

Photometric Test Report

Relevant Standards

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

Prepared For

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2022/7/29

Issue Date

2022/7/30

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		5735
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	140.2
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		40.9
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	5.25%
		20.00%	277V	10.03%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.995
		0.9	277V	0.881
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	3799
		4 step	3985±154	
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		83
Minimum Rg (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	≥89		93
Minimum IES Rcs,h1 (Integrating Sphere - Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-13%
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%		2.03%
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		0.343
(Goniophotometer - Section 4.2)		Non-Worst Case		0.166
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		40.9
(Goniophotometer - Section 4.2)		Non-Worst Case		40.6

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2022/7/29	ALEDS4TN	I1
2	Goniophotometer Test	2022/7/29	ALEDS4TN	I1
3	THD and PF Test	2022/7/29	ALEDS4TN	I1

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.

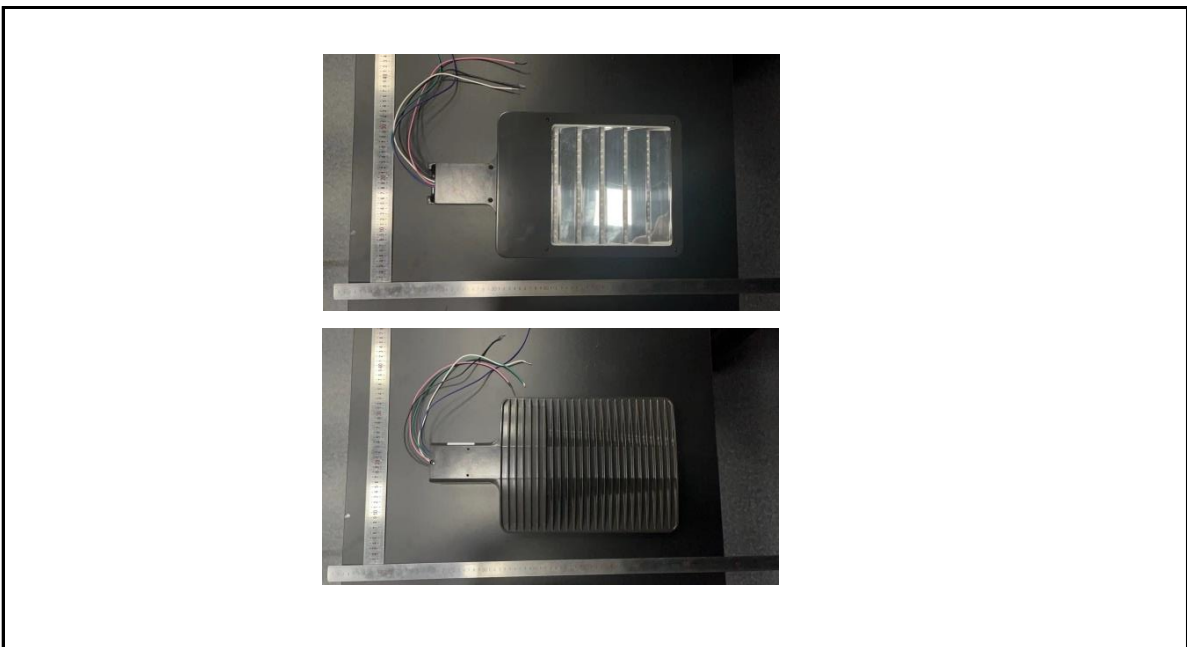
3.0 Production Description

Luminaire Description: ALEDS4TN

Description: 40W @ 4000K

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.	ALEDS4TN	Sample ID.	I1
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	0.343	40.9	0.995
277.00	60	0.166	40.6	0.881

Test Result

CCT (K)	CRI	R9	Duv
3799	82	4	0.0012

Rf	Rg	IES Rcs,h1
83	93	-13%

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	ALEDS4TN	Sample ID.	I1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.3	Humidity (%RH)	54.0

Test Method

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

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

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

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

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

Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
WORST CASE	120.00	60	0.343	40.9	0.995
NON-WROST CASE	277.00	60	0.166	40.6	0.881

Test Result

Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
5735	96.3	147.9	56.2	135.2	140.2

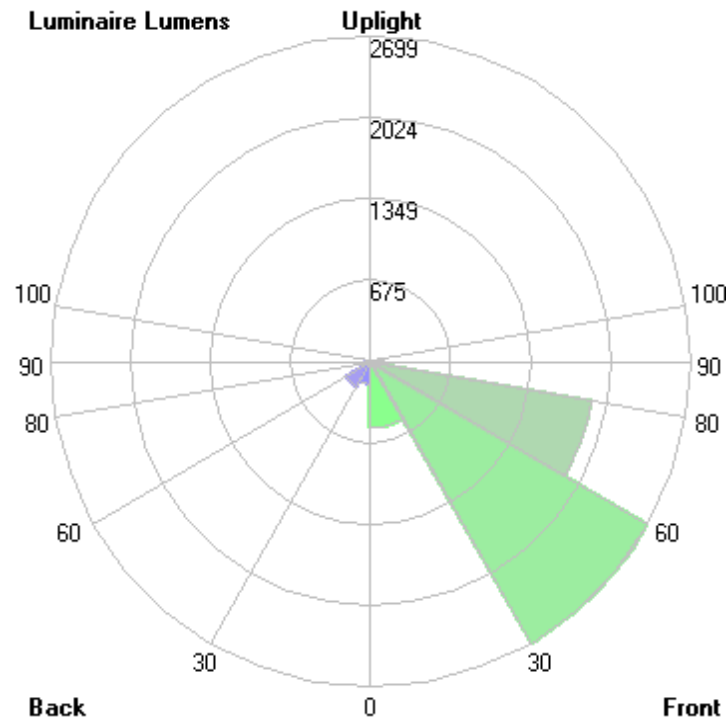
Zonal Lumen Requirement (0° - 90°)	Zonal Lumen Requirement (80° - 90°)	BUG rating
100.00%	2.03%	B1-U0-G2

4.2 Goniophotometer Test

	Zonal (lm)		Total (lm)	Percent
0-10	85.60	0 - 10	85.60	1.49%
10-20	230.79	0 - 20	316.39	5.52%
20-30	420.62	0 - 30	737.01	12.85%
30-40	691.24	0 - 40	1428.25	24.90%
40-50	995.11	0 - 50	2423.36	42.26%
50-60	1248.19	0 - 60	3671.55	64.02%
60-70	1206.61	0 - 70	4878.16	85.06%
70-80	740.52	0 - 80	5618.68	97.97%
80-90	116.32	0 - 90	5735.00	100.00%
90-100	0.00	0 - 100	5735.00	100.00%
100-110	0.00	0 - 110	5735.00	100.00%
110-120	0.00	0 - 120	5735.00	100.00%
120-130	0.00	0 - 130	5735.00	100.00%
130-140	0.00	0 - 140	5735.00	100.00%
140-150	0.00	0 - 150	5735.00	100.00%
150-160	0.00	0 - 160	5735.00	100.00%
160-170	0.00	0 - 170	5735.00	100.00%
170-180	0.00	0 - 180	5735.00	100.00%

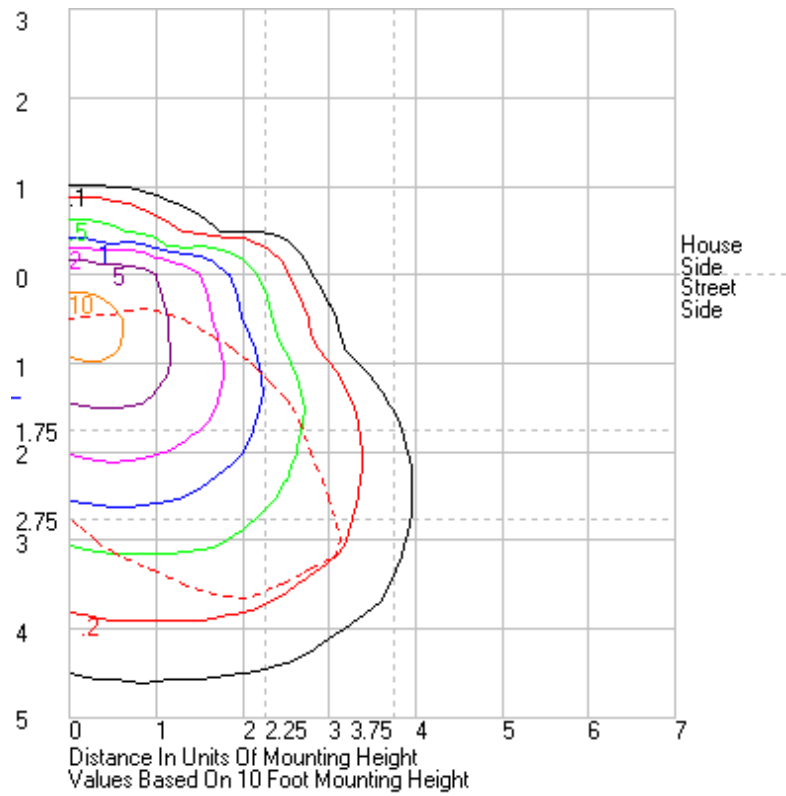
4.2 Goniophotometer Test

LCS/BUG



	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	549.6	N.A.	9.6
FM - Front-Medium (30-60)	2698.9	N.A.	47.1
FH - Front-High (60-80)	1893.8	N.A.	33.0
FVH - Front-Very High (80-90)	113.7	N.A.	2.0
BL - Back-Low (0-30)	187.4	N.A.	3.3
BM - Back-Medium (30-60)	235.7	N.A.	4.1
BH - Back-High (60-80)	53.3	N.A.	0.9
BVH - Back-Very High (80-90)	2.6	N.A.	0.0
UL - Uplight-Low (90-100)	0.0	N.A.	0.0
UH - Uplight-High (100-180)	0.0	N.A.	0.0
Total	5735.0	N.A.	100.0
BUG Rating	B1-U0-G2		

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	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562	960.562
1	966.915	966.693	965.834	964.824	964.522	962.393	959.708	957.639	955.473	951.929	949.304	947.456	946.689	947.456	949.304	951.929	955.473	957.639	959.708	962.393	964.522	964.824	965.834	966.693	966.915
2	968.951	967.822	968.562	968.822	968.357	965.953	961.696	956.051	948.261	938.272	929.386	923.481	920.769	923.481	929.386	938.272	948.261	956.051	961.696	965.953	968.357	968.822	968.562	967.822	968.951
3	966.807	966.331	968.033	970.199	971.987	969.724	964.165	954.625	938.31	920.088	902.682	889.928	885.114	889.928	902.682	920.088	938.31	954.625	964.165	969.724	971.987	970.199	968.033	966.331	966.807
4	966.564	966.137	968.692	971.966	974.705	973.565	966.212	951.491	925.247	896.178	868.319	847.358	838.893	847.358	868.319	896.178	925.247	951.491	966.212	973.565	974.705	971.966	968.692	966.137	966.564
5	966.31	967.568	970.956	974.672	976.812	977.854	968.703	947.591	910.321	866.833	826.122	798.803	788.183	798.803	826.122	866.833	910.321	947.591	968.703	977.854	976.812	974.672	970.956	967.568	966.31
6	969.621	970.291	975.115	978.665	980.734	981.236	970.545	941.794	891.894	833.107	781.035	745.386	732.896	745.386	781.035	833.107	891.894	941.794	970.545	981.236	980.734	978.665	975.115	970.291	969.621
7	974.267	976.547	981.522	984.488	985.201	983.294	971.426	934.015	870.723	796.156	731.443	690.278	677.448	690.278	731.443	796.156	870.723	934.015	971.426	983.294	985.201	984.488	981.522	976.547	974.267
8	980.269	983.132	989.393	992.067	989.356	985.39	971.215	926.458	846.472	756.834	682.386	630.908	615.895	630.908	682.386	756.834	846.472	926.458	971.215	985.39	989.356	992.067	989.393	983.132	980.269
9	990.366	994.034	999.501	999.96	993.332	985.968	969.616	916.55	819.926	715.744	628.331	570.603	551.08	570.603	628.331	715.744	819.926	916.55	969.616	985.968	993.332	999.96	999.501	994.034	990.366
10	1011.09	1012.56	1012.55	1008.67	996.314	984.661	968.163	904.973	792.002	673.861	573.072	508.251	487.08	508.251	573.072	673.861	792.002	904.973	968.163	984.661	996.314	1008.67	1012.55	1012.56	1011.09
11	1042.37	1041.81	1032.98	1018.19	999.576	983.445	964.829	893.039	761.852	628.574	517.289	446.071	424.576	446.071	517.289	628.574	761.852	893.039	964.829	983.445	999.576	1018.19	1032.98	1041.81	1042.37
12	1084.82	1080.51	1060.19	1029.33	1002.88	982.127	961.815	878.621	730.871	581.883	461.262	387.933	364.017	387.933	461.262	581.883	730.871	878.621	961.815	982.127	1002.88	1029.33	1060.19	1080.51	1084.82
13	1139.44	1131.5	1097.84	1044.02	1005.71	979.626	958.206	863.922	698.997	534.262	405.949	331.053	306.489	331.053	405.949	534.262	698.997	863.922	958.206	979.626	1005.71	1044.02	1097.84	1131.5	1139.44
14	1193.26	1188.21	1142.39	1062.05	1008.85	977.049	954.576	847.931	664.726	486.064	353.202	280.121	255.254	280.121	353.202	486.064	664.726	847.931	954.576	977.049	1008.85	1062.05	1142.39	1188.21	1193.26
15	1260.23	1251.17	1194.37	1087.49	1013.48	975.855	951.853	831.552	629.104	438.962	305.652	234.191	214.976	234.191	305.652	438.962	629.104	831.552	951.853	975.855	1013.48	1087.49	1194.37	1251.17	1260.23
16	1317.02	1315.37	1251.55	1118.29	1019.79	976.223	949.968	814.691	593.53	394.28	261.564	197.861	183.464	197.861	261.564	394.28	593.53	814.691	949.968	976.223	1019.79	1118.29	1251.55	1315.37	1317.02
17	1367.12	1369.01	1309.59	1153.52	1030.01	978.303	949.611	798.517	558.459	350.128	222.62	174.708	164.703	174.708	222.62	350.128	558.459	798.517	949.611	978.303	1030.01	1153.52	1309.59	1369.01	1367.12
18	1415.48	1417.24	1368.43	1192.89	1042.63	982.408	950.67	783.31	523.393	310.276	193.712	159.392	153.747	159.392	193.712	310.276	523.393	783.31	950.67	982.408	1042.63	1192.89	1368.43	1417.24	1415.48
19	1465.83	1468.31	1417.28	1235.22	1058.89	988.842	955.5	768.524	488.949	272.66	174.167	150.916	147.291	150.916	174.167	272.66	488.949	768.524	955.5	988.842	1058.89	1235.22	1417.28	1468.31	1465.83
20	1522.13	1525.6	1464.63	1277.84	1077.95	998.258	962.852	756.034	455.817	240.285	160.764	144.596	140.863	144.596	160.764	240.285	455.817	756.034	962.852	998.258	1077.95	1277.84	1464.63	1525.6	1522.13
21	1576.74	1580.8	1513.92	1324.16	1100.21	1011.28	973.538	744.517	424.943	211.826	152.477	138.615	135.493	138.615	152.477	211.826	424.943	744.517	973.538	1011.28	1100.21	1324.16	1513.92	1580.8	1576.74
22	1633.47	1636.81	1564.89	1368.18	1125.81	1026.83	987.135	734.371	395.674	190.109	146.492	133.094	129.718	133.094	146.492	190.109	395.674	734.371	987.135	1026.83	1125.81	1368.18	1564.89	1636.81	1633.47
23	1698.93	1700.59	1619.59	1413.76	1155.3	1045.73	1006.1	725.674	366.988	173.713	140.539	127.519	124.397	127.519	140.539	173.713	366.988	725.674	1006.1	1045.73	1155.3	1413.76	1619.59	1700.59	1698.93
24	1750.46	1761.69	1672.81	1459.13	1184.91	1068.28	1027.05	718.553	338.416	161.915	135.18	122.387	119.016	122.387	135.18	161.915	338.416	718.553	1027.05	1068.28	1184.91	1459.13	1672.81	1761.69	1750.46
25	1806.8	1818.48	1731.3	1507.23	1219.09	1094.88	1050.56	712.211	311.254	153.633	129.821	117.52	114.035	117.52	129.821	153.633	311.254	712.211	1050.56	1094.88	1219.09	1507.23	1731.3	1818.48	1806.8
26	1852.84	1872.16	1792.47	1553.03	1256.45	1122.8	1076.27	706.399	285.053	147.491	124.834	112.906	109.492	112.906	124.834	147.491	285.053	706.399	1076.27	1122.8	1256.45	1553.03	1792.47	1872.16	1852.84
27	1893.34	1921.83	1849.3	1598.95	1296.54	1154.71	1103.82	699.316	259.927	142.213	120.259	108.925	105.451	108.925	120.259	142.213	259.927	699.316	1103.82	1154.71	1296.54	1598.95	1849.3	1921.83	1893.34
28	1928.72	1967.76	1904.54	1649.43	1340.34	1188.62	1131.94	692.207	235.353	136.649	115.78	104.997	101.653	104.997	115.78	136.649	235.353	692.207	1131.94	1188.62	1340.34	1649.43	1904.54	1967.76	1928.72
29	1965.98	2006.82	1955.1	1701.17	1385.49	1224.2	1161.71	683.455	212.955	131.803	111.928	101.378	97.423	101.378	111.928	131.803	212.955	683.455	1161.71	1224.2	1385.49	1701.17	1955.1	2006.82	1965.98
30	2001.58	2049.17	2001.97	1756.88	1432.59	1262.06	1192.26	674.028	194.161	127.211	108.25	97.386	93.08	97.386	108.25	127.211	194.161	674.028	1192.26	1262.06	1432.59	1756.88	2001.97	2049.17	2001.58
31	2035.6	2090.25	2050.37	1812.54	1481.68	1299.36	1222.36	662.576	178.089	122.917	104.695	92.983	88.666	92.983	104.695	122.917	178.089	662.576	1222.36	1299.36	1481.68	1812.54	2050.37	2090.25	2035.6
32	2066.01	2130.95	2094.73	1865.65	1530.94	1339.03	1253.08	650.016	165.021	119.108	101.264	88.856	84.058	88.856	101.264	119.108	165.021	650.016	1253.08	1339.03	1530.94	1865.65	2094.73	2130.95	2066.01
33	2102.85	2169.76	2140.96	1919.39	1583	1377.63	1282.19	634.825	155.07	115.375	97.477	84.334	79.591	84.334	97.477	115.375	155.07	634.825	1282.19	1377.63	1583	1919.39	2140.96	2169.76	2102.85
34	2143.34	2208.85	2187.33	1971.21	1630.51	1414.68	1310.85	618.153	147.934	112.155	93.561	80.018	75.129	80.018	93.561	112.155	147.934	618.153	1310.85	1414.68	1630.51	1971.21	2187.33	2208.85	2143.34
35	2198.05	2258.34	2232.59	2025.13	1679.14	1453.06	1337.4	599.883	141.927	108.876	89.45	75.793	71.088	75.793	89.45	108.876	141.927	599.883	1337.4	1453.06	1679.14	2025.13	2232.59	2258.34	2198.05
36	2255.06	2324.3	2279.41	2078.96	1726.34	1488.8	1361.72	579.981	136.411	105.689	85.177	71.752	67.258	71.752	85.177	105.689	136.411	579.981	1361.72	1488.8	1726.34	2078.96	2279.41	2324.3	2255.06
37	2304.89	2386.26	2328.13	2133.56	1772.5	1521.68	1382.5	557.449	131.63	102.545	81.19	68.154	63.471	68.154	81.19	102.545	131.63	557.449	1382.5	1521.68	1772.5	2133.56	2328.13	2386.26	2304.89
38	2353.85	2447.33	2386.88	2189.6	1818.59	1552.44	1401.63	531.28	127.39	99.087	77.095	64.438	59.856	64.438	77.095</										

Page 10 of 14

Page 11 of 14



160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	0

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	ALEDS4TN	Sample ID.	I1
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	0.343	40.9	0.995	5.25%
277.00	60	0.166	40.6	0.881	10.03%

5.0 Equipment Information

Test Equipment			
Equipment ID	Equipment Name	Last Calibration Date	Calibration Due Date
DLF107	Integrating Sphere System	2021/12/26	2022/12/25
DLF108	Auxiliary Lamp	2021/12/26	2022/12/25
DLF122	Measurement Standard Lamp Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF116	AC Power Source	2021/12/26	2022/12/25
DLF113	Power Meter	2021/12/26	2022/12/25
DLF112	Temperature Recorder	2021/12/26	2022/12/25
DLF114	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF101	Goniophotometer	2021/12/26	2022/12/25
DLF125	Standard Lamp Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional	2021/12/26	2022/12/25
DLF104	AC Power Source	2021/12/26	2022/12/25
DLF507	DC Power Source	2021/12/26	2022/12/25
DLF102	Power Meter	2021/12/26	2022/12/25
DLF111	Temperature & Humidity Datalogger	2021/12/26	2022/12/25
DLF119	Power Meter	2021/12/26	2022/12/25
DLF031	Temperature data logger	2021/12/26	2022/12/25
DLF022	Digital power meter	2021/12/26	2022/12/25
DLF003	Temperature & Humidity Datalogger	2021/12/26	2022/12/25

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