



DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed by Rxx or Fxx series suffixes. This test report applies to PFM 80X80X38mm series as the right table	PFR0848HE-02EM2				

Representative Test P/N : PFM0812HE-03CCA	
Equipment: 1.Oven: E24-T0161	On/Off Cycles: Every 500 hours

◎ **L₁₀ Expectancy:** **70,000** hours minimum @ fan rated voltage and the temperature of 40°C
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 490,000 hours**

And we rely on a zero failure Weibull test strategy and accelerated testing technique, to determine the total test time (t) for verifying the above life estimation by the equations,

$$t = 1.036 \times \text{MTTF} \times [(B_{r,c}) \div n]^{0.91} \div A_F, \text{ and } A_F = 2^{(T_s - T_u)/10}$$

where, (B_{r,c}) is Poisson distribution factor with the failure number of r equal to 0 and the decimal confidence level of c equal to 0.90(90%).

Stress/Elevated Temperature T _s (°C) (Actual Test Temperature)	Unstress Temperature T _u (°C)	Acceleration Factor A _F	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B _{r,c}	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 °C (hours)	Verified L ₁₀ 40 °C (hours)
70	40	8.00	56	2.303	3,478	3,478.0	490,031	70,004

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2019/5/9 9:00 AM	2020/5/5 11:46 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	3478.0

Herewith, we could assume as right on the basis of above test result. Besides, if the actual test time exceed the required, it comes out that those fans' L₁₀ expectancy and MTTF are greater than the warrant. (MTTF: means Mean Time To Failures, it should be used in a non-repairable system setting. Now we show the MTTF in our life report, that's because we will not repair the failed fans during life experiment. MTBF: means Mean Time Between failures, it should be used in a repairable system setting.

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	1,386,017	198,002
30	16.00	980,062	140,009
40	8.00	490,031	70,004
50	4.00	245,015	35,002
60	2.00	122,508	17,501
70	1.00	61,254	8,751

Fan permission criteria for the measurement after test :

1. Speed can not drop of ≥ 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Test Result	<input checked="" type="checkbox"/> Accept
	<input type="checkbox"/> Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG19FNL027	5225.00	2020/5/6	Loly.Wang	Tim.Yi

BGN (dBA) : 15.9

Temp (°C) : 21.4



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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PFR0848HE-02EM2

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2019/5/9 9:00 AM	2020/5/5 11:46 PM	56	0	3478.0

Representative Test P/N :PFM0812HE-03CCA	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: E24-T0161 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A)	Final Test Current Spec. (A)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Spec. (dB A)	Deviation 3 dBMax.
	5.4Max.	5.4Max.		15930-19470	15930-19470		80Max	80Max	
1	4.07	4.14	1.6	16961	16849	-0.7	75.0	76.3	1.3
2	4.09	4.14	1.2	15915	16863	6.0	74.5	77.1	2.6
3	4.02	4.16	3.3	16279	16812	3.3	74.1	75.8	1.7
4	4.19	4.16	-0.9	16675	16826	0.9	74.2	76.4	2.2
5	4.14	4.14	-0.2	16609	16812	1.2	75.2	75.3	0.1
6	4.07	4.14	1.5	16318	16856	3.3	74.7	76.1	1.4
7	4.13	4.16	0.6	16196	16825	3.9	75.4	77.4	2.0
8	4.08	4.55	11.6	16782	16800	0.1	75.1	76.2	1.1
9	4.31	4.14	-3.8	16223	16920	4.3	75.0	74.9	-0.1
10	4.08	4.15	1.8	16680	16804	0.7	75.3	76.1	0.8
11	4.12	4.14	0.4	16544	16802	1.6	75.4	76.0	0.6
12	4.08	4.17	2.1	16237	16876	3.9	74.8	75.9	1.1
13	4.08	4.16	1.8	16374	16802	2.6	75.0	76.2	1.2
14	4.36	4.17	-4.2	16910	16865	-0.3	74.7	76.9	2.2
15	4.15	4.12	-0.8	17029	16921	-0.6	75.2	76.3	1.1
16	4.10	4.16	1.5	16909	16884	-0.1	74.2	76.1	1.9
17	4.10	4.12	0.4	17020	16919	-0.6	74.6	76.4	1.8
18	4.23	4.13	-2.4	16992	16816	-1.0	74.9	76.5	1.6
19	4.13	4.13	-0.1	16785	16815	0.2	75.0	77.0	2.0
20	4.06	4.13	1.9	16563	16845	1.7	74.8	77.2	2.4
21	4.14	4.13	-0.2	16901	16850	-0.3	75.1	76.0	0.9
22	4.15	4.15	0.0	16999	16826	-1.0	75.4	76.7	1.3
23	4.12	4.13	0.4	16988	16879	-0.6	75.3	75.9	0.6
24	4.05	4.13	2.0	16711	16834	0.7	74.7	76.9	2.2
25	4.36	4.14	-5.2	16931	16850	-0.5	74.5	77.1	2.6
26	4.09	4.11	0.6	16889	16874	-0.1	74.1	76.5	2.4
27	4.11	4.12	0.3	16947	16873	-0.4	74.9	76.6	1.7
28	4.25	4.15	-2.4	16992	16810	-1.1	74.7	77.0	2.3
29	4.19	4.16	-0.8	17003	16900	-0.6	74.8	77.6	2.8
30	4.10	4.17	1.8	16876	16856	-0.1	74.5	76.5	2.0
31	4.05	4.16	2.6	16890	16805	-0.5	74.9	76.9	2.0
32	4.04	4.12	2.1	16909	16833	-0.4	74.3	75.9	1.6

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG19FNL027	5225.00	2020/5/6	Loly.Wang	Tim.Yi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2019/5/9 9:00 AM	2020/5/5 11:46 PM	56	0	3478.0

Representative Test P/N :PFM0812HE-03CCA	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: E24-T0161	On/Off Cycles: Every 500 hours
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Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A)	Final Test Current Spec. (A)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Spec. (dB A)	Deviation
	5.4Max.	5.4Max.		15930-19470	15930-19470		80Max	80Max	
33	4.08	4.15	1.7	16961	16889	-0.4	74.0	76.2	2.2
34	4.08	4.12	1.1	16955	16854	-0.6	74.1	76.1	2.0
35	4.07	4.14	1.6	16905	16812	-0.6	75.1	76.3	1.2
36	4.08	4.13	1.3	16825	16911	0.5	74.6	76.4	1.8
37	4.07	4.12	1.3	16838	16811	-0.2	75.0	73.9	-1.1
38	4.08	4.15	1.8	16894	16842	-0.3	74.5	76.2	1.7
39	4.12	4.16	0.9	16919	16861	-0.3	74.9	76.7	1.8
40	4.10	4.12	0.4	16917	16834	-0.5	74.8	76.9	2.1
41	4.10	4.14	1.0	16967	16837	-0.8	74.9	76.8	1.9
42	4.14	4.14	0.1	16978	16848	-0.8	75.1	76.5	1.4
43	4.08	4.13	1.2	16949	16826	-0.7	74.6	75.9	1.3
44	4.08	4.14	1.5	16915	16827	-0.5	75.0	76.4	1.4
45	4.10	4.12	0.7	16873	16828	-0.3	74.2	74.8	0.6
46	4.08	4.13	1.2	16879	16864	-0.1	74.8	75.8	1.0
47	4.02	4.16	3.4	16919	16802	-0.7	74.0	75.7	1.7
48	4.05	4.13	1.9	16882	16807	-0.4	74.2	76.0	1.8
49	4.02	4.12	2.3	16877	16818	-0.3	74.3	75.5	1.2
50	4.08	4.12	1.1	16940	16862	-0.5	74.6	76.6	2.0
51	4.03	4.15	3.0	16869	16833	-0.2	74.5	76.3	1.8
52	4.23	4.11	-2.9	16881	16851	-0.2	74.3	75.9	1.6
53	4.31	4.11	-4.5	16936	16876	-0.4	74.7	76.9	2.2
54	4.14	4.12	-0.4	16986	16851	-0.8	74.6	76.7	2.1
55	4.03	4.16	3.4	16807	16844	0.2	74.7	76.1	1.4
56	4.29	4.15	-3.2	16913	16827	-0.5	75.2	76.9	1.7
X-Bar	4.12	4.15	-	16800.39	16844.95	-	74.73	76.31	-
σ	0.08	0.06	-	250.17	32.19	-	0.37	0.65	-

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DG19FNL027	5225.00	2020/5/6	Loly.Wang	Tim.Yi