

# Photometric Test Report

## Relevant Standards

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

## Prepared For RAB Lighting Inc.

Room 6A33, No.1388, Wuzhong road, Shanghai, China

Xiao Xiang, 15921313292, Gary.Xiao@rabweb.com

## Prepared By

Deliver Co., Ltd.

Block 11, 78 Keling Road, SSTP, Suzhou, China

0512-66801950, kevin.jia@szdeliver.com

## Project Number

**DLF2102103**

## Report Number

**DLF2102103-4a**


## Test Date

**2021/2/6**

## Issue Date

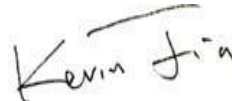
**2021/3/16**

### Prepared By



Wangzun Zhu

### Approved By



Kevin Jia

The results contained in this report pertain only to the tested sample.

This report shall not be reproduced, except in full, without written approval of Deliver Co., Ltd.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP.

## 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		10127
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	126.3
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		80.2
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	2.03%
		20.00%	277V	8.75%
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		0.669
(Goniophotometer - Section 4.2)		Non-Wrost Case		0.291
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Wrost Case		80.2
(Goniophotometer - Section 4.2)		Non-Wrost Case		77.8

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/2/6	ALED5T78N/D10	D1
2	Goniophotometer Test	2021/2/6	ALED5T78N/D10	D1
3	THD and PF Test	2021/2/6	ALED5T78N/D10	D1

### Remark(If any)

1、 This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government.

2、 The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification.

## 3.0 Production Description

**Luminaire Description:** ALED5T78N/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.	ALED5T78N/D10	Sample ID.	D1
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° C ± 1° 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
120.03	60	0.668	80.1	0.999
277.04	60	0.291	77.7	0.964

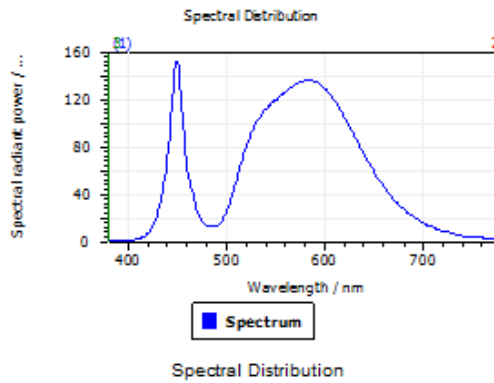
#### Test Result

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

Rf	Rg	IES Rcs,h1
72	94	-17%

## 4.1 Integrating Sphere Test

### Results



#### Spectral values

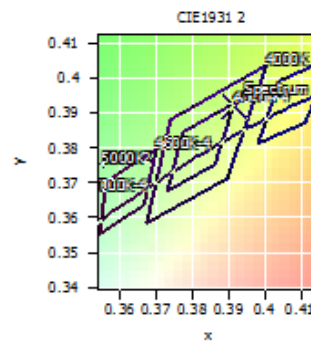
DominantWavelength 577.93 nm  
Purity 0.351  
PeakWavelength 449.37 nm  
Radiant Power 21.7 W  
Width50%:

Date: 2021/2/7 18:56:20

#### Color Coordinates

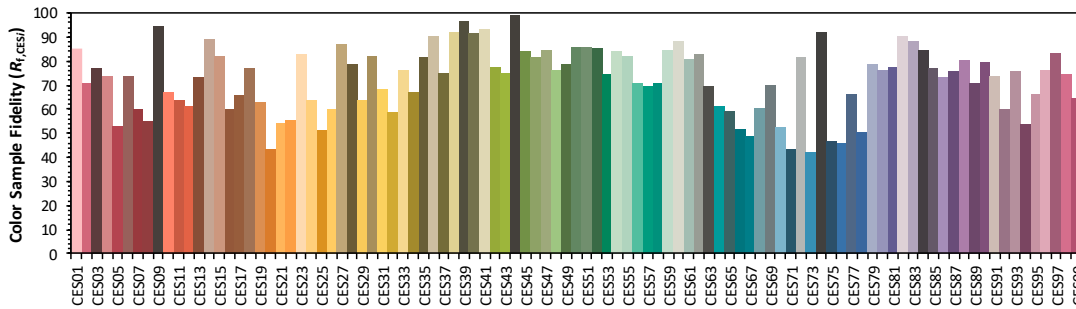
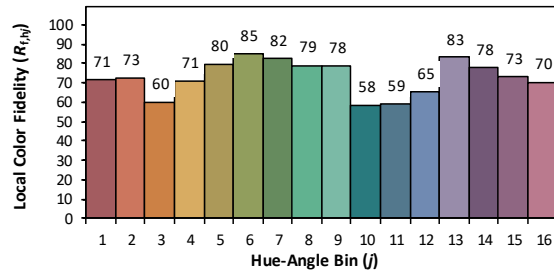
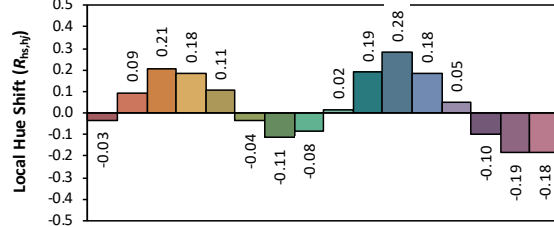
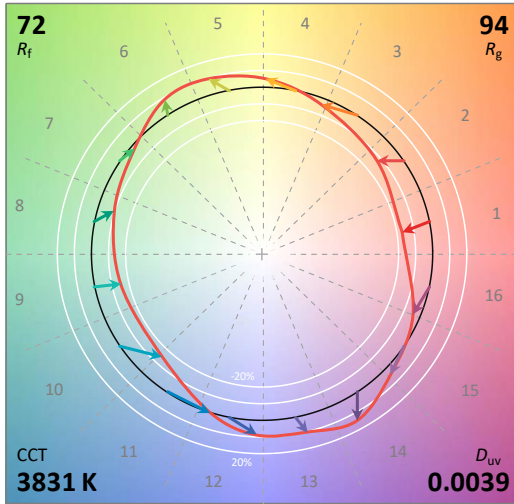
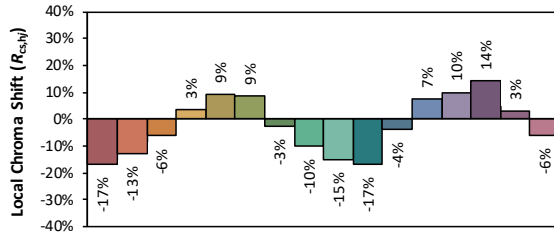
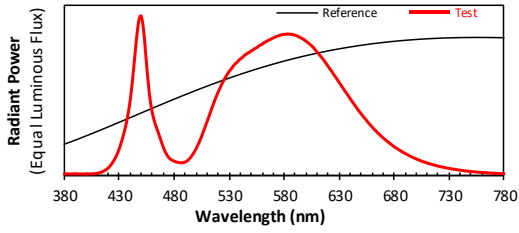
Correlated Color Temperatu 3832 K  
x: 0.3914 u: 0.2262 u': 0.2262  
y: 0.3920 v: 0.3398 v': 0.5097

CRI01	66.8	CRI09	-32.3
CRI02	76.5	CRI10	43.2
CRI03	83.4	CRI11	62.0
CRI04	68.4	CRI12	32.5
CRI05	65.0	CRI13	68.2
CRI06	65.4	CRI14	90.3
CRI07	81.1	CRI15	60.1
CRI08	51.4	CRI16	61.7
ResultsCRI	69.7		



PlanckDistance 3.9E-003

### 4.1 Integrating Sphere Test



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

$x$  0.3914  
 $y$  0.3920  
 $u'$  0.2262  
 $v'$  0.5097

CIE 13.3-1995 (CRI)	
$R_a$	70
$R_g$	-31

## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

Model No.	ALED5T78N/D10	Sample ID.	D1
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	120.04	60	0.669	80.2	0.999
NON-WROST CASE	277.20	60	0.291	77.8	0.964

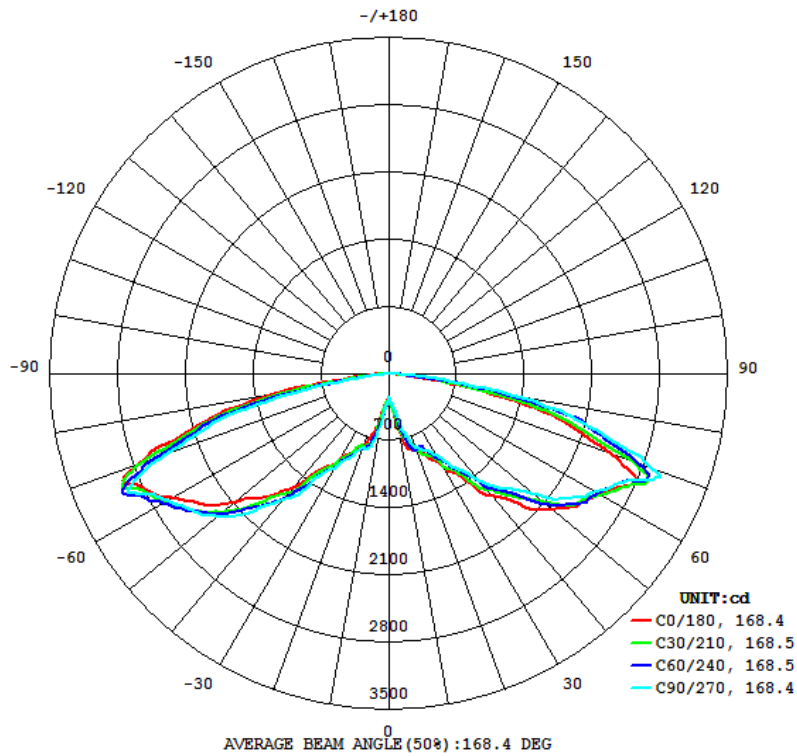
#### Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
10127	172.8	173.0	168.4	168.4	126.3

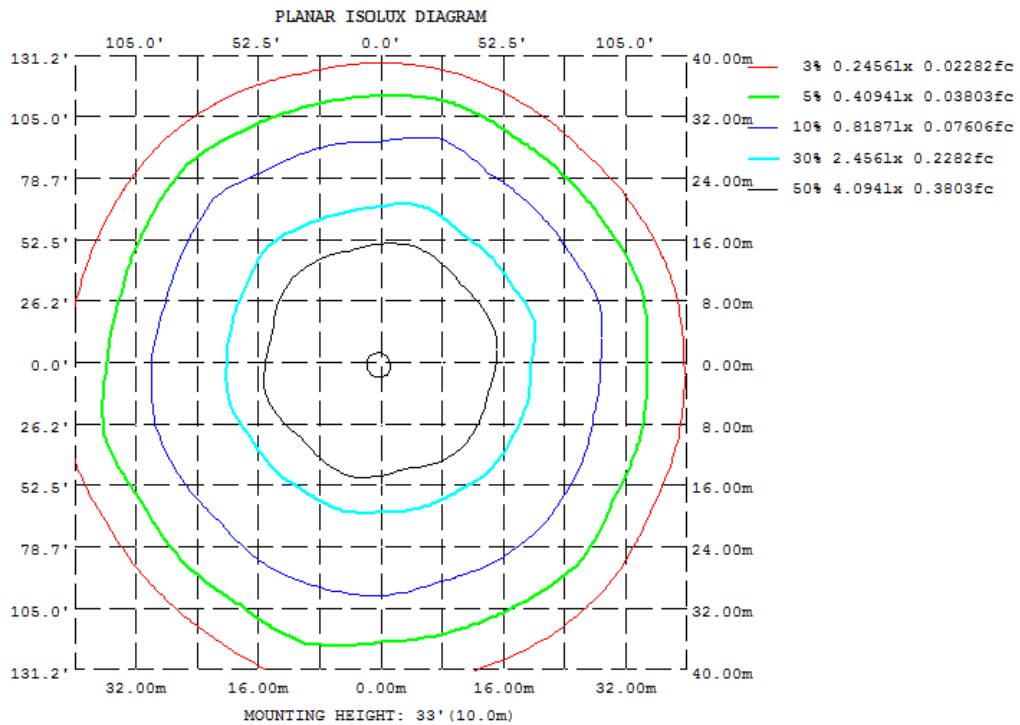
Zonal Lumen Requirement (0°-90°)	BUG rating
100.00%	B3-U0-G2

## 4.2 Goniophotometer Test

### Light Distrubtion Curve



### Isolux Plot



## 4.2 Goniophotometer Test

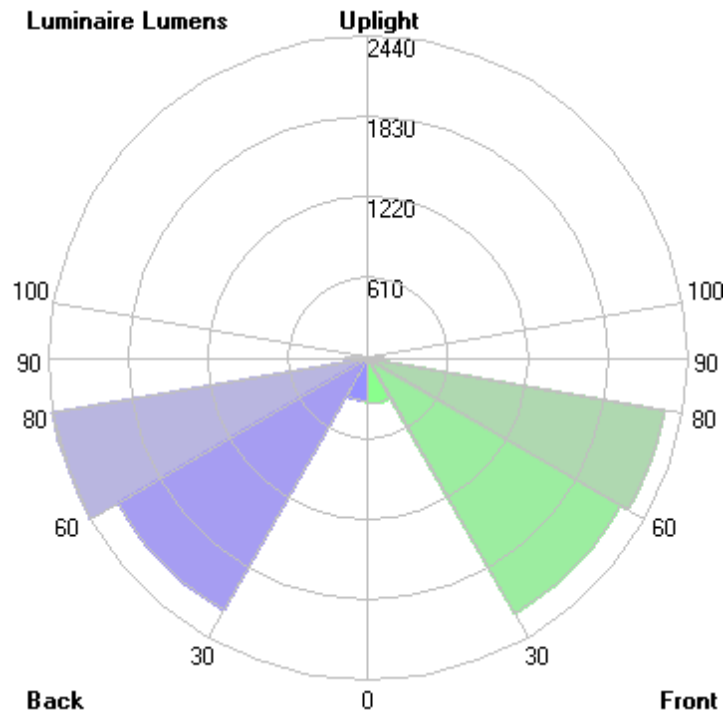
### Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	571.4	454.3	393.8	368.0	395.0	462.8	558.6	589.1
20	832.2	833.7	819.9	749.7	796.5	810.6	830.4	854.6
30	1117	1024	993.4	1066	1027	1049	1153	1250
40	1667	1484	1466	1538	1556	1601	1719	1712
50	2209	2245	1955	1952	2069	2414	2322	2046
60	2523	2597	2458	2386	2595	2847	2653	2626
70	2446	2629	2880	2634	2751	2862	2422	2248
80	747.9	1094	1274	1200	1150	1022	659.3	571.5
90	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)	Total (lm)	Percent
0-10	34.61	0 - 10	34.61 0.34%
10-20	201.97	0 - 20	236.58 2.34%
20-30	437.22	0 - 30	673.80 6.65%
30-40	830.43	0 - 40	1504.23 14.85%
40-50	1462.67	0 - 50	2966.90 29.30%
50-60	2138.65	0 - 60	5105.55 50.42%
60-70	2730.03	0 - 70	7835.58 77.37%
70-80	2007.98	0 - 80	9843.56 97.20%
80-90	283.45	0 - 90	10127.01 100.00%
90-100	0.00	0 - 100	10127.01 100.00%
100-110	0.00	0 - 110	10127.01 100.00%
110-120	0.00	0 - 120	10127.01 100.00%
120-130	0.00	0 - 130	10127.01 100.00%
130-140	0.00	0 - 140	10127.01 100.00%
140-150	0.00	0 - 150	10127.01 100.00%
150-160	0.00	0 - 160	10127.01 100.00%
160-170	0.00	0 - 170	10127.01 100.00%
170-180	0.00	0 - 180	10127.01 100.00%

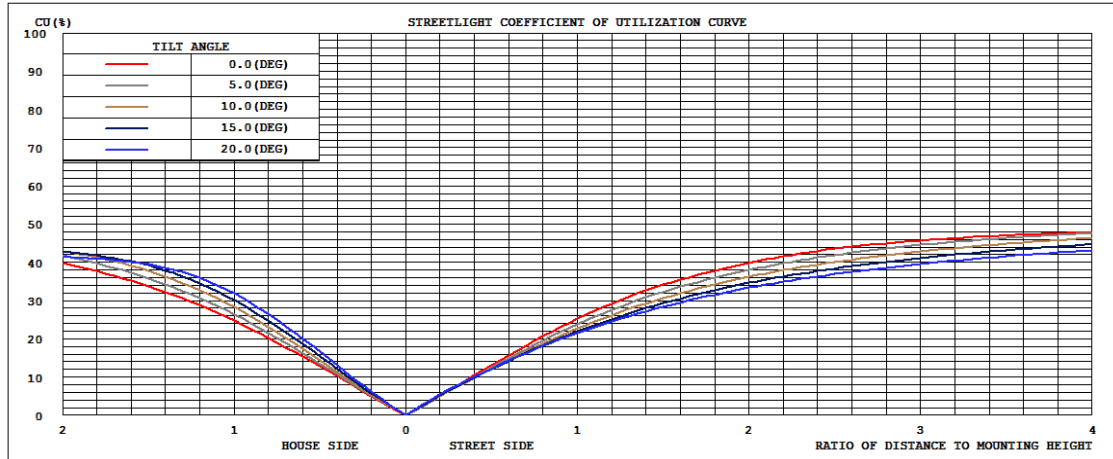
## 4.2 Goniophotometer Test

LCS/BUG

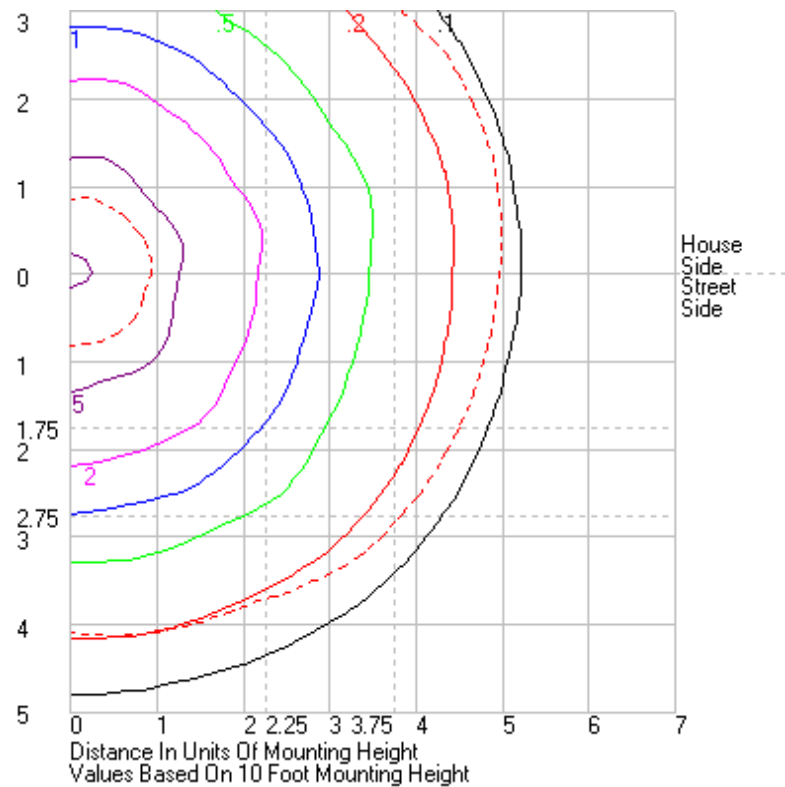


	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	347.7	N.A.	3.4
FM - Front-Medium (30-60)	2229.6	N.A.	22.0
FH - Front-High (60-80)	2298.4	N.A.	22.7
FVH - Front-Very High (80-90)	115.9	N.A.	1.1
BL - Back-Low (0-30)	326.1	N.A.	3.2
BM - Back-Medium (30-60)	2202.1	N.A.	21.7
BH - Back-High (60-80)	2439.6	N.A.	24.1
BVH - Back-Very High (80-90)	167.6	N.A.	1.7
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>10127.0</b>	<b>N.A.</b>	<b>100.0</b>
<b>BUG Rating</b>	<b>B3-U0-G2</b>		

Coefficients of Utilization



Isolines





**Deliver**



NVLAP LAB CODE 201074-0



	<u>0</u>	<u>15</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>75</u>	<u>90</u>	<u>105</u>	<u>120</u>	<u>135</u>
0	269.887	269.887	269.887	269.887	269.887	269.887	269.887	269.887	269.887	269.887
1	297.080	288.820	277.520	268.110	260.450	249.650	237.750	227.890	222.780	218.290
2	302.670	295.290	292.050	290.470	277.880	259.300	242.840	223.890	209.170	201.580
3	316.410	310.530	311.580	306.690	289.530	272.810	255.400	237.850	225.000	220.270
4	323.940	322.670	318.050	317.310	299.260	282.690	261.850	264.800	249.110	262.670
5	329.360	334.910	333.480	321.240	304.860	301.040	300.590	290.890	272.110	286.290
6	347.620	349.450	344.910	329.370	316.920	317.480	321.220	301.170	284.150	299.930
7	386.150	377.000	374.650	343.840	325.560	332.720	331.480	310.400	295.080	313.530
8	438.250	412.850	405.030	372.660	336.180	348.940	342.650	320.130	308.060	323.100
9	505.580	471.850	447.600	409.510	373.390	377.930	362.700	332.220	324.220	341.470
10	571.430	533.930	507.530	454.340	422.260	410.660	393.830	357.580	347.410	367.970
11	638.050	596.910	581.040	511.100	491.450	460.600	433.110	400.560	384.770	408.430
12	701.730	645.700	634.570	576.850	557.880	511.260	479.990	452.050	431.660	451.930
13	753.000	680.500	669.560	651.480	625.920	570.390	546.010	528.230	491.390	519.360
14	794.990	701.930	693.870	698.990	684.260	616.950	601.420	586.710	554.980	587.970
15	812.600	727.290	713.980	746.480	735.220	658.540	643.950	666.010	614.340	626.990
16	822.780	750.320	752.500	789.300	776.840	691.400	683.490	736.540	664.710	658.840
17	848.020	766.790	775.930	817.120	809.210	728.280	707.270	775.320	703.480	676.080
18	840.720	786.330	794.170	824.600	828.900	768.470	749.160	810.140	750.190	710.220
19	833.760	810.480	813.060	827.390	850.670	783.020	791.210	826.340	791.160	731.810
20	832.180	846.330	840.270	833.700	850.860	790.740	819.860	830.700	836.350	749.730
21	837.400	884.230	871.600	829.490	835.140	803.350	835.090	836.460	856.890	769.510
22	858.030	912.530	904.700	827.760	823.840	827.300	845.120	847.250	855.530	790.300
23	885.300	934.620	926.550	839.050	822.100	860.370	865.760	853.490	859.870	816.830
24	919.460	964.190	932.980	861.930	835.500	901.750	887.550	854.580	867.650	848.580
25	955.810	995.650	946.310	882.750	857.890	936.130	895.360	856.780	880.700	881.590
26	991.180	1022.640	958.840	908.860	892.570	972.400	899.480	873.950	896.430	920.730
27	1018.710	1046.000	977.500	935.250	931.140	1004.850	914.430	893.470	914.720	964.850
28	1035.230	1073.220	997.290	962.030	971.410	1034.120	937.920	913.030	936.990	1007.520
29	1064.480	1123.310	1027.900	990.300	1006.890	1056.170	968.430	940.020	961.340	1045.030
30	1117.110	1194.200	1084.480	1024.320	1032.470	1069.760	993.410	967.420	985.320	1066.220
31	1181.610	1232.160	1149.430	1050.600	1052.800	1094.070	1025.520	997.310	1014.190	1092.510
32	1214.700	1250.370	1177.220	1079.640	1084.150	1148.110	1053.650	1026.130	1038.410	1144.060
33	1235.700	1277.620	1193.000	1134.480	1128.540	1218.200	1103.990	1056.970	1088.620	1192.610
34	1263.650	1321.730	1225.760	1194.660	1194.420	1262.430	1168.960	1088.940	1136.460	1230.500
35	1315.970	1372.540	1270.700	1232.950	1227.620	1282.390	1208.590	1122.290	1170.930	1252.410
36	1392.540	1445.780	1344.800	1281.660	1249.700	1314.990	1235.720	1195.770	1195.740	1288.960
37	1469.110	1541.080	1419.180	1331.670	1297.710	1347.800	1267.900	1273.770	1220.820	1342.680
38	1574.010	1590.520	1510.670	1381.670	1352.500	1408.530	1331.450	1311.590	1260.680	1396.730
39	1632.840	1613.070	1555.420	1424.650	1407.280	1523.180	1395.330	1349.170	1334.430	1475.300
40	1666.580	1634.020	1591.350	1484.340	1523.610	1565.090	1465.880	1377.530	1408.220	1538.010
41	1701.480	1672.150	1616.360	1562.540	1597.650	1596.540	1524.740	1416.630	1470.220	1575.810
42	1742.040	1720.930	1656.310	1621.050	1623.960	1629.550	1577.260	1475.150	1531.390	1603.370
43	1787.480	1779.380	1709.770	1714.050	1664.990	1663.210	1620.810	1559.710	1593.410	1634.670
44	1863.110	1841.390	1774.330	1805.140	1707.060	1713.090	1667.130	1667.320	1666.430	1694.430
45	1937.900	1896.100	1807.480	1876.150	1755.980	1778.940	1697.890	1732.760	1716.920	1779.510
46	2026.050	1918.490	1864.370	1953.700	1825.580	1823.130	1731.480	1813.450	1766.850	1843.890
47	2078.660	1928.530	1909.400	2041.750	1897.730	1884.960	1775.580	1909.250	1817.840	1907.140
48	2132.170	1957.380	1953.500	2113.540	1976.420	1911.480	1822.450	2008.510	1874.930	1928.600
49	2172.960	1992.900	2018.460	2176.480	2061.470	1926.300	1886.180	2119.120	1933.980	1957.870
50	2209.350	2022.140	2081.720	2245.260	2122.770	1949.220	1954.880	2198.350	2003.030	1951.810
51	2245.320	2059.970	2148.580	2288.450	2183.350	1980.500	2036.350	2258.250	2076.730	2000.610
52	2285.530	2088.370	2224.410	2351.740	2234.840	2014.350	2130.590	2298.320	2162.950	2032.510
53	2325.030	2133.060	2282.430	2405.270	2275.880	2031.900	2180.840	2343.940	2228.170	2072.980
54	2364.520	2168.960	2335.560	2433.230	2320.750	2065.770	2223.170	2395.820	2278.540	2108.270
55	2391.840	2234.580	2362.550	2484.890	2372.020	2137.330	2271.300	2444.900	2323.800	2154.520
56	2395.120	2270.130	2388.550	2515.620	2413.320	2188.500	2309.470	2493.940	2355.420	2202.080

57	2421.770	2287.910	2400.820	2531.490	2439.890	2212.400	2365.230	2538.490	2411.350	2215.080
58	2455.310	2363.830	2428.510	2556.040	2446.480	2236.120	2405.790	2561.430	2421.570	2272.620
59	2485.290	2432.240	2489.800	2580.130	2468.260	2269.220	2422.060	2581.490	2439.330	2334.370
60	2523.180	2512.440	2536.580	2597.000	2484.810	2362.260	2458.020	2605.270	2470.990	2385.880
61	2541.350	2592.480	2578.600	2617.340	2521.250	2445.030	2512.330	2630.120	2494.710	2469.940
62	2583.390	2641.120	2616.250	2657.520	2555.030	2542.730	2559.570	2677.820	2547.410	2571.000
63	2624.990	2686.100	2656.520	2708.710	2587.240	2630.290	2587.910	2722.890	2585.460	2638.220
64	2691.250	2673.920	2705.570	2814.940	2627.680	2680.350	2622.990	2794.710	2606.050	2735.260
65	2751.040	2642.150	2751.090	2915.560	2669.660	2692.900	2685.500	2950.930	2648.830	2738.870
66	2802.110	2685.210	2845.920	3022.580	2759.820	2706.700	2741.510	3057.260	2680.380	2735.090
67	2759.280	2676.080	2887.680	3003.000	2876.500	2681.380	2843.920	3133.900	2695.350	2741.790
68	2668.960	2607.230	2888.940	2899.900	2886.670	2710.790	2942.160	3092.200	2794.890	2745.500
69	2568.610	2499.070	2779.340	2763.460	2856.550	2674.640	3010.400	2979.410	2845.760	2710.650
70	2446.040	2365.970	2690.470	2628.860	2736.440	2588.770	2879.660	2820.700	2819.240	2634.400
71	2269.500	2270.700	2512.140	2618.050	2651.710	2515.550	2788.590	2721.660	2747.380	2531.680
72	2172.360	2194.360	2314.180	2547.790	2480.950	2369.000	2645.930	2652.000	2630.970	2394.410
73	2031.090	2119.460	2158.110	2546.500	2326.800	2268.600	2447.630	2617.000	2428.880	2357.940
74	1932.990	2036.830	2021.480	2424.100	2236.820	2212.470	2293.090	2648.820	2315.990	2335.020
75	1820.820	1914.350	1891.790	2219.550	2127.110	2138.110	2151.420	2512.120	2188.530	2195.900
76	1642.210	1729.490	1763.260	2030.930	2047.330	2026.670	2010.650	2313.420	2055.060	2043.670
77	1449.410	1513.630	1569.480	1779.490	1883.030	1886.950	1894.080	2087.530	1938.640	1813.740
78	1233.700	1247.970	1362.030	1539.940	1621.400	1686.500	1697.770	1786.070	1737.920	1592.350
79	988.380	1000.900	1168.300	1329.170	1410.870	1439.790	1527.730	1553.650	1545.920	1426.620
80	747.950	788.090	927.250	1093.930	1186.880	1140.140	1274.460	1330.810	1334.610	1199.670
81	549.810	620.770	711.280	952.910	933.030	904.850	1010.370	1145.930	1132.990	980.650
82	363.960	443.210	507.100	750.340	712.140	713.130	792.980	997.790	900.180	747.500
83	178.110	265.460	317.060	543.630	499.650	522.350	586.350	784.050	636.000	564.760
84	73.330	131.360	153.060	333.580	302.640	352.500	390.140	561.920	438.160	394.810
85	48.020	53.840	56.920	123.520	133.080	195.980	193.930	344.850	242.180	224.850
86	24.770	37.010	38.740	60.610	50.700	106.220	77.030	127.780	91.990	98.610
87	8.670	20.760	21.080	41.770	32.020	52.790	51.330	60.820	47.920	54.620
88	4.610	9.500	8.190	23.280	13.490	34.220	26.590	42.540	29.910	40.020
89	2.410	6.170	5.350	9.160	7.960	16.130	11.160	24.480	11.900	25.430
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	269.887	269.887	269.887	269.887	269.887	269.887	269.887	269.887	269.887	269.887
1	223.770	230.080	246.550	254.050	260.430	266.700	274.480	281.270	289.130	294.080
2	205.760	224.550	241.110	258.860	271.540	283.110	282.190	282.440	290.930	300.000
3	227.160	246.400	259.570	275.390	287.100	297.620	296.000	289.860	296.440	308.700
4	262.400	275.020	281.150	284.370	292.870	310.640	315.470	306.370	304.510	315.530
5	288.580	296.540	300.930	290.890	300.030	316.960	330.230	320.960	315.110	325.000
6	298.870	308.660	316.400	302.550	306.000	332.300	351.030	346.770	339.880	353.020
7	312.760	314.870	328.120	313.040	315.800	350.500	372.600	379.980	375.810	395.740
8	326.190	320.990	345.430	330.540	340.540	373.940	414.570	423.820	432.310	452.860
9	334.460	331.960	361.760	363.090	377.170	414.890	461.410	480.520	495.390	529.790
10	362.670	356.910	395.020	406.720	430.350	462.760	530.770	544.980	558.560	606.720
11	401.240	405.460	436.770	468.320	493.890	525.650	585.610	594.490	621.740	667.780
12	451.920	463.810	506.640	541.330	561.730	582.730	616.400	632.510	678.910	723.150
13	511.630	544.720	566.260	585.780	629.570	639.880	647.380	665.850	729.420	749.390
14	569.460	618.730	601.890	614.880	692.080	700.110	685.940	705.220	775.330	780.210
15	622.010	688.030	637.510	643.990	731.620	736.760	730.580	737.670	793.640	803.780
16	678.310	746.670	672.350	680.690	770.000	773.980	774.820	750.950	814.240	830.450
17	731.060	786.840	714.300	703.820	791.630	794.700	797.690	763.100	829.680	839.710
18	772.530	820.920	754.670	730.040	792.100	801.550	811.740	785.010	825.420	846.010
19	811.180	845.760	777.310	751.950	801.740	808.090	821.780	821.270	824.170	849.430
20	838.940	847.290	796.490	779.100	811.970	810.550	834.530	864.110	830.430	846.320
21	843.710	847.470	822.270	812.350	806.060	805.010	855.910	899.420	843.370	856.230
22	837.110	860.820	850.050	851.590	807.470	814.730	871.550	928.800	866.300	866.990
23	837.560	864.660	882.580	888.490	825.100	833.190	888.800	961.450	896.160	887.850
24	841.510	870.490	908.990	913.760	857.340	858.150	914.770	993.010	930.220	910.620
25	859.500	887.540	924.850	930.510	895.510	891.580	946.010	1018.150	962.120	940.150
26	883.720	904.530	935.330	960.550	926.370	923.240	971.540	1035.070	992.770	967.940
27	915.450	934.330	948.460	983.160	956.920	966.160	992.390	1063.030	1013.130	997.260
28	958.760	956.820	964.110	1012.950	982.660	998.130	1020.530	1121.460	1038.530	1029.810
29	990.400	983.810	983.370	1057.020	1004.720	1030.140	1076.830	1186.540	1097.850	1058.320
30	1016.200	1014.580	1027.330	1111.520	1053.060	1049.130	1136.390	1199.340	1152.630	1115.520
31	1036.120	1041.110	1089.350	1144.820	1112.990	1078.270	1151.440	1225.880	1167.230	1180.180
32	1060.800	1075.190	1133.570	1163.950	1145.010	1139.670	1183.110	1266.960	1188.900	1271.180
33	1118.400	1120.730	1154.330	1195.290	1164.640	1215.380	1214.610	1304.760	1218.110	1327.780
34	1165.110	1174.760	1178.340	1241.520	1199.020	1265.280	1249.510	1371.820	1268.660	1334.510
35	1201.560	1216.400	1206.990	1290.320	1235.250	1297.590	1326.800	1468.190	1352.850	1361.860
36	1215.850	1254.680	1248.940	1352.630	1290.150	1319.330	1427.890	1528.160	1482.370	1407.620
37	1250.280	1300.430	1306.480	1462.920	1367.630	1363.310	1486.470	1590.150	1574.600	1464.330
38	1315.820	1339.290	1409.230	1554.570	1501.240	1414.740	1545.900	1636.220	1644.960	1542.330
39	1406.010	1375.440	1499.910	1605.050	1583.180	1507.890	1617.770	1673.750	1678.120	1638.520
40	1496.210	1424.870	1555.870	1649.880	1618.710	1600.900	1702.880	1724.370	1718.670	1711.510
41	1573.170	1491.850	1598.390	1682.550	1655.740	1688.660	1754.830	1793.190	1761.840	1761.520
42	1603.810	1594.620	1645.800	1729.890	1700.070	1779.670	1810.800	1858.390	1826.590	1851.120
43	1634.220	1690.030	1717.710	1796.780	1753.130	1849.370	1866.900	1928.820	1886.920	1946.160
44	1678.450	1788.640	1779.130	1866.430	1826.440	1929.030	1924.380	1974.190	1975.600	2067.820
45	1717.300	1856.710	1835.410	1920.280	1913.490	2043.500	1971.210	1995.750	2049.570	2157.540
46	1778.490	1946.860	1868.620	1965.760	1989.540	2149.740	2023.300	2000.930	2117.420	2232.110
47	1845.390	2050.650	1913.150	1988.920	2062.570	2241.630	2083.000	2022.200	2176.710	2275.470
48	1931.290	2156.600	1950.510	1996.460	2120.700	2320.300	2150.460	2055.040	2226.020	2324.790
49	2002.910	2235.550	1996.890	2034.500	2178.450	2359.490	2221.670	2092.360	2269.850	2379.740
50	2103.020	2295.820	2068.800	2069.280	2246.050	2414.180	2282.690	2123.540	2321.830	2431.530
51	2171.560	2345.790	2150.920	2075.300	2291.450	2461.350	2331.370	2179.270	2354.940	2480.410



NVLAP LAB CODE 201074-0

52	2233.460	2383.890	2223.030	2108.510	2347.980	2512.140	2376.130	2202.590	2407.130	2519.140
53	2276.980	2449.450	2295.640	2131.250	2410.660	2576.320	2402.540	2256.250	2438.380	2548.290
54	2314.930	2500.260	2344.570	2185.710	2444.090	2611.210	2450.840	2266.610	2465.750	2570.200
55	2348.090	2551.490	2370.930	2229.070	2493.380	2657.180	2503.680	2323.150	2488.610	2590.960
56	2381.470	2595.940	2410.450	2285.180	2537.210	2686.670	2538.280	2376.750	2511.280	2610.720
57	2433.100	2628.530	2448.180	2334.360	2567.370	2701.670	2579.870	2451.310	2540.170	2637.990
58	2459.500	2653.690	2497.220	2371.900	2589.230	2723.490	2625.520	2533.850	2586.200	2672.550
59	2513.250	2689.950	2542.000	2433.860	2623.750	2773.670	2657.720	2634.600	2615.970	2740.830
60	2553.890	2720.900	2595.060	2515.980	2674.110	2846.950	2702.260	2717.630	2652.770	2842.950
61	2575.140	2755.240	2664.660	2600.160	2712.300	2886.530	2746.880	2772.770	2682.420	2961.680
62	2606.450	2798.610	2708.720	2702.810	2742.420	2938.500	2809.910	2760.660	2725.730	3066.280
63	2622.680	2860.950	2738.720	2755.000	2779.290	3002.870	2836.330	2758.690	2768.220	3181.710
64	2655.980	2904.870	2782.100	2791.950	2808.180	3127.390	2893.720	2742.630	2865.850	3174.100
65	2721.620	3007.070	2806.770	2791.420	2854.270	3172.940	2979.050	2774.150	2933.380	3063.860
66	2778.470	3082.310	2851.520	2765.440	2961.720	3154.190	3030.390	2760.800	2941.750	2942.010
67	2892.340	3092.670	2943.260	2805.760	2994.980	3098.110	2957.050	2663.560	2861.240	2790.370
68	2949.810	3040.800	2962.750	2761.800	2944.820	3039.680	2827.740	2594.560	2744.020	2737.200
69	2920.030	2933.090	2897.320	2625.900	2854.230	2924.970	2725.370	2489.430	2628.400	2792.860
70	2833.730	2813.840	2750.970	2536.060	2740.140	2861.960	2554.520	2431.630	2422.170	2801.460
71	2691.610	2723.110	2629.140	2406.240	2550.150	2782.350	2365.250	2372.290	2267.100	2738.260
72	2610.970	2732.720	2500.870	2236.950	2345.330	2707.800	2242.720	2267.590	2137.750	2543.950
73	2404.350	2671.760	2264.140	2078.060	2191.380	2509.670	2101.080	2096.340	1998.880	2267.550
74	2232.980	2579.790	2136.950	1985.660	2069.580	2245.020	2006.780	1891.920	1903.460	1995.870
75	2085.900	2362.740	2000.440	1904.810	1926.490	2039.700	1880.360	1709.840	1738.720	1714.650
76	1955.530	2138.730	1884.230	1792.940	1783.680	1811.260	1694.320	1509.300	1522.410	1495.150
77	1832.510	1883.530	1742.580	1673.050	1586.180	1617.830	1475.390	1290.430	1311.820	1304.450
78	1700.420	1677.260	1544.740	1476.590	1414.610	1425.520	1247.070	1070.760	1101.070	1114.330
79	1483.950	1478.520	1347.390	1236.930	1237.220	1233.210	999.650	845.230	876.340	964.960
80	1257.850	1300.340	1150.050	979.370	1010.420	1022.470	745.290	667.760	659.290	781.780
81	1030.740	1120.340	925.440	795.610	756.150	761.640	529.360	484.320	431.080	537.980
82	754.990	903.070	702.860	639.760	524.270	549.930	343.470	326.830	267.220	341.960
83	535.800	656.760	480.860	437.940	337.830	354.860	205.600	196.110	130.810	197.540
84	342.250	430.170	298.590	265.560	193.990	203.890	67.830	68.200	42.160	56.060
85	168.410	204.060	146.890	138.420	51.780	56.670	25.490	43.840	26.880	31.760
86	75.240	84.960	42.770	46.760	28.650	35.180	16.880	31.290	16.280	20.910
87	49.660	46.280	26.540	22.980	17.350	22.480	8.320	16.460	5.760	10.970
88	24.260	25.940	15.880	14.600	6.220	9.770	2.260	1.800	1.200	1.070
89	8.690	11.380	5.330	6.220	1.730	1.020	0.750	0.560	0.510	0.500
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**

	<b>300</b>	<b>315</b>	<b>330</b>	<b>345</b>	<b>360</b>
0	269.887	269.887	269.887	269.887	269.887
1	295.470	295.880	295.930	296.620	297.080
2	306.470	310.170	306.760	304.920	302.670
3	314.960	322.640	327.380	320.390	316.410
4	324.890	337.330	337.070	326.440	323.940
5	346.690	361.420	357.100	334.570	329.360
6	380.110	393.520	381.550	356.730	347.620
7	418.610	428.710	416.030	396.480	386.150
8	465.380	477.420	466.900	448.270	438.250
9	530.460	544.370	543.620	514.560	505.580
10	577.640	589.120	588.910	587.700	571.430
11	619.240	623.830	623.650	660.560	638.050
12	660.890	658.370	658.570	711.140	701.730
13	708.250	689.790	706.240	752.840	753.000
14	755.820	725.790	768.080	783.920	794.990
15	804.060	747.560	811.250	816.500	812.600
16	820.650	757.100	838.790	842.460	822.780
17	827.600	777.940	856.560	851.310	848.020
18	836.220	796.130	864.700	848.400	840.720
19	847.550	822.060	864.270	850.430	833.760
20	856.150	854.610	868.910	849.220	832.180
21	871.130	886.250	882.750	849.400	837.400
22	887.910	919.920	898.470	866.860	858.030
23	916.800	961.520	922.940	888.930	885.300
24	934.520	1003.620	942.920	910.010	919.460
25	965.840	1038.250	962.090	930.960	955.810
26	990.980	1071.310	984.570	957.030	991.180
27	1032.150	1127.850	1016.900	983.320	1018.710
28	1095.000	1183.470	1073.080	1010.470	1035.230
29	1156.160	1233.130	1128.920	1039.640	1064.480
30	1199.920	1250.350	1175.690	1074.620	1117.110
31	1219.370	1281.710	1186.070	1135.630	1181.610
32	1246.190	1311.780	1206.690	1202.000	1214.700
33	1279.330	1357.140	1238.470	1275.190	1235.700
34	1339.130	1428.020	1288.480	1322.560	1263.650
35	1418.650	1496.950	1366.330	1352.540	1315.970
36	1471.010	1553.680	1437.940	1383.850	1392.540
37	1527.420	1593.270	1500.610	1420.680	1469.110
38	1592.590	1624.290	1546.620	1479.100	1574.010
39	1654.380	1649.790	1613.220	1554.480	1632.840
40	1690.270	1711.980	1668.940	1647.120	1666.580
41	1753.800	1771.960	1717.310	1713.450	1701.480
42	1791.820	1843.110	1739.160	1794.760	1742.040
43	1852.080	1881.760	1773.700	1876.090	1787.480
44	1897.350	1906.530	1806.600	1973.230	1863.110
45	1974.580	1917.090	1860.770	2064.380	1937.900
46	2037.850	1907.790	1930.020	2144.300	2026.050

47	2102.200	1926.800	2015.550	2201.840	2078.660
48	2164.340	1952.260	2108.020	2231.710	2132.170
49	2212.600	1998.240	2168.980	2280.250	2172.960
50	2247.630	2046.210	2209.290	2332.310	2209.350
51	2281.490	2097.070	2243.930	2380.940	2245.320
52	2330.620	2124.640	2273.950	2441.620	2285.530
53	2355.680	2143.750	2308.360	2472.920	2325.030
54	2389.120	2194.670	2329.850	2506.550	2364.520
55	2421.640	2227.610	2358.750	2529.550	2391.840
56	2442.840	2270.010	2381.710	2535.660	2395.120
57	2473.180	2348.470	2411.010	2549.690	2421.770
58	2516.270	2427.800	2454.880	2585.960	2455.310
59	2535.050	2533.990	2507.370	2613.810	2485.290
60	2567.060	2626.300	2537.650	2634.510	2523.180
61	2602.210	2655.310	2572.230	2706.050	2541.350
62	2613.610	2676.990	2617.030	2822.910	2583.390
63	2649.550	2704.330	2651.230	2926.650	2624.990
64	2770.820	2696.330	2751.180	3017.140	2691.250
65	2829.030	2708.210	2800.280	2990.280	2751.040
66	2803.620	2630.190	2788.640	2870.820	2802.110
67	2746.080	2556.260	2724.160	2742.990	2759.280
68	2639.070	2468.060	2612.520	2621.760	2668.960
69	2468.120	2315.150	2534.560	2545.860	2568.610
70	2297.290	2248.470	2358.000	2531.100	2446.040
71	2177.380	2197.120	2199.480	2530.430	2269.500
72	2061.100	2093.630	2093.020	2436.240	2172.360
73	1905.760	1963.560	1980.690	2300.320	2031.090
74	1807.940	1771.210	1878.770	2089.780	1932.990
75	1621.330	1555.950	1703.800	1852.680	1820.820
76	1429.900	1365.920	1498.850	1611.230	1642.210
77	1238.460	1175.580	1314.220	1411.450	1449.410
78	1031.070	972.710	1128.130	1211.670	1233.700
79	804.690	754.780	886.580	1015.740	988.380
80	600.800	571.520	645.770	834.380	747.950
81	380.080	416.880	431.660	633.260	549.810
82	243.950	268.740	268.990	406.220	363.960
83	107.830	134.290	132.920	266.750	178.110
84	31.400	42.740	41.130	127.270	73.330
85	21.480	26.480	29.230	41.770	48.020
86	11.560	19.740	17.330	26.350	24.770
87	4.170	10.470	5.520	14.780	8.670
88	1.080	1.300	1.410	3.370	4.610
89	0.490	0.500	0.550	0.670	2.410
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.	ALED5T78N/D10	Sample ID.	D1
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
120.03	60	0.668	80.1	0.999	2.03%
277.04	60	0.291	77.7	0.964	8.75%

## 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\*\*\*\*\*