



DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed byRxx orFxx series suffixes. This test report applies to PFC50x50x32.0mm series as the right table	PFB0512EHF				

Representative Test P/N : PFC0512DF-F00	
Equipment: 1.Oven:E24-F0057	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%), and

Stress/Elevated Temperature T _s (°C)	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	12,360.0	1,741,455	248,779

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2007/5/10 4:00 PM	2008/1/29 3:16 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	12360.0

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	4,925,579	703,654
30	16.00	3,482,911	497,559
40	8.00	1,741,455	248,779
50	4.00	870,728	124,390
60	2.00	435,364	62,195
70	1.00	217,682	31,097

Fan permission criteria for the measurement after test :

1. Speed can not drop of $\geq 15\%$ below the original measured rpm.
2. Current cannot increase $> 15\%$ of original measure current.
3. Noise cannot $> 3\text{dB}$ 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
DG07FNL095	2857.50	2009/4/17	Nan.Yang	Zenny Lei



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 PFC50x50x32.0mm series as the right table

PFB0512EHF				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2007/5/10 4:00 PM	2008/1/29 3:16 PM	56	0	12360.0

Representative Test P/N : PFC0512DF-F00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
---	----------------------------	-------------------------------------	--	---

Equipment: 1.Oven:E24-F0057 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation
	Current Spec. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	810Max.	810 Max.		9000-11000	9000-11000		55.2 Max	55.2 Max	3 dBMax.
1	522	491	-5.9	10305	9904	-3.9	53.0	53.1	0.1
2	503	504	0.2	9954	10106	1.5	52.8	52.8	0.0
3	499	496	-0.6	9945	9960	0.2	52.3	53.2	0.9
4	503	502	-0.2	9971	10064	0.9	52.9	53.6	0.7
5	513	492	-4.1	9771	9891	1.2	52.4	52.9	0.5
6	515	503	-2.3	10074	10120	0.5	53.0	53.5	0.5
7	515	501	-2.7	9765	10064	3.1	52.5	52.8	0.3
8	539	492	-8.7	9971	9924	-0.5	52.8	53.3	0.5
9	519	501	-3.5	9967	10073	1.1	52.6	53.5	0.9
10	522	500	-4.2	10037	10109	0.7	52.2	53.1	0.9
11	506	491	-3.0	9621	9909	3.0	52.8	53.5	0.7
12	523	500	-4.4	10118	10073	-0.4	52.4	52.7	0.3
13	526	495	-5.9	10008	9996	-0.1	52.8	53.3	0.5
14	517	493	-4.6	10029	9901	-1.3	52.1	52.8	0.7
15	523	492	-5.9	9793	9957	1.7	52.6	53.1	0.5
16	547	511	-6.6	10073	9949	-1.2	52.3	52.9	0.6
17	518	501	-3.3	9963	10082	1.2	52.9	53.2	0.3
18	503	490	-2.6	9825	9914	0.9	52.2	53.6	1.4
19	512	491	-4.1	9921	9911	-0.1	52.8	53.3	0.5
20	514	491	-4.5	10032	9922	-1.1	52.4	52.8	0.4
21	526	500	-4.9	9925	10065	1.4	53.1	53.1	0.0
22	508	502	-1.2	9935	10113	1.8	52.6	52.6	0.0
23	527	492	-6.6	10099	9938	-1.6	52.4	53.3	0.9
24	522	500	-4.2	9905	10092	1.9	53.0	52.7	-0.3
25	560	533	-4.8	9974	9951	-0.2	52.7	53.1	0.4
26	523	502	-4.0	9754	10100	3.5	52.4	52.8	0.4
27	548	501	-8.6	10120	10073	-0.5	52.6	53.2	0.6
28	524	502	-4.2	10050	10060	0.1	52.8	53.5	0.7
29	507	502	-1.0	9815	10059	2.5	53.0	53.3	0.3
30	507	492	-3.0	9975	9941	-0.3	52.7	52.8	0.1
31	508	493	-3.0	9892	9949	0.6	52.5	53.0	0.5
32	521	502	-3.6	9974	10023	0.5	53.0	52.9	-0.1
33	529	492	-7.0	10038	9937	-1.0	52.9	53.1	0.2
34	525	501	-4.6	10052	10042	-0.1	52.4	53.3	0.9
35	530	501	-5.5	10046	10064	0.2	53.1	52.8	-0.3

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG07FNL095	2857.50	2009/4/17	Nan.Yang	Zenny Lei



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 PFC50x50x32.0mm series as the right table

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2007/5/10 4:00 PM	2008/1/29 3:16 PM	56	0	12360.0

Representative Test P/N : PFC0512DF-F00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
---	----------------------------	-------------------------------------	--	---

Equipment: 1.Oven:E24-F0057 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation 3 dBMax.
	Current Spec. (mA) 810Max.	Current Spec. (mA) 810 Max.		Speed Spec. (RPM) 9000-11000	Speed Spec. (RPM) 9000-11000		Noise Spec. (dB A) 55.2 Max	Noise Spec. (dB A) 55.2 Max	
36	518	492	-5.0	10218	9916	-3.0	52.5	52.6	0.1
37	531	492	-7.3	9841	9918	0.8	52.9	53.2	0.3
38	524	491	-6.3	10026	9914	-1.1	52.1	53.0	0.9
39	517	491	-5.0	9970	9905	-0.7	52.5	52.9	0.4
40	522	501	-4.0	10017	10063	0.5	52.7	52.6	-0.1
41	528	503	-4.7	10039	10170	1.3	52.3	53.1	0.8
42	511	499	-2.3	10077	10069	-0.1	52.8	52.8	0.0
43	534	491	-8.1	9971	9899	-0.7	52.7	53.2	0.5
44	540	502	-7.0	9957	10096	1.4	53.0	52.9	-0.1
45	539	494	-8.3	10095	9945	-1.5	52.8	53.3	0.5
46	526	501	-4.8	10043	10080	0.4	52.5	53.0	0.5
47	554	491	-11.4	9900	9957	0.6	52.9	52.6	-0.3
48	539	503	-6.7	9892	10111	2.2	52.1	53.1	1.0
49	553	491	-11.2	9902	9911	0.1	52.6	53.4	0.8
50	504	492	-2.4	9876	9943	0.7	52.4	52.6	0.2
51	507	491	-3.2	9963	9904	-0.6	53.1	53.2	0.1
52	533	500	-6.2	10032	10092	0.6	52.8	52.7	-0.1
53	531	502	-5.5	10060	10025	-0.3	52.9	52.9	0.0
54	542	500	-7.7	10044	10076	0.3	52.7	53.1	0.4
55	524	491	-6.3	9842	9911	0.7	52.6	52.7	0.1
56	512	501	-2.1	10077	10046	-0.3	52.8	53.3	0.5
X-Bar	523.1	497.7	-	9973.9	10003.3	-	52.66	53.05	-
σ	14.041	7.058	-	117.907	81.080	-	0.276	0.281	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG07FNL095	2857.50	2009/4/17	Nan.Yang	Zenny Lei