380	222.590	232.427
8	245.883	255.570	257.524	259.135	262.454
9	311.521	314.506	309.061	308.546	310.114
10	361.050	385.803	367.429	354.402	362.617
11	412.522	447.628	419.095	402.041	408.763
12	449.121	492.937	478.965	465.616	465.198
13	489.092	528.269	530.427	516.251	511.580
14	541.553	558.381	550.391	560.078	542.466
15	582.480	585.411	563.267	591.501	569.195
16	622.182	597.815	589.525	608.705	579.075
17	655.699	612.399	624.545	625.973	619.025
18	676.683	627.358	645.658	638.573	653.336
19	697.786	646.109	657.417	653.412	674.374
20	722.668	670.691	676.168	673.859	690.064
21	734.975	688.969	694.918	693.716	711.478
22	743.932	707.440	714.302	708.020	722.529
23	757.538	738.272	732.183	725.450	737.338
24	772.541	775.569	752.910	743.159	764.690
25	794.309	825.732	775.086	754.692	790.636
26	810.815	863.609	801.579	769.953	812.855
27	836.031	889.138	815.809	800.409	827.096
28	860.473	910.120	825.721	844.020	841.604
29	908.112	932.876	835.848	879.535	843.151
30	953.785	943.594	834.473	922.180	840.401
31	961.453	956.749	850.174	947.793	859.356
32	960.497	951.315	873.446	915.973	879.470
33	954.687	952.819	850.249	886.214	858.937
34	965.007	978.850	840.412	861.375	853.976
35	972.396	1005.268	848.488	846.158	858.056
36	983.457	1002.004	859.614	839.671	860.505
37	1002.219	1013.377	886.859	857.111	875.948
38	1034.178	1024.835	928.054	917.326	906.737
39	1083.299	1037.948	989.503	968.874	967.896
40	1129.853	1066.138	1041.416	995.625	1022.698
41	1172.928	1109.857	1066.363	1015.095	1049.406
42	1189.939	1158.183	1076.813	1045.240	1061.831
43	1210.934	1219.095	1098.731	1069.918	1093.759
44	1236.063	1269.848	1124.559	1111.350	1117.396
45	1273.145	1300.670	1167.698	1164.251	1154.993
46	1309.315	1326.164	1222.403	1212.663	1205.167



47	1367.800	1347.997	1269.451	1266.627	1247.425
48	1425.254	1386.948	1324.425	1301.701	1297.706
49	1497.722	1430.076	1355.826	1346.300	1333.091
50	1593.622	1467.609	1404.345	1380.214	1378.571
51	1666.337	1504.455	1440.332	1421.442	1412.346
52	1747.085	1539.154	1470.423	1437.488	1445.616
53	1819.037	1588.886	1484.857	1476.684	1467.062
54	1877.468	1621.662	1531.003	1487.208	1520.145
55	1934.225	1653.933	1532.796	1504.896	1538.058
56	2010.322	1691.080	1529.327	1541.462	1538.251
57	2112.301	1722.965	1546.445	1563.327	1557.346
58	2195.518	1762.195	1576.429	1624.766	1582.722
59	2268.373	1790.793	1602.718	1640.381	1621.426
60	2319.083	1808.805	1604.297	1695.805	1613.232
61	2352.943	1827.027	1630.533	1796.989	1623.671
62	2354.425	1836.434	1655.319	1826.114	1642.120
63	2360.063	1861.295	1681.436	1878.005	1637.438
64	2388.007	1889.281	1777.863	1944.416	1671.535
65	2401.538	1855.636	1795.067	2006.886	1774.169
66	2416.852	1839.441	1777.079	2030.598	1811.680
67	2489.083	1820.411	1749.619	1858.988	1745.291
68	2443.925	1772.934	1667.325	1743.412	1672.534
69	2342.322	1726.734	1583.796	1729.848	1616.722
70	2145.871	1684.325	1549.517	1714.158	1572.810
71	2004.222	1619.751	1480.905	1668.120	1542.934
72	1860.866	1569.245	1406.858	1578.631	1472.399
73	1689.942	1418.521	1332.780	1463.518	1401.338
74	1536.941	1267.518	1244.579	1348.405	1308.928
75	1374.190	1125.214	1054.690	1266.702	1183.205
76	1211.181	963.547	928.838	1204.673	1028.508
77	1001.961	816.625	791.216	1053.831	888.373
78	768.020	690.837	685.350	870.084	756.561
79	581.374	557.973	587.602	725.697	643.983
80	394.405	406.798	476.409	594.926	541.735
81	248.783	273.848	336.103	437.308	422.445
82	148.361	140.897	206.213	297.732	248.987
83	74.422	44.492	77.837	183.618	119.430
84	39.606	30.123	38.328	71.845	61.933
85	26.365	15.765	22.874	48.455	36.599
86	13.123	5.713	7.550	30.155	11.255
87	2.824	1.879	2.556	11.856	5.778
88	0.483	0.548	0.569	0.934	2.610
89	0.301	0.301	0.279	0.290	0.816
90	0.000	0.000	0.000	0.000	0.000
91	0.000	0.000	0.000	0.000	0.000
92	0.000	0.000	0.000	0.000	0.000
93	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000
95	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000
97	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000
99	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000
101	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000
103	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000
105	0.000	0.000	0.000	0.000	0.000
106	0.000	0.000	0.000	0.000	0.000



107	0.000	0.000	0.000	0.000	0.000
108	0.000	0.000	0.000	0.000	0.000
109	0.000	0.000	0.000	0.000	0.000
110	0.000	0.000	0.000	0.000	0.000
111	0.000	0.000	0.000	0.000	0.000
112	0.000	0.000	0.000	0.000	0.000
113	0.000	0.000	0.000	0.000	0.000
114	0.000	0.000	0.000	0.000	0.000
115	0.000	0.000	0.000	0.000	0.000
116	0.000	0.000	0.000	0.000	0.000
117	0.000	0.000	0.000	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000
119	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.000
121	0.000	0.000	0.000	0.000	0.000
122	0.000	0.000	0.000	0.000	0.000
123	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000
125	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000
127	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000
129	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000
131	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000
133	0.000	0.000	0.000	0.000	0.000
134	0.000	0.000	0.000	0.000	0.000
135	0.000	0.000	0.000	0.000	0.000
136	0.000	0.000	0.000	0.000	0.000
137	0.000	0.000	0.000	0.000	0.000
138	0.000	0.000	0.000	0.000	0.000
139	0.000	0.000	0.000	0.000	0.000
140	0.000	0.000	0.000	0.000	0.000
141	0.000	0.000	0.000	0.000	0.000
142	0.000	0.000	0.000	0.000	0.000
143	0.000	0.000	0.000	0.000	0.000
144	0.000	0.000	0.000	0.000	0.000
145	0.000	0.000	0.000	0.000	0.000
146	0.000	0.000	0.000	0.000	0.000
147	0.000	0.000	0.000	0.000	0.000
148	0.000	0.000	0.000	0.000	0.000
149	0.000	0.000	0.000	0.000	0.000
150	0.000	0.000	0.000	0.000	0.000
151	0.000	0.000	0.000	0.000	0.000
152	0.000	0.000	0.000	0.000	0.000
153	0.000	0.000	0.000	0.000	0.000
154	0.000	0.000	0.000	0.000	0.000
155	0.000	0.000	0.000	0.000	0.000
156	0.000	0.000	0.000	0.000	0.000
157	0.000	0.000	0.000	0.000	0.000
158	0.000	0.000	0.000	0.000	0.000
159	0.000	0.000	0.000	0.000	0.000
160	0.000	0.000	0.000	0.000	0.000
161	0.000	0.000	0.000	0.000	0.000
162	0.000	0.000	0.000	0.000	0.000
163	0.000	0.000	0.000	0.000	0.000
164	0.000	0.000	0.000	0.000	0.000
165	0.000	0.000	0.000	0.000	0.000
166	0.000	0.000	0.000	0.000	0.000



167	0.000	0.000	0.000	0.000	0.000
168	0.000	0.000	0.000	0.000	0.000
169	0.000	0.000	0.000	0.000	0.000
170	0.000	0.000	0.000	0.000	0.000
171	0.000	0.000	0.000	0.000	0.000
172	0.000	0.000	0.000	0.000	0.000
173	0.000	0.000	0.000	0.000	0.000
174	0.000	0.000	0.000	0.000	0.000
175	0.000	0.000	0.000	0.000	0.000
176	0.000	0.000	0.000	0.000	0.000
177	0.000	0.000	0.000	0.000	0.000
178	0.000	0.000	0.000	0.000	0.000
179	0.000	0.000	0.000	0.000	0.000
180	0.000	0.000	0.000	0.000	0.000

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

Model No.	ALED5T52N/D10	Sample ID.	B1
Temperature (°C)	25.3	Humidity (%RH)	56.0

#### 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° C ± 1° 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
120.00	60	0.440	52.8	0.999	3.27%
277.00	60	0.191	51.1	0.964	6.42%

## 5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2020/12/26	2021/12/25
DLF108	Auxiliary Lamp	2020/12/26	2021/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF116	AC Power Source	2020/12/26	2021/12/25
DLF113	Power Meter	2020/12/26	2021/12/25
DLF112	Temperature Recorder	2020/12/26	2021/12/25
DLF114	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF101	Goniophotometer	2020/12/26	2021/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2020/12/26	2021/12/25
DLF104	AC Power Source	2020/12/26	2021/12/25
DLF507	DC Power Source	2020/12/26	2021/12/25
DLF102	Power Meter	2020/12/26	2021/12/25
DLF111	Temperature & Humidity Datalogger	2020/12/26	2021/12/25
DLF119	Power Meter	2020/12/26	2021/12/25
DLF031	Temperature data logger	2020/12/26	2021/12/25
DLF022	Digital power meter	2020/12/26	2021/12/25
DLF003	Temperature & Humidity Datalogger	2020/12/26	2021/12/25

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