

Photometric Test Report

Relevant Standards

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

Prepared For

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2021/10/28

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Prepared By



Wangzun Zhu

Approved By



Kevin Jia

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1.0 Test Summary

DLC Technical Requirements v5.1

Outdoor - Architectural Flood and Spot Luminaires				
Requirement Category	Test Method	Requirements		Test value
Luminaire Output (lm) (Goniophotometer - Section 4.2)	IES LM-79-2008	1000		6241
Minimum Luminaire Efficacy (lm/W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Standard 105	Premium 120	134.5
Power (Input Wattage) (W) (Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		46.4
Total Harmonic Distortion (A%) (THD & PF - section 4.3)	ANSI C82.77:2014	20.00%	120V	3.08%
		20.00%	277V	6.81%
Power Factor (THD & PF - section 4.3)	ANSI C82.77:2014	0.9	120V	0.999
		0.9	277V	0.955
Allowable CCTs* (K) (Integrating Sphere - Section 4.1)	IES LM-79-2008	7 step	3985±275	4140
		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		3
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		96
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	85%		99.87%
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		0.387
(Goniophotometer - Section 4.2)		Non-Worst Case		0.172
Power (Input Wattage - W)				
(Goniophotometer - Section 4.2)	IES LM-79-2008	Worst Case		46.4
(Goniophotometer - Section 4.2)		Non-Worst Case		45.4

2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2021/10/28	FFLEDS @ 39W / 4000K	E1
2	Goniophotometer Test	2021/10/28	FFLEDS @ 39W / 4000K	E1
3	THD and PF Test	2021/10/28	FFLEDS @ 39W / 4000K	E1

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: FFLEDS @ 39W / 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.	FFLEDS @ 39W / 4000K	Sample ID.	E1
Operate time (Min.)	90	Stabilization time (Min.)	45
Temperature (°C)	25.4	Humidity (%RH)	54.0

Test Method

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

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

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

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

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

Test Result

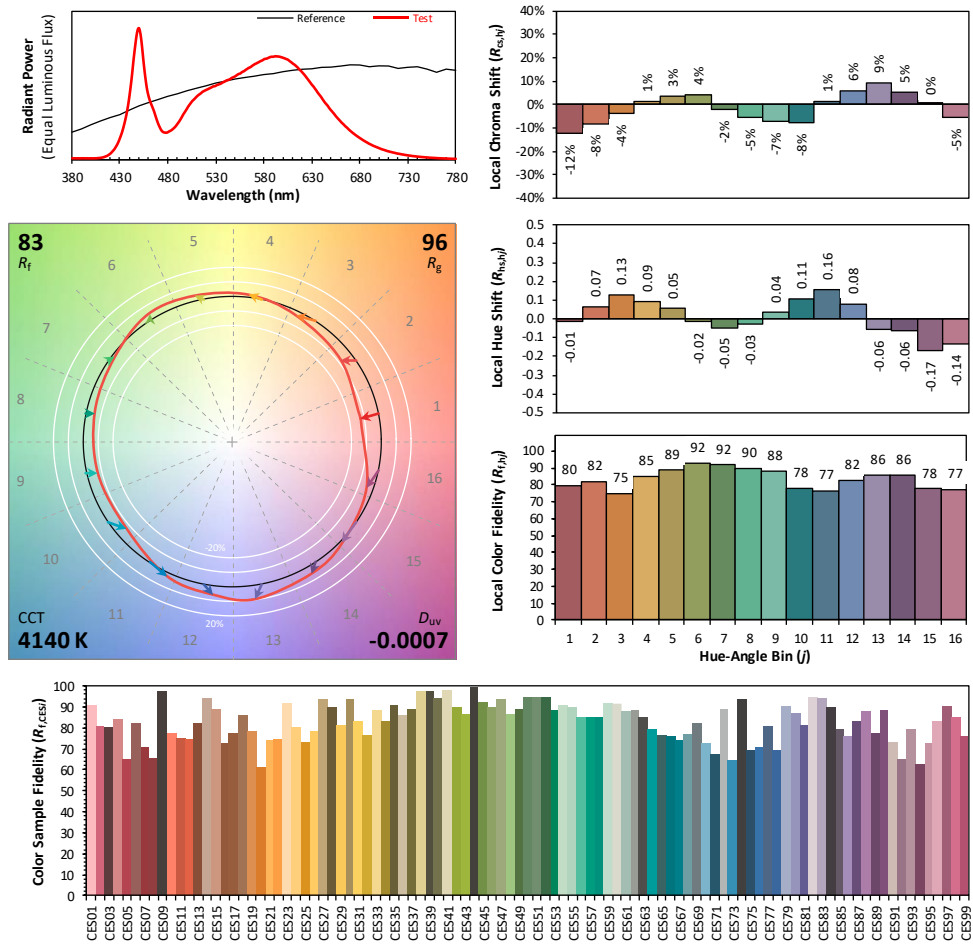
Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.04	60	0.387	46.5	0.999
276.95	60	0.171	45.2	0.955

Test Result

CCT (K)	CRI	R9	Duv
4140	82	3	0.00068

Rf	Rg	IES Rcs,h1
83	96	-12%

4.1 Integrating Sphere Test



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

x 0.3741
 y 0.3713
 u' 0.2231
 v' 0.4982

CIE 13.3-1995
(CRI)

R_a 82
 R_9 5

Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.0

4.0 LM-79 Measurement and Test Results

4.2 Goniophotometer Test

Model No.	FFLEDS @ 39W / 4000K	Sample ID.	E1
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	120.10	60	0.387	46.4	0.999
NON-WORST CASE	277.08	60	0.172	45.4	0.954

Test Result

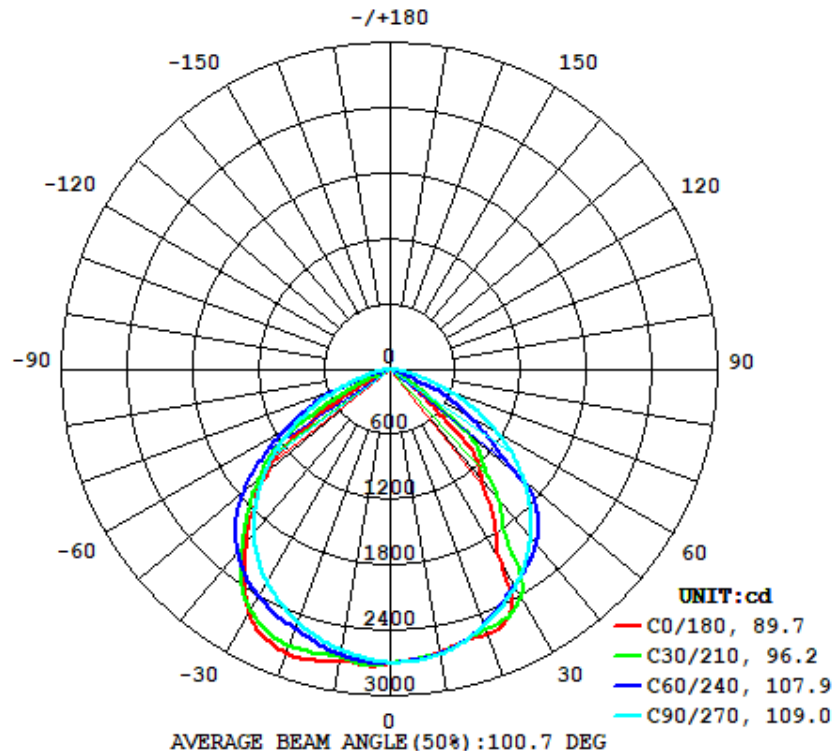
Flux (lm)	Field Angle(10%)		Beam Angle(50%)		Luminous Efficacy (lm/W)
	C0-180	C90-270	C0-180	C90-270	
6241	115.2	149.9	89.7	109.0	134.5

Zonal Lumen Requirement
(0° - 90°)

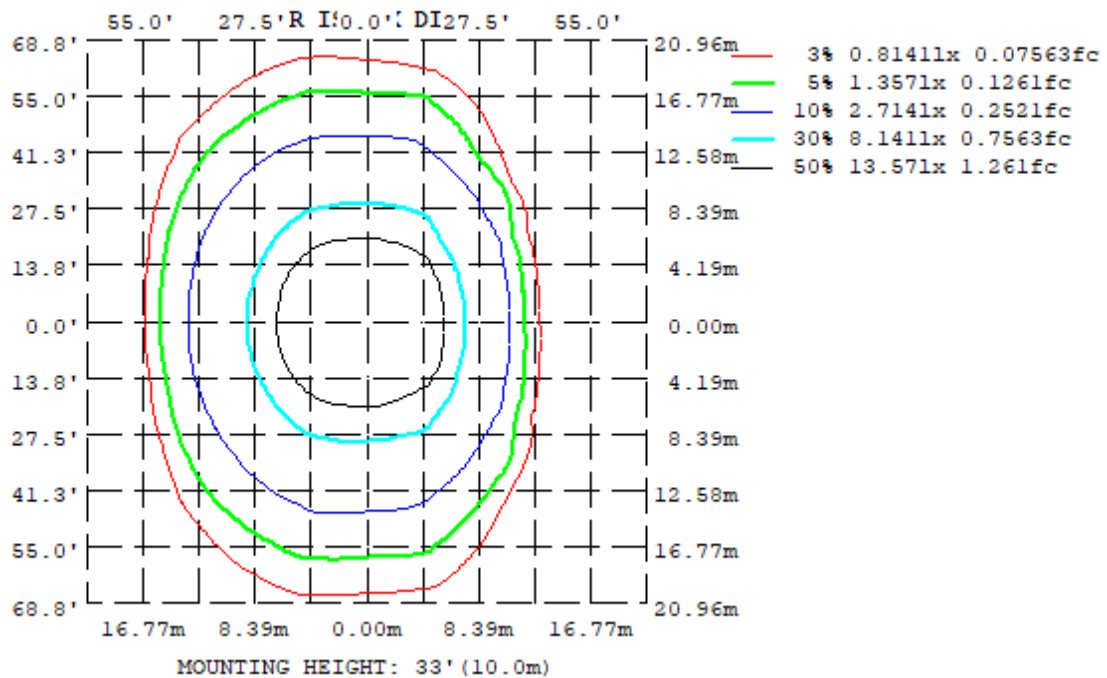
99.87%

4.2 Goniophotometer Test

Light Distribution Curve



Isolux Plot



4.2 Goniophotometer Test

Zonal Lumen Summary

γ	C0	C45	C90	C135	C180	C225	C270	C315
10	2633	2641	2656	2695	2720	2667	2616	2611
20	2587	2503	2505	2681	2778	2628	2470	2467
30	2023	2377	2298	2543	2580	2508	2254	2366
40	1318	1805	2008	2205	2043	2200	1945	1636
50	489.3	1106	1618	1665	1456	1645	1502	1057
60	27.99	376.0	1123	1082	474.3	1079	991.0	266.8
70	0.5236	14.64	569.1	143.3	49.96	171.4	453.7	10.34
80	0.3532	0.4449	108.8	19.89	13.45	16.62	56.11	0.1900
90	0.3539	0.5358	0.3948	0.3060	0.2186	0.4247	0.1562	0.1921
100	0.5350	0.5200	0.5050	1.273	4.317	1.028	0.5101	0.4282
110	0.6024	0.9052	0.9641	0.4894	0.2666	0.5559	0.9457	0.6889
120	1.010	1.177	1.069	0.9203	0.5477	0.9023	0.9901	0.9334
130	1.502	1.459	1.553	1.272	0.9526	1.197	1.542	1.344
140	1.867	1.837	1.808	1.628	1.550	1.682	1.799	1.832
150	2.119	2.179	1.949	1.975	1.868	1.946	2.032	2.171
160	2.227	2.277	2.135	2.141	2.342	2.182	2.051	2.292
170	2.195	2.063	2.076	2.142	2.274	2.111	1.924	1.926
180	2.331	2.195	1.969	2.135	2.269	2.210	2.115	2.164
DEG	LUMINOUS INTENSITY:cd							

	Zonal (lm)		Total (lm)	Percent
0-10	256.02	0 - 10	256.02	4.10%
10-20	743.19	0 - 20	999.21	16.01%
20-30	1158.19	0 - 30	2157.40	34.57%
30-40	1347.63	0 - 40	3505.03	56.16%
40-50	1278.74	0 - 50	4783.77	76.66%
50-60	924.65	0 - 60	5708.41	91.47%
60-70	418.04	0 - 70	6126.46	98.17%
70-80	99.13	0 - 80	6225.59	99.76%
80-90	6.72	0 - 90	6232.31	99.87%
90-100	1.55	0 - 100	6233.86	99.89%
100-110	0.68	0 - 110	6234.54	99.90%
110-120	0.80	0 - 120	6235.35	99.92%
120-130	1.03	0 - 130	6236.38	99.93%
130-140	1.22	0 - 140	6237.60	99.95%
140-150	1.20	0 - 150	6238.80	99.97%
150-160	0.99	0 - 160	6239.79	99.99%
160-170	0.61	0 - 170	6240.41	100.00%
170-180	0.20	0 - 180	6240.61	100.00%

4.2 Goniophotometer Test

Axial Candela

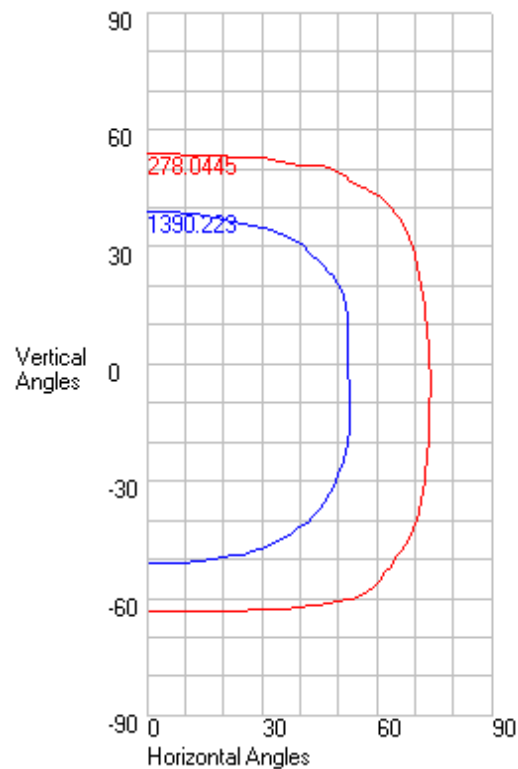
DEG.	HOR.	DEG.	VERT.
90	0.16	90	0.35
85	0.34	85	0.37
75	219.69	75	0.35
65	726.27	65	8.45
55	1255.34	55	189.65
47.5	1620.965	47.5	681.47
42.5	1847	42.5	1217.71
37.5	2032.755	37.5	1469.46
33	2175.04	33	1800.38
29	2278.98	29	2221.04
25.5	2360.57	25.5	2519.105
22.5	2423.62	22.5	2578.585
19.5	2479.28	19.5	2586.12
17	2523.48	17	2580.79
15	2555.27	15	2582.26
13	2582.93	13	2601.49
11	2606.77	11	2624.44
9	2625.3	9	2644.3
7	2643.49	7	2656.05
5	2662.18	5	2668.04
3	2683.25	3	2680.43
1	2690.97	1	2689.22
0	2694.343	0	2694.343
-1	2693.9	-1	2704.44
-3	2690.35	-3	2728.08
-5	2684.91	-5	2729.73
-7	2675.33	-7	2716
-9	2662.68	-9	2712.52
-11	2646.11	-11	2732.62
-13	2620.93	-13	2752.48
-15	2592.44	-15	2764.98
-17	2560.43	-17	2780.19
-19.5	2514.71	-19.5	2780.445
-22.5	2456.46	-22.5	2753.345
-25.5	2398.425	-25.5	2711.775
-29	2322.16	-29	2621.4
-33	2224.66	-33	2429.17
-37.5	2089.54	-37.5	2174.555
-42.5	1920.07	-42.5	1921.365
-47.5	1726.55	-47.5	1657.65
-55	1384.1	-55	1095.95
-65	838.76	-65	105.61
-75	307.64	-75	25.43
-85	7.74	-85	7.06
-90	0.39	-90	0.221

4.2 Goniophotometer Test

Characteristics

NEMA Type	7 H x 6 V
Maximum Candela	2780.445
Maximum Candela Angle	0 H -19.5 V
Horizontal Beam Angle (50%)	107.8
Vertical Beam Angle (50%)	90.1
Horizontal Field Angle (10%)	148.8
Vertical Field Angle (10%)	116.9
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Beam Lumens	4833
Beam Efficiency	N.A.
Field Lumens	6145
Field Efficiency	N.A.
Spill Lumens	96
Luminaire Lumens	6241
Total Efficiency	N.A.
Total Luminaire Watts	46.3848
Ballast Factor	1

ISOCANDELA CURVES



Axial Candela

	0	1	3	5	7	9	11	13	15	17	19.5	22.5	25.5	29	33	37.5	42.5	47.5	55	65	75	85	90	
90	0.35	0.342	0.326	0.31	0.294	0.278	0.262	0.246	0.23	0.223	0.215	0.205	0.195	0.183	0.182	0.185	0.188	0.192	0.197	0.193	0.18	0.167	0.16	
85	0.37	0.363	0.35	0.337	0.323	0.31	0.296	0.282	0.268	0.26	0.25	0.238	0.226	0.213	0.208	0.205	0.202	0.198	0.193	0.183	0.17	0.159	0.16	
75	0.35	0.345	0.336	0.326	0.316	0.305	0.295	0.284	0.273	0.265	0.254	0.243	0.232	0.221	0.214	0.203	0.193	0.188	0.183	0.17	0.163	0.148	0.16	
65	8.45	8.649	9.048	9.02	8.904	8.517	7.808	6.73	6.065	6.327	6.961	7.543	5.822	4.379	5.814	5.721	2.616	4.966	1.424	2.623	0.517	0.145	0.16	
55	189.65	192.246	197.435	195.706	194.317	190.81	185.233	182.478	182.861	179.806	172.538	161.097	144.645	146.006	129.675	107.699	92.145	95.543	39.019	33.032	6.049	0.164	0.16	
47.5	681.47 *	693.339 *	708.855 *	709.765 *	691.807 *	668.432 *	645.609 *	666.802 *	695.142 *	706.814 *	665.302 *	570.306 *	586.807 *	626.259 *	551.999 *	434.34 *	429.937 *	388.232 *	219.388	129.498	18.308	0.193	0.16	
42.5	1217.71 *	1219.521 *	1220.724 *	1218.813 *	1213.935 *	1205.402 *	1195.601 *	1189.18 *	1172.126 *	1156.514 *	1134.305 *	1107.618 *	1065.383 *	985.457 *	943.719 *	873.758 *	665.018 *	624.627 *	376.614 *	212.839	30.617	0.215	0.16	
37.5	1469.46 *	1474.082 *	1476.623 *	1471.92 *	1466.626 *	1445.692 *	1433.724 *	1429.686 *	1421.915 *	1400.798 *	1356.298 *	1333.564 *	1313.662 *	1264.616 *	1164.904 *	1110.861 *	976.883 *	827.343 *	621.469 *	296.963 *	51.853	0.24	0.16	
33	1800.38 *	1802.255 *	1798.989 *	1790.99 *	1778.175 *	1768.837 *	1748.71 *	1726.954 *	1705.695 *	1680.969 *	1674.699 *	1606.139 *	1550.774 *	1502.414 *	1489.357 *	1319.219 *	1175.509 *	1016.46 *	831.985 *	378.693 *	72.504	0.254	0.16	
29	2221.04 *	2235.13 *	2235.699 *	2215.732 *	2173.312 *	2143.599 *	2134.919 *	2129.825 *	2077.216 *	1987.866 *	1980.951 *	2024.424 *	1858.874 *	1745.109 *	1743.063 *	1650.925 *	1345.533 *	1194.091 *	970.104 *	438.517 *	91.703	0.269	0.16	
25.5	2519.105 *	2515.637 *	2505.745 *	2492.221 *	2474.75 *	2458.232 *	2437.935 *	2413.084 *	2388.065 *	2351.366 *	2280.876 *	2241.685 *	2187.694 *	1992.467 *	1931.244 *	1878.241 *	1495.245 *	1328.718 *	1082.387 *	492.438 *	109.874	0.281	0.16	
22.5	2578.585 *	2573.73 *	2562.982 *	2551.438 *	2534.353 *	2517.01 *	2499.225 *	2477.13 *	2444.814 *	2413.776 *	2378.199 *	2321.096 *	2248.431 *	2168.471 *	2076.223 *	1926.848 *	1622.713 *	1427.917 *	1177.14 *	538.115 *	125.151	0.29	0.16	
19.5	2586.12 *	2581.204 *	2571.435 *	2561.419 *	2543.523 *	2527.066 *	2510.888 *	2486.228 *	2459.918 *	2432.384 *	2396.222 *	2337.9 *	2274.126 *	2205.887 *	2111.621 *	1955.983 *	1726.152 *	1514.747 *	1214.476 *	576.963 *	140.715	0.3	0.16	
17	2580.79 *	2575.815 *	2566.409 *	2555.139 *	2537.255 *	2518.751 *	2501.566 *	2480.157 *	2454.546 *	2430.059 *	2393.447 *	2336.936 *	2277.924 *	2214.746 *	2118.894 *	1970.172 *	1767.938 *	1579.429 *	1236.241 *	606.867 *	153.788	0.307	0.16	
15	2582.26 *	2578.654 *	2569.716 *	2556.241 *	2537.977 *	2518.875 *	2504.068 *	2480.378 *	2454.642 *	2432.948 *	2394.07 *	2333.969 *	2281.09 *	2220.469 *	2122.192 *	1976.205 *	1784.308 *	1592.103 *	1248.309 *	628.22 *	163.714	0.312	0.16	
13	2601.49 *	2599.189 *	2590.165 *	2574.28 *	2554.316 *	2537.443 *	2518.702 *	2494.642 *	2469.918 *	2443.812 *	2400.49 *	2341.229 *	2293.309 *	2227.028 *	2124.248 *	1977.611 *	1802.093 *	1603.421 *	1258.663 *	647.159 *	173.132	0.317	0.16	
11	2624.44 *	2622.196 *	2613.297 *	2597.149 *	2578.084 *	2560.258 *	2541.323 *	2518.063 *	2490.171 *	2460.245 *	2416.373 *	2361.549 *	2308.05 *	2233.865 *	2125.552 *	1984.172 *	1813.991 *	1613.234 *	1263.167 *	664.299 *	182.009	0.329	0.16	
9	2644.3 *	2642.929 *	2632.942 *	2617.264 *	2599.759 *	2581.319 *	2560.761 *	2539.978 *	2510.392 *	2477.972 *	2435.085 *	2380.012 *	2322.987 *	2240.48 *	2136.266 *	1999.209 *	1826.866 *	1620.674 *	1266.733 *	679.633 *	190.312	0.331	0.16	
7	2656.05 *	2653.675 *	2645.606 *	2630.369 *	2612.33 *	2596.648 *	2575.344 *	2554.692 *	2527.118 *	2493.211 *	2449.968 *	2395.263 *	2336.494 *	2253.005 *	2148.202 *	2013.614 *	1837.044 *	1625.52 *	1268.207 *	693.156 *	198.007	0.333	0.16	
5	2668.04 *	2665.73 *	2658.086 *	2640.426 *	2621.99 *	2604.929 *	2586.853 *	2563.459 *	2537.28 *	2505.336 *	2461.8 *	2407.66 *	2347.373 *	2264.572 *	2159.65 *	2021.295 *	1843.364 *	1627.701 *	1267.48 *	704.869 *	207.344	0.335	0.16	
3	2680.43 *	2675.197 *	2668.962 *	2649.061 *	2629.352 *	2614.114 *	2594.731 *	2571.33 *	2545.523 *	2515.33 *	2471.314 *	2416.027 *	2355.026 *	2272.786 *	2168.207 *	2027.991 *	1846.986 *	1627.174 *	1267.257 *	716.791 *	212.275	0.337	0.16	
1	2689.22 *	2684.636 *	2676.939 *	2657.735 *	2638.367 *	2622.617 *	2604.28 *	2580.515 *	2553.456 *	2522.262 *	2477.501 *	2421.836 *	2359.511 *	2278.105 *	2174.04 *	2031.892 *	1847.745 *	1623.783 *	1259.315 *	723.108 *	217.217	0.34	0.16	
0	2694.343 *	2690.97 *	2683.25 *	2662.18 *	2643.49 *	2625.3 *	2606.77 *	2582.93 *	2555.27 *	2523.48 *	2479.28 *	2423.62 *	2360.57 *	2278.98 *	2175.04 *	2032.755 *	1847 *	1620.965 *	1255.34 *	726.27 *	219.69	0.34	0.16	
-1	2704.44 *	2701.232 *	2692.036 *	2671.709 *	2653.613 *	2635.851 *	2617.818 *	2593.908 *	2565.814 *	2532.97 *	2487.158 *	2430.31 *	2366.25 *	2284.104 *	2179.756 *	2037.209 *	1852.616 *	1627.461 *	1262.221 *	730.327 *	220.605	0.359	0.16	
-3	2728.08 *	2723.499 *	2715.291 *	2692.736 *	2672.304 *	2652.107 *	2636.046 *	2611.583 *	2582.13 *	2547.469 *	2499.994 *	2441.261 *	2375.109 *	2290.826 *	2185.267 *	2043.934 *	1861.604 *	1638.176 *	1275.968 *	738.435 *	222.435	0.397	0.16	
-5	2729.73 *	2726.982 *	2718.956 *	2696.589 *	2677.809 *	2658.811 *	2639.275 *	2614.061 *	2587.299 *	2556.42 *	2508.861 *	2449.121 *	2380.407 *	2294.741 *	2187.82 *	2047.845 *	1867.735 *	1645.931 *	1281.877 *	740.796 *	224.261	0.435	0.16	
-7	2716 *	2714.174 *	2705.064 *	2686.792 *	2667.731 *	2652.165 *	2633.968 *	2606.179 *	2579.469 *	2550.462 *	2509.209 *	2452.677 *	2381.981 *	2295.451 *	2187.094 *	2050.711 *	1871.181 *	1650.821 *	1288.184 *	743.225 *	221.349	0.473	0.16	
-9	2712.52 *	2709.43 *	2701.216 *	2681.122 *	2666.115 *	2646.684 *	2631.182 *	2606.449 *	2570.926 *	2543.366 *	2507.961 *	2457.499 *	2389.257 *	2297.069 *	2185.439 *	2046.869 *	1871.626 *	1653.132 *	1292.112 *	743.62 *	220.01	0.511	0.16	
-11	2732.62 *	2727.139 *	2719.832 *	2698.528 *	2682.274 *	2661.877 *	2640.924 *	2618.532 *	2584.903 *	2546.888 *	2508.432 *	2461.98 *	2396.425 *	2309.267 *	2186.093 *	2042.311 *	1870.173 *	1653.15 *	1293.726 *	741.917 *	217.831	0.549	0.16	
-13	2752.48 *	2746.99 *	2737.611 *	2720.428 *	2701.406 *	2679.395 *	2658.586 *	2634.128 *	2599.945 *	2563.987 *	2520.506 *	2465.998 *	2402.7 *	2319.268 *	2196.237 *	2044.587 *	1870.073 *	1650.935 *	1294.17 *	738.061 *	214.796	0.563	0.16	
-15	2764.98 *	2758.321 *	2747.183 *	2732.678 *	2714.249 *	2695.622 *	2673.266 *	2646.197 *	2615.301 *	2579.925 *	2534.967 *	2473.423 *	2408.705 *	2327.644 *	2204.022 *	2050.562 *	1864.281 *	1646.724 *	1290.673 *	732.004 *	210.892	0.589	0.16	
-17	2780.19 *	2773.298 *	2760.517 *	2746.347 *	2727.201 *	2709.427 *	2685.15 *	2655.12 *	2624.586 *	2592.944 *	2543.726 *	2478.981 *	2413.511 *	2334.446 *	2208.831 *	2053.249 *	1862.118 *	1640.568 *	1285.899 *	724.011 *	206.107	0.613	0.16	
-19.5	2780.445 *	2774.142 *	2760.986 *	2747.203 *	2728.692 *	2709.678 *	2689.447 *	2657.069 *	2624.705 *	2592.774 *	2547.31 *	2478.417 *	2411.27 *	2332.238 *	2209.522 *	2050.52 *	1852.837 *	1626.83 *	1274.165 *	711.427 *	198.873	0.639	0.16	
-22.5	2753.345 *	2747.885 *	2735.399 *	2720.932 *	2703.866 *	2685.255 *	2663.234 *	2636.85 *	2604.648 *	2571.1 *	2527.428 *	2462.688 *	2393.832 *	2308.091 *	2198.311 *	2038.59 *	1835.44 *	1599.038 *	1250.37 *	693.343 *	189.432	0.663	0.16	
-25.5	2711.775 *	2706.636 *	2694.495 *	2679.945 *	2662.363 *	2642.376 *	2619.276 *	2593.637 *	2564.034 *	2529.356 *	2482.987 *	2426.63 *	2359.096 *	2265.164 *	2149.616 *	2016.522 *	1802.559 *	1559.223 *	1204.122 *	670.599 *	179.222	0.678	0.16	
-29	2621.4 *	2618.763 *	2608.109 *	2594.122 *	2576.992 *	2556.147 *	2533.444 *	2508.584 *	2482.953 *	2448.369 *	2399.686 *	2346.6 *	2289.702 *	2192.564 *	2067.556 *	1942.927 *	1750.849 *	1497.578 *	1146.047 *	638.611 *	165.43	0.684	0.16	
-33	2429.17 *	2429.629 *	2424.008 *	2413.686 *	2398.331 *	2384.523 *	2362.34 *	2340.863 *	2315.316 *	2286.492 *	2243.91 *	2191.362 *	2136.264 *	2056.475 *	1936.157 *	1811.316 *	1644.509 *	1404.429 *	1064.948 *	591.413 *	148.321	0.675	0.16	
-37.5	2174.555 *	2175.048 *	2172.304 *	2164.547 *	2154.692 *	2134.782 *	2121.909 *	2105.852 *	2084.664 *	2058.001 *	2018.917 *	1978.211 *	1927.927 *	1856.804 *	1754.113 *	1638.635 *	1476.186 *	1278.937 *	955.067 *	519.821 *	126.593	0.654	0.16	
-42.5	1921.365 *	1921.57 *	1919.18 *	1913.104 *	1903.414 *	1888.947 *	1874.932 *	1863.437 *	1831.261 *	1805.797 *	1776.092 *	1744.201 *	1695.058 *	1625.19 *	1540.172 *	1436.017 *	1298.228 *	1113.894 *	828.449 *	426.701 *	99.903	0.611	0.16	
-47.5	1657.65 *	1658.05 *	1656.795 *	1652.572 *	1645.127 *	1632.676 *	1620.758 *	1610.535 *	1587.52 *	1557.118 *	1526.093 *	1496.531 *	1462.206 *	1403.959 *	1332.224 *	1242.872 *	1090.819 *	922.851 *	690.642 *	321.686 *	73.605	0.557	0.16	
-55	1095.95 *	1099.841 *	1107.618 *	1107.618 *	1097.406 *	1091.171 *	1083.421 *	1075.712 *	1074.017 *	1052.725 *	1032.206 *	1014.056 *	1008.242 *	975.823 *	910.859 *	860.761 *	807.874 *	682.159 *	556.206 *	448.391 *	165.724	38.277	0.437	0.16
-65																								

LUMEN TABULATION

	0	1	3	5	7	9	11	13	15	17	20	23	26	29	33	38	43	48	55	65	75	85	90	Total
90																								
85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0.1	0.1	0	0	0	0	0
55	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.9	0.8	0.9	1	0.9	0.9	0.8	0.9	0.7	0.3	0	0	0	0
47.5	1.01 *	2.07 *	2.11 *	2.11 *	2.07 *	2.01 *	1.98 *	2.01 *	2.06 *	2.55 *	2.85 *	2.58 *	2.91 *	3.24 *	3.16 *	2.9	2.5	2.6	1.8	0.6	0.1	0	0	0
42.5	1.45 *	2.94 *	2.96 *	2.95 *	2.91 *	2.85 *	2.82 *	2.81 *	2.80 *	3.44 *	3.92 *	3.67 *	4.04 *	4.31 *	4.31 *	3.96 *	3.21 *	3.45 *	2.4	0.7	0.1	0	0	0
37.5	2.05 *	4.11 *	4.11 *	4.09 *	4.05 *	3.99 *	3.94 *	3.89 *	3.82 *	4.64 *	5.36 *	5.14 *	5.66 *	5.92 *	6.00 *	5.68 *	4.56 *	4.99 *	3.54 *	1	0.1	0	0	0
33	2.24 *	4.50 *	4.49 *	4.47 *	4.43 *	4.37 *	4.30 *	4.23 *	4.15 *	5.08 *	5.91 *	5.62 *	6.19 *	6.61 *	6.77 *	6.41 *	5.17 *	5.78 *	4.19 *	1.2	0.1	0	0	0
29	2.46 *	4.93 *	4.92 *	4.87 *	4.81 *	4.75 *	4.69 *	4.61 *	4.47 *	5.43 *	6.38 *	6.11 *	6.58 *	6.97 *	7.26 *	6.85 *	5.42 *	6.08 *	4.46 *	1.3	0.1	0	0	0
25.5	2.53 *	5.07 *	5.06 *	5.01 *	4.94 *	4.87 *	4.81 *	4.73 *	4.60 *	5.54 *	6.45 *	6.22 *	6.69 *	6.95 *	7.22 *	6.86 *	5.37 *	5.98 *	4.40 *	1.31 *	0.1	0	0	0
22.5	2.33 *	4.65 *	4.62 *	4.59 *	4.54 *	4.49 *	4.42 *	4.33 *	4.24 *	5.14 *	5.94 *	5.67 *	6.19 *	6.49 *	6.64 *	6.29 *	4.97 *	5.58 *	4.12 *	1.23 *	0.1	0	0	0
19.5	2.36 *	4.70 *	4.68 *	4.65 *	4.60 *	4.55 *	4.48 *	4.39 *	4.29 *	5.23 *	6.05 *	5.77 *	6.34 *	6.73 *	6.83 *	6.48 *	5.24 *	5.90 *	4.34 *	1.31 *	0.2	0	0	0
17	1.97 *	3.92 *	3.90 *	3.88 *	3.84 *	3.79 *	3.74 *	3.67 *	3.59 *	4.37 *	5.06 *	4.83 *	5.32 *	5.66 *	5.75 *	5.50 *	4.52 *	5.08 *	3.72 *	1.15 *	0.1	0	0	0
15	1.57 *	3.14 *	3.12 *	3.10 *	3.07 *	3.03 *	2.99 *	2.93 *	2.88 *	3.50 *	4.05 *	3.87 *	4.28 *	4.55 *	4.62 *	4.43 *	3.68 *	4.14 *	3.03 *	0.95 *	0.1	0	0	0
13	1.58 *	3.15 *	3.14 *	3.11 *	3.08 *	3.05 *	3.00 *	2.95 *	2.89 *	3.52 *	4.06 *	3.88 *	4.30 *	4.57 *	4.63 *	4.46 *	3.71 *	4.19 *	3.08 *	0.98 *	0.1	0	0	0
11	1.59 *	3.18 *	3.16 *	3.14 *	3.11 *	3.07 *	3.02 *	2.97 *	2.91 *	3.54 *	4.09 *	3.91 *	4.32 *	4.58 *	4.64 *	4.48 *	3.75 *	4.22 *	3.11 *	1.00 *	0.1	0	0	0
9	1.60 *	3.20 *	3.19 *	3.17 *	3.13 *	3.10 *	3.05 *	3.00 *	2.93 *	3.57 *	4.12 *	3.94 *	4.35 *	4.61 *	4.67 *	4.51 *	3.77 *	4.25 *	3.14 *	1.02 *	0.1	0	0	0
7	1.61 *	3.22 *	3.21 *	3.18 *	3.15 *	3.12 *	3.07 *	3.02 *	2.95 *	3.59 *	4.15 *	3.96 *	4.37 *	4.63 *	4.70 *	4.54 *	3.80 *	4.27 *	3.17 *	1.04 *	0.1	0	0	0
5	1.62 *	3.24 *	3.22 *	3.20 *	3.17 *	3.13 *	3.08 *	3.03 *	2.97 *	3.61 *	4.17 *	3.98 *	4.39 *	4.66 *	4.73 *	4.57 *	3.81 *	4.28 *	3.18 *	1.06 *	0.1	0	0	0
3	1.63 *	3.25 *	3.24 *	3.21 *	3.18 *	3.14 *	3.10 *	3.04 *	2.98 *	3.62 *	4.19 *	4.00 *	4.41 *	4.68 *	4.75 *	4.58 *	3.82 *	4.29 *	3.20 *	1.07 *	0.1	0	0	0
1	1.63 *	3.26 *	3.25 *	3.22 *	3.19 *	3.15 *	3.11 *	3.05 *	2.99 *	3.64 *	4.20 *	4.01 *	4.43 *	4.69 *	4.76 *	4.60 *	3.83 *	4.29 *	3.20 *	1.08 *	0.1	0	0	0
0	0.82 *	1.64 *	1.63 *	1.61 *	1.60 *	1.58 *	1.56 *	1.53 *	1.50 *	1.82 *	2.10 *	2.01 *	2.22 *	2.35 *	2.38 *	2.30 *	1.92 *	2.14 *	1.60 *	0.54 *	0.1	0	0	0

-1	0.82 *	1.64 *	1.63 *	1.62 *	1.60 *	1.58 *	1.56 *	1.53 *	1.50 *	1.83 *	2.11 *	2.01 *	2.22 *	2.35 *	2.39 *	2.30 *	1.92 *	2.14 *	1.60 *	0.55 *	0.1	0	0
-3	1.65 *	3.30 *	3.28 *	3.26 *	3.22 *	3.19 *	3.14 *	3.08 *	3.02 *	3.67 *	4.23 *	4.04 *	4.45 *	4.72 *	4.79 *	4.63 *	3.86 *	4.32 *	3.23 *	1.10 *	0.1	0	0
-5	1.66 *	3.31 *	3.30 *	3.27 *	3.24 *	3.20 *	3.15 *	3.09 *	3.03 *	3.68 *	4.25 *	4.05 *	4.46 *	4.73 *	4.81 *	4.65 *	3.88 *	4.35 *	3.26 *	1.11 *	0.1	0	0
-7	1.66 *	3.31 *	3.29 *	3.26 *	3.23 *	3.20 *	3.15 *	3.09 *	3.03 *	3.69 *	4.26 *	4.06 *	4.47 *	4.74 *	4.82 *	4.66 *	3.90 *	4.37 *	3.27 *	1.11 *	0.1	0	0
-9	1.65 *	3.30 *	3.28 *	3.26 *	3.23 *	3.19 *	3.14 *	3.09 *	3.03 *	3.69 *	4.27 *	4.07 *	4.48 *	4.74 *	4.82 *	4.67 *	3.91 *	4.39 *	3.28 *	1.11 *	0.1	0	0
-11	1.66 *	3.31 *	3.29 *	3.27 *	3.24 *	3.20 *	3.15 *	3.10 *	3.03 *	3.69 *	4.28 *	4.08 *	4.49 *	4.75 *	4.82 *	4.67 *	3.91 *	4.40 *	3.29 *	1.11 *	0.1	0	0
-13	1.67 *	3.33 *	3.31 *	3.29 *	3.26 *	3.22 *	3.17 *	3.12 *	3.05 *	3.71 *	4.29 *	4.10 *	4.52 *	4.77 *	4.83 *	4.67 *	3.92 *	4.40 *	3.28 *	1.10 *	0.1	0	0
-15	1.68 *	3.35 *	3.33 *	3.31 *	3.28 *	3.24 *	3.19 *	3.13 *	3.07 *	3.73 *	4.31 *	4.11 *	4.54 *	4.79 *	4.84 *	4.67 *	3.91 *	4.39 *	3.27 *	1.09 *	0.1	0	0
-17	1.69 *	3.37 *	3.35 *	3.32 *	3.29 *	3.25 *	3.20 *	3.15 *	3.08 *	3.75 *	4.32 *	4.13 *	4.55 *	4.80 *	4.85 *	4.67 *	3.90 *	4.38 *	3.26 *	1.08 *	0.1	0	0
-20	2.12 *	4.22 *	4.20 *	4.17 *	4.13 *	4.08 *	4.01 *	3.94 *	3.86 *	4.69 *	5.41 *	5.16 *	5.69 *	6.01 *	6.06 *	5.83 *	4.85 *	5.44 *	4.04 *	1.33 *	0.2	0	0
-23	2.53 *	5.04 *	5.01 *	4.97 *	4.93 *	4.87 *	4.79 *	4.70 *	4.60 *	5.60 *	6.46 *	6.16 *	6.78 *	7.17 *	7.24 *	6.94 *	5.75 *	6.44 *	4.77 *	1.56 *	0.2	0	0
-26	2.50 *	4.98 *	4.95 *	4.91 *	4.86 *	4.80 *	4.73 *	4.64 *	4.54 *	5.52 *	6.38 *	6.08 *	6.68 *	7.06 *	7.15 *	6.85 *	5.64 *	6.28 *	4.64 *	1.51 *	0.2	0	0
-29	2.84 *	5.67 *	5.64 *	5.59 *	5.53 *	5.46 *	5.38 *	5.28 *	5.17 *	6.27 *	7.25 *	6.92 *	7.59 *	7.98 *	8.09 *	7.78 *	6.37 *	7.04 *	5.18 *	1.68 *	0.2	0	0
-33	3.08 *	6.14 *	6.11 *	6.06 *	6.00 *	5.92 *	5.82 *	5.72 *	5.60 *	6.80 *	7.85 *	7.50 *	8.24 *	8.65 *	8.75 *	8.44 *	6.91 *	7.59 *	5.56 *	1.79 *	0.2	0	0
-38	3.16 *	6.30 *	6.28 *	6.23 *	6.17 *	6.09 *	5.99 *	5.89 *	5.76 *	7.00 *	8.09 *	7.74 *	8.51 *	8.96 *	9.05 *	8.71 *	7.16 *	7.84 *	5.70 *	1.82 *	0.2	0	0
-43	3.12 *	6.23 *	6.21 *	6.17 *	6.10 *	6.02 *	5.94 *	5.83 *	5.69 *	6.93 *	8.03 *	7.67 *	8.42 *	8.89 *	8.96 *	8.60 *	7.09 *	7.74 *	5.54 *	1.72 *	0.2	0	0
-48	2.73 *	5.44 *	5.42 *	5.39 *	5.33 *	5.26 *	5.19 *	5.09 *	4.96 *	6.03 *	7.00 *	6.68 *	7.30 *	7.70 *	7.78 *	7.44 *	6.07 *	6.58 *	4.61 *	1.4	0.2	0	0
-55	3.15 *	6.30 *	6.27 *	6.21 *	6.14 *	6.05 *	5.96 *	5.84 *	5.68 *	6.89 *	8.00 *	7.66 *	8.35 *	8.72 *	8.83 *	8.37 *	6.65 *	7.23 *	4.96 *	1.4	0.2	0	0
-65	1.83 *	3.69 *	3.68 *	3.63 *	3.58 *	3.52 *	3.46 *	3.39 *	3.31 *	4.03 *	4.68 *	4.49 *	4.88 *	5.13 *	5.23 *	4.87 *	3.92 *	4.37 *	3	0.9	0.1	0	0
-75	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.8	0.7	0.7	0.8	0.7	0.3	0	0	0
-85	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0	0	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	73.8	148	147	146	144	143	140	138	135	164	190	181	199	211	214	205	168	187	137	43.6	5.11	0.01	3120.5

4.0 LM-79 Measurement and Test Results

4.3 THD and PF Test

Model No.	FFLEDS @ 39W / 4000K	Sample ID.	E1
Temperature (°C)	25.4	Humidity (%RH)	54.0

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
120.04	60	0.387	46.5	0.999	3.08%
276.95	60	0.171	45.2	0.955	6.81%

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*****