



# DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed by ARxx or AFxx series suffixes. This test report applies to PFB 40x40x28.0 mm series as the right table	PFB0412EHN	PFB0412SHN	PFB0412VHN	PFB0412HHN	PFB0412EHN-TP06

<b>Representative Test P/N : PFB0412EHN-BF00</b>					
<b>Equipment: 1.Oven: E24-F0031</b>				On/Off Cycles: Every 500 hours	

◎ **L<sub>10</sub> Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40°C**  
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 350,000 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,

$$t = 1.036 \times \text{MTTF} \times [(B_{r;c}) \div n]^{0.91} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

where, (B<sub>r;c</sub>) 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 Ts (°C) ( Actual Test Temperature )	Unstress Temperature Tu (°C)	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r;c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 °C (hours)	Verified L <sub>10</sub> 40 °C (hours)
70	40	8.00	70	2.303	2,028	9,360.0	1,615,689	230,813

### Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2006/8/17 2:30 PM	2007/6/3 1:07 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	9360.0

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' L<sub>10</sub> 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 <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	22.63	4,569,859	652,837
30	16.00	3,231,378	461,625
40	8.00	1,615,689	230,813
50	4.00	807,845	115,406
60	2.00	403,922	57,703
70	1.00	201,961	28,852

- Fan permission criteria for the measurement after test :
- Speed can not drop of ≥ 15% below the original measured rpm.
  - Current cannot increase > 15% of original measure current.
  - Noise cannot >3dB over the original measure noise.

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

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG06FNL182	4931.00	2008/4/12	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 ARxx or AFxx series suffixes. This test report applies to PFB 40x40x28.0 mm series as the right table	PFB0412EHN	PFB0412SHN	PFB0412VHN	PFB0412HHN	PFB0412EHN-TP06

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,806	2006/8/17 2:30 PM	2007/6/3 1:07 PM	70	0	<b>9360.0</b>

Representative Test P/N : PFB0412EHN-BF00	<b>Current Test Status</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
---	----------------------------	-------------------------------------	--	---

Equipment: 1.Oven: E24-F0031 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) 720Max.	Current Spec. (mA) 720Max.		Speed Spec. (RPM) 14400-17600	Speed Spec. (RPM) 14400-17600		Noise Spec. (dB A) 58.5Max	Noise Spec. (dB A) 58.5Max	
1	675	654	-3.1	16088	17384	8.1	54.8	54.3	-0.5
2	684	625	-8.6	15422	17385	12.7	54.2	54.7	0.5
3	651	632	-2.9	15355	17401	13.3	53.8	54.5	0.7
4	672	632	-6.0	15628	17401	11.3	54.6	54.9	0.3
5	659	630	-4.4	15990	17150	7.3	54.0	54.3	0.3
6	651	650	-0.2	15327	17351	13.2	54.7	54.7	0.0
7	624	592	-5.1	15635	17197	10.0	54.9	54.2	-0.7
8	654	592	-9.5	15419	17206	11.6	54.6	54.9	0.3
9	680	592	-12.9	15894	17197	8.2	54.4	54.3	-0.1
10	652	597	-8.4	15763	17321	9.9	54.8	54.7	-0.1
11	642	632	-1.6	15313	17401	13.6	55.1	54.2	-0.9
12	644	590	-8.4	15460	17132	10.8	54.9	54.9	0.0
13	680	624	-8.2	15514	17270	11.3	54.2	54.6	0.4
14	666	634	-4.8	15770	17203	9.1	54.6	54.1	-0.5
15	645	592	-8.2	15584	17206	10.4	54.4	54.9	0.5
16	645	589	-8.7	15591	16932	8.6	54.9	54.5	-0.4
17	677	647	-4.4	16139	17304	7.2	54.6	54.7	0.1
18	681	632	-7.2	15686	17401	10.9	55.1	54.2	-0.9
19	638	593	-7.1	15813	17264	9.2	54.2	54.9	0.7
20	661	600	-9.2	15413	17060	10.7	54.9	54.3	-0.6
21	684	589	-13.9	16209	16932	4.5	55.3	54.9	-0.4
22	640	611	-4.5	16165	17454	8.0	54.7	54.3	-0.4
23	654	593	-9.3	15538	17264	11.1	54.5	54.7	0.2
24	698	650	-6.9	15524	17351	11.8	53.9	54.6	0.7
25	656	589	-10.2	15642	16932	8.2	54.6	54.2	-0.4
26	612	592	-3.3	16214	17197	6.1	55.0	54.8	-0.2
27	651	603	-7.4	16011	17465	9.1	54.7	54.3	-0.4
28	619	584	-5.7	16131	16934	5.0	54.5	54.1	-0.4

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG06FNL182	4931.00	2008/4/12	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 ARxx or AFxx series suffixes. This test report applies to PFB 40x40x28.0 mm series as the right table

PFB0412EHN	PFB0412SHN	PFB0412VHN	PFB0412HHN	PFB0412EHN-TP06

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
2,028	2006/8/17 2:30 PM	2007/6/3 1:07 PM	70	0	<b>9360.0</b>

Representative Test P/N : PFB0412EHN-BF00	<b>Current Test Status</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
---	----------------------------	-------------------------------------	--	---

Equipment: 1.Oven: E24-F0031 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.	Current Spec.		Speed Spec.	Speed Spec.		Noise Spec.	Noise Spec.	
	( mA )	( mA )		( RPM )	( RPM )		( dB A )	( dB A )	
	<b>720Max.</b>	<b>720Max.</b>		<b>14400-17600</b>	<b>14400-17600</b>		<b>58.5Max</b>	<b>58.5Max</b>	<b>3 dBMax.</b>
29	633	587	-7.3	16063	17370	8.1	54.3	54.9	0.6
30	663	634	-4.4	15964	17203	7.8	55.1	54.5	-0.6
31	676	592	-12.4	16168	17197	6.4	54.7	54.9	0.2
32	696	621	-10.8	15723	17045	8.4	55.2	54.3	-0.9
33	659	609	-7.6	15294	16848	10.2	54.9	54.9	0.0
34	659	587	-10.9	15342	17370	13.2	54.6	54.7	0.1
35	658	610	-7.3	15613	17278	10.7	55.2	54.1	-1.1
36	660	570	-13.6	15728	17228	9.5	54.6	54.3	-0.3
37	648	597	-7.9	15213	17401	14.4	55.2	54.8	-0.4
38	623	571	-8.3	15925	17287	8.6	54.6	54.5	-0.1
39	632	586	-7.3	15823	17350	9.7	54.8	54.9	0.1
40	672	634	-5.7	15913	17407	9.4	55.1	54.4	-0.7
41	663	625	-5.7	15983	17441	9.1	55.1	54.9	-0.2
42	676	606	-10.4	15308	17418	13.8	54.9	54.3	-0.6
43	663	597	-10.0	15379	17309	12.5	54.1	54.7	0.6
44	630	597	-5.2	16291	17401	6.8	55.0	54.5	-0.5
45	672	614	-8.6	15835	17473	10.3	54.7	54.2	-0.5
46	663	645	-2.7	15523	16400	5.6	54.2	54.7	0.5
47	689	631	-8.4	15519	17390	12.1	54.9	54.2	-0.7
48	685	603	-12.0	15197	17350	14.2	54.5	54.9	0.4
49	683	634	-7.2	15765	17407	10.4	54.6	54.3	-0.3
50	669	579	-13.5	15966	17346	8.6	54.4	54.7	0.3
51	647	633	-2.2	16327	17518	7.3	55.1	54.9	-0.2
52	623	606	-2.7	16313	17201	5.4	54.7	54.5	-0.2
53	664	623	-6.2	15965	17466	9.4	54.2	54.8	0.6

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG06FNL182	4931.00	2008/4/12	Nan Yang	Zenny Lei