

Photometric Test Report

Relevant Standards

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

Prepared For RAB Lighting Inc.

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Report Number

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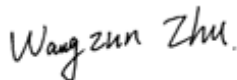
Test Date

2023/2/6

Issue Date

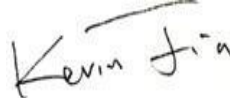
2023/2/7

Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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

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1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Pole/Arm-Mounted Area and Roadway Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		7710
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	137.2
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		56.2
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	3.14%
		20.00%	277V	6.98%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.998
		0.9	277V	0.926
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3045±175	2933
		4 step	3045±100	
Minimum CRI (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥70		82
Minimum R9 (Integrating Sphere - Section 4.1)	IES LM-79-2008 CIE 13.3-1995	≥-40		4
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		94
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (0°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	100%		100.00%
Zonal Lumen Requirement (80°-90°) (Goniophotometer - Section 4.2)	IES LM-79-2008	≤10%		1.09%
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		0.469
(Goniophotometer - Section 4.2)		Non-Worst Case		0.215
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		56.2
(Goniophotometer - Section 4.2)		Non-Worst Case		55.2

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023/2/6	ALEDS3TY	AW1
2	Goniophotometer Test	2023/2/6	ALEDS3TY	AW1
3	THD and PF Test	2023/2/6	ALEDS3TY	AW1

Remark(If any)

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- 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.

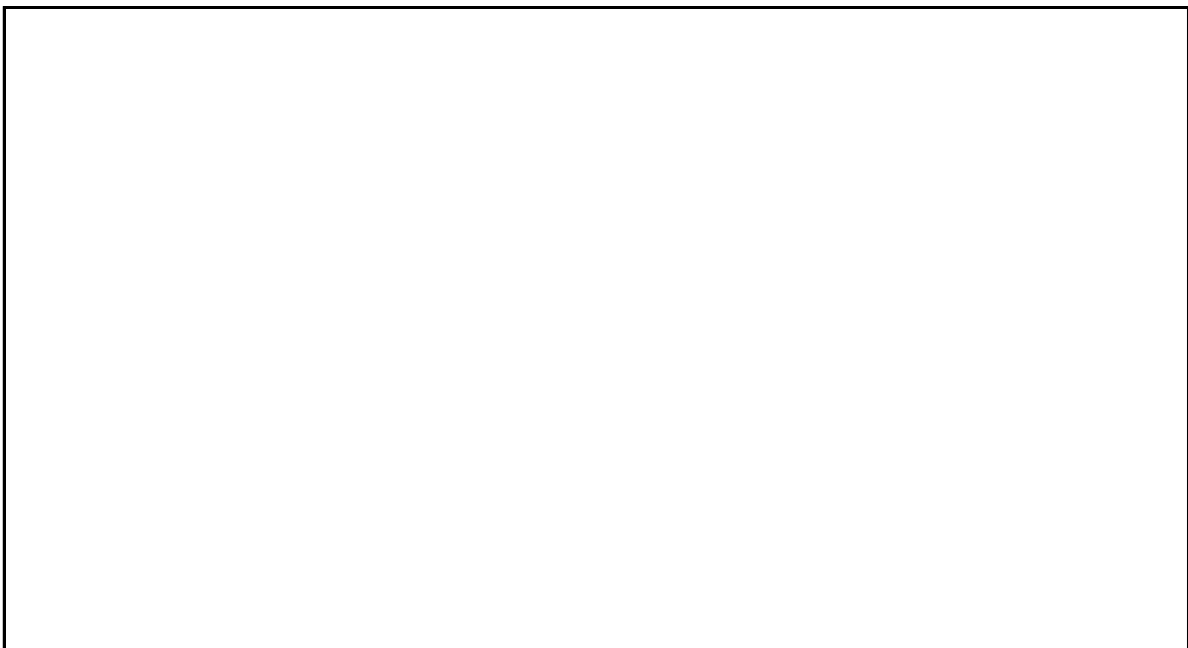
3.0 Production Description

Luminaire Description: ALEDS3TY

Description: 60W @ 3000K

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.	ALEDS3TY	Sample ID.	AW1
Opreate 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 paramters 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
120.00	60	0.469	56.2	0.998
277.00	60	0.215	55.2	0.926

Test Result

CCT (K)	CRI	R9	Duv
2933	82	4	0.0012

Rf	Rg	IES Rcs,h1
84	94	-12%

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	ALEDS3TY	Sample ID.	AW1
Opreate 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 paramters 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	120.00	60	0.469	56.2	0.998
NON-WROST CASE	277.00	60	0.215	55.2	0.926

Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
7710	91.2	164.2	37.0	152.5	137.2

Zonal Lumen Requirement (0° - 90°)	Zonal Lumen Requirement (80° - 90°)	BUG rating
100.00%	1.09%	B1-U0-G2

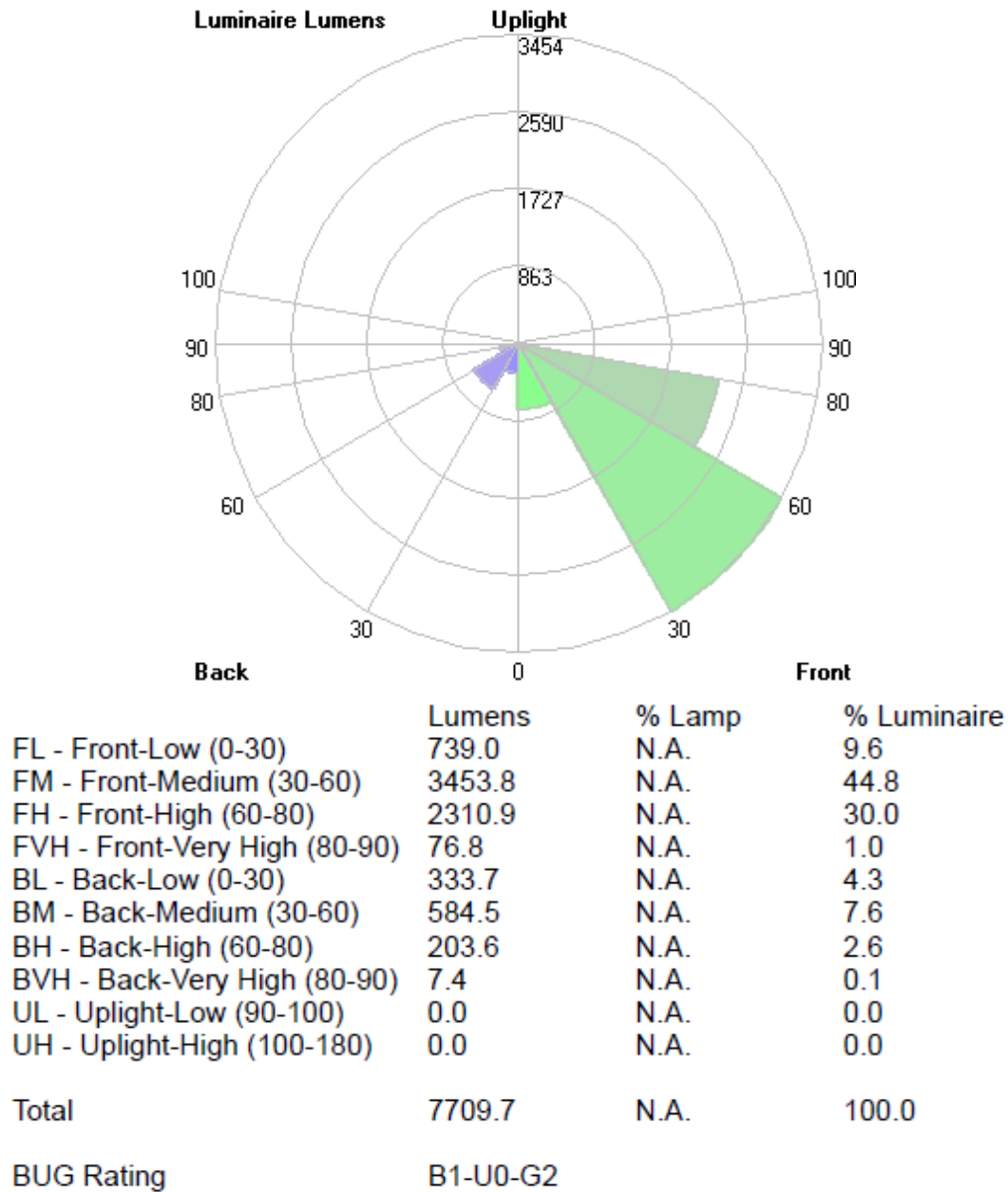
4.2 Goniophotometer Test

Zonal Lumen Summary

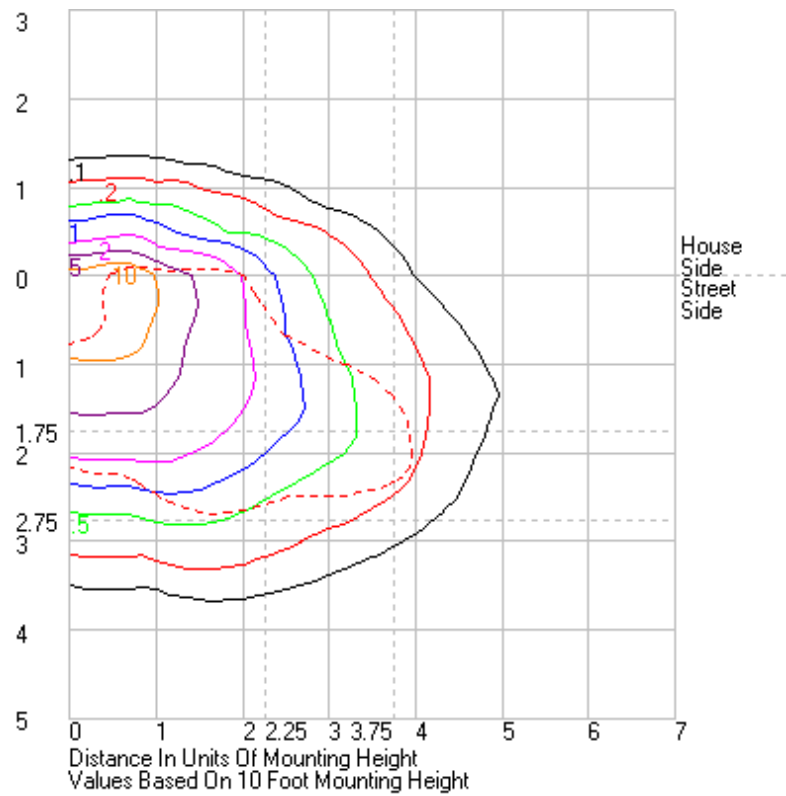
	Zonal (lm)		Total (lm)	Percent
0-10	121.70	0 - 10	121.70	1.58%
10-20	341.15	0 - 20	462.85	6.00%
20-30	609.87	0 - 30	1072.72	13.91%
30-40	1023.17	0 - 40	2095.89	27.19%
40-50	1374.48	0 - 50	3470.37	45.01%
50-60	1640.66	0 - 60	5111.03	66.29%
60-70	1662.62	0 - 70	6773.65	87.86%
70-80	851.92	0 - 80	7625.57	98.91%
80-90	84.15	0 - 90	7709.72	100.00%
90-100	0.00	0 - 100	7709.72	100.00%
100-110	0.00	0 - 110	7709.72	100.00%
110-120	0.00	0 - 120	7709.72	100.00%
120-130	0.00	0 - 130	7709.72	100.00%
130-140	0.00	0 - 140	7709.72	100.00%
140-150	0.00	0 - 150	7709.72	100.00%
150-160	0.00	0 - 160	7709.72	100.00%
160-170	0.00	0 - 170	7709.72	100.00%
170-180	0.00	0 - 180	7709.72	100.00%

4.2 Goniophotometer Test

LCS/BUG



Isolines



4.2 Goniophotometer Test

	0	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360
0	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08	1291.08
1	1310.1	1308.14	1306.02	1303.17	1299.59	1295.36	1290.76	1286.08	1281.83	1277.89	1274.44	1272.56	1273.36	1272.56	1274.44	1277.89	1281.83	1286.08	1290.76	1295.36	1299.59	1303.17	1306.02	1308.14	1310.1
2	1330.25	1327.33	1324.25	1318.58	1311.53	1302.66	1293.32	1284.28	1275.34	1267.39	1260.33	1255.32	1254.87	1255.32	1260.33	1267.39	1275.34	1284.28	1293.32	1302.66	1311.53	1318.58	1324.25	1327.33	1330.25
3	1354.69	1351.2	1346.31	1337.04	1326.33	1312.68	1298.35	1284.01	1269.73	1253.64	1239.26	1228.93	1226.42	1228.93	1239.26	1253.64	1269.73	1284.01	1298.35	1312.68	1326.33	1337.04	1346.31	1351.2	1354.69
4	1377.19	1374.04	1367.92	1357.6	1342.35	1323.58	1304.07	1284.29	1262.25	1237.87	1213.97	1195.53	1187.47	1195.53	1213.97	1237.87	1262.25	1284.29	1304.07	1323.58	1342.35	1357.6	1367.92	1374.04	1377.19
5	1399.25	1395.2	1390.43	1378.89	1360.53	1336.53	1310.68	1285.59	1254.46	1217.08	1176.81	1144.56	1133.38	1144.56	1176.81	1217.08	1254.46	1285.59	1310.68	1336.53	1360.53	1378.89	1390.43	1395.2	1399.25
6	1419.55	1416.53	1411.76	1401.52	1379.69	1349.84	1318.06	1286.74	1244.44	1187.88	1125.2	1080.16	1060.99	1080.16	1125.2	1187.88	1244.44	1286.74	1318.06	1349.84	1379.69	1401.52	1411.76	1416.53	1419.55
7	1437.79	1435.09	1432.43	1422.92	1400.32	1364.81	1326.39	1288.46	1232.43	1150.9	1069.37	1010.29	985.165	1010.29	1069.37	1150.9	1232.43	1288.46	1326.39	1364.81	1400.32	1422.92	1432.43	1435.09	1437.79
8	1458.53	1456.05	1453.98	1444.59	1421.18	1380.89	1335.93	1289.88	1216.12	1106.96	1000.96	925.752	897.689	925.752	1000.96	1106.96	1216.12	1289.88	1335.93	1380.89	1421.18	1444.59	1453.98	1456.05	1458.53
9	1476.24	1475.98	1475.19	1465.88	1441.48	1397.92	1346.8	1291.75	1193.54	1057.38	928.682	848.452	813.588	848.452	928.682	1057.38	1193.54	1291.75	1346.8	1397.92	1441.48	1465.88	1475.19	1475.98	1476.24
10	1489.97	1491.7	1496.88	1487.61	1463.5	1417.25	1360.49	1294.61	1168.82	1000.66	859.808	764.513	729.334	764.513	859.808	1000.66	1168.82	1294.61	1360.49	1417.25	1463.5	1487.61	1496.88	1491.7	1489.97
11	1500.16	1504.28	1516.36	1511.23	1485.87	1439.75	1377.79	1299.64	1139.79	941.085	781.686	677.329	635.871	677.329	781.686	941.085	1139.79	1299.64	1377.79	1439.75	1485.87	1511.23	1516.36	1504.28	1500.16
12	1506.12	1512.88	1531.13	1534.26	1511.44	1466.51	1399.48	1306.41	1108.39	883.303	710.261	599.136	557.587	599.136	710.261	883.303	1108.39	1306.41	1399.48	1466.51	1511.44	1534.26	1531.13	1512.88	1506.12
13	1510.33	1518.68	1543.72	1557.15	1541.29	1499.17	1428.57	1316.58	1075.44	821.541	633.502	518.072	479.307	518.072	633.502	821.541	1075.44	1316.58	1428.57	1499.17	1541.29	1557.15	1543.72	1518.68	1510.33
14	1510.38	1522.92	1553.92	1578.29	1575.3	1540.36	1466.46	1330.78	1038.89	759.49	563.253	445.296	406.674	445.296	563.253	759.49	1038.89	1330.78	1466.46	1540.36	1575.3	1578.29	1553.92	1522.92	1510.38
15	1502.7	1521.07	1563.36	1599.97	1615.09	1590.56	1513.4	1350.14	1006.46	697.803	495.122	384.363	353.918	384.363	495.122	697.803	1006.46	1350.14	1513.4	1590.56	1615.09	1599.97	1563.36	1521.07	1502.7
16	1489.27	1512.23	1570.45	1623.04	1663.63	1650.39	1568.61	1376.47	974.875	635.883	428.648	334.242	308.883	334.242	428.648	635.883	974.875	1376.47	1568.61	1650.39	1663.63	1623.04	1570.45	1512.23	1489.27
17	1478.27	1503.37	1572.99	1646.57	1720.07	1717.09	1631.25	1405.51	946.045	579.921	380.288	301.724	282.809	301.724	380.288	579.921	946.045	1405.51	1631.25	1717.09	1720.07	1646.57	1572.99	1503.37	1478.27
18	1466.51	1494.69	1572.51	1675.28	1783.07	1790.9	1697.09	1437.43	920.872	524.165	340.453	279.603	265.226	279.603	340.453	524.165	920.872	1437.43	1697.09	1790.9	1783.07	1675.28	1572.51	1494.69	1466.51
19	1455	1486.79	1572.78	1707.22	1848.69	1866.91	1762.67	1467.75	889.459	474.758	312.378	264.779	251.571	264.779	312.378	474.758	889.459	1467.75	1762.67	1866.91	1848.69	1707.22	1572.78	1486.79	1455
20	1446.05	1480.45	1573.85	1741.21	1922.5	1942.48	1826.29	1496.46	858.059	431.748	295.544	253.739	240.763	253.739	295.544	431.748	858.059	1496.46	1826.29	1942.48	1922.5	1741.21	1573.85	1480.45	1446.05
21	1434.61	1475.15	1577.16	1778.64	1997.98	2015.35	1887.43	1517.54	824.36	396.154	282.083	242.966	230.287	242.966	282.083	396.154	824.36	1517.54	1887.43	2015.35	1997.98	1778.64	1577.16	1475.15	1434.61
22	1423.11	1469.03	1582.8	1819.17	2069.71	2085.41	1946.42	1534.77	784.778	368.77	272.156	233.699	221.343	233.699	272.156	368.77	784.778	1534.77	1946.42	2085.41	2069.71	1819.17	1582.8	1469.03	1423.11
23	1411.58	1460.93	1592.59	1866.48	2139.98	2156.12	2010.09	1547.51	743.486	349.156	263.614	225.035	213.319	225.035	263.614	349.156	743.486	1547.51	2010.09	2156.12	2139.98	1866.48	1592.59	1460.93	1411.58
24	1404	1454.96	1603.58	1916.02	2205.85	2229.98	2076.16	1559.96	697.416	337.693	255.733	217.537	206.046	217.537	255.733	337.693	697.416	1559.96	2076.16	2229.98	2205.85	1916.02	1603.58	1454.96	1404
25	1403.88	1455.32	1614.54	1968.25	2273.82	2309.4	2150.53	1572.16	653.265	329.472	249	211.704	200.241	211.704	249	329.472	653.265	1572.16	2150.53	2309.4	2273.82	1968.25	1614.54	1455.32	1403.88
26	1411.16	1460.8	1627.18	2020.22	2340.44	2401.62	2231.38	1586.02	609.821	322.881	242.583	205.848	194.436	205.848	242.583	322.881	609.821	1586.02	2231.38	2401.62	2340.44	2020.22	1627.18	1460.8	1411.16
27	1429.66	1475.15	1644.58	2071.43	2411.75	2499.4	2317.32	1599.89	568.391	317.586	237.869	201.062	189.031	201.062	237.869	317.586	568.391	1599.89	2317.32	2499.4	2411.75	2071.43	1644.58	1475.15	1429.66
28	1459.1	1501.01	1671.01	2122	2485.93	2604.39	2406.68	1613.28	532.145	312.216	234.098	196.324	184.114	196.324	234.098	312.216	532.145	1613.28	2406.68	2604.39	2485.93	2122	1671.01	1501.01	1459.1
29	1502.71	1543.5	1702.44	2165.37	2573.9	2713.09	2498.74	1623.7	498.62	308.038	230.702	191.649	179.02	191.649	230.702	308.038	498.62	1623.7	2498.74	2713.09	2573.9	2165.37	1702.44	1543.5	1502.71
30	1547.18	1595.11	1745.82	2206.98	2668.1	2827.71	2590.26	1629.05	468.243	304.358	228.048	187.281	174.175	187.281	228.048	304.358	468.243	1629.05	2590.26	2827.71	2668.1	2206.98	1745.82	1595.11	1547.18
31	1609.62	1657.7	1799.68	2245.21	2765.11	2942.23	2675.14	1628.44	447.417	300.693	225.438	182.14	169.299	182.14	225.438	300.693	447.417	1628.44	2675.14	2942.23	2765.11	2245.21	1799.68	1657.7	1609.62
32	1680.92	1731.96	1868.13	2281.84	2864.11	3051.59	2753.23	1619.47	431.93	298.419	223.006	177.338	164.382	177.338	223.006	298.419	431.93	1619.47	2753.23	3051.59	2864.11	2281.84	1868.13	1731.96	1680.92
33	1758.47	1810.22	1944.55	2325.47	2964.15	3156.23	2821.95	1596.64	424.502	296.622	220.47	172.442	159.92	172.442	220.47	296.622	424.502	1596.64	2821.95	3156.23	2964.15	2325.47	1944.55	1810.22	1758.47
34	1855.88	1900.67	2025.65	2373.08	3056.27	3250.59	2878.13	1561.11	420.64	295.516	217.398	167.166	152.836	167.166	217.398	295.516	420.64	1561.11	2878.13	3250.59	3056.27	2373.08	2025.65	1900.67	1855.88
35	1946.44	1989.99	2113.68	2430.45	3144.89	3335.43	2922.15	1512.81	418.469	295.572	214.95	161.05	144.26	161.05	214.95	295.572	418.469	1512.81	2922.15	3335.43	3144.89	2430.45	2113.68	1989.99	1946.44
36	2045.47	2089.75	2210.5	2498.37	3223.88	3406.7	2952.66	1455.51	418.007	296.448	212.407	151.762	132.706	151.762	212.407	296.448	418.007	1455.51	2952.66	3406.7	3223.88	2498.37	2210.5	2089.75	2045.47
37	2138.22	2191.2	2309.12	2575.34	3289.01	3463.4	2965.94	1389.4	417.679	297.668	209.145	140.453	119.446	140.453	209.145	297.668	417.679	1389.4	2965.94	3463.4	3289.01	2575.34	2309.12	2191.2	2138.22
38	2217.33	2280.45	2412.11	2659.24	3336.79	3503.76	2965.02	1312.75	418.236	298.924	204.012	128.358	107.268	128.358											

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161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
176	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	ALEDS3TY	Sample ID.	AW1
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 $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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
120.00	60	0.469	56.2	0.998	3.14%
277.00	60	0.215	55.2	0.926	6.98%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2022/12/26	2023/12/25
DLF108	Auxiliary Lamp	2022/12/26	2023/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2022/12/26	2023/12/25
DLF116	AC Power Source	2022/12/26	2023/12/25
DLF113	Power Meter	2022/12/26	2023/12/25
DLF112	Temperature Recorder	2022/12/26	2023/12/25
DLF114	Temperature & Humidity Datalogger	2022/12/26	2023/12/25
DLF101	Goniophotometer	2022/12/26	2023/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2022/12/26	2023/12/25
DLF104	AC Power Source	2022/12/26	2023/12/25
DLF507	DC Power Source	2022/12/26	2023/12/25
DLF102	Power Meter	2022/12/26	2023/12/25
DLF111	Temperature & Humidity Datalogger	2022/12/26	2023/12/25
DLF119	Power Meter	2022/12/26	2023/12/25
DLF031	Temperature data logger	2022/12/26	2023/12/25
DLF022	Digital power meter	2022/12/26	2023/12/25
DLF003	Temperature & Humidity Datalogger	2022/12/26	2023/12/25

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