



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 FFB80x80x25.4mm series as the right table	FFB0812SH	FFB0812M			
	FFB0812VH	FFB0812L			
	FFB0812HH				
	FFB0812H				

Representative Test P/N :FFB0812SH-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**, $MTTF \cong 7 \times L_{10} = 490,000$ 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,

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

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 Ts (°C)	Unstress Temperature Tu (°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)
60	40	4.00	56	2.303	6,956	6,956.0	490,031	70,004

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2003/9/25 10:00 PM	2004/11/1 3:33 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	6956.0

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. Basically, MTBF is equal to MTTF, they use same formula to work out a life data.)

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	11.31	1,386,017	198,002
30	8.00	980,062	140,009
40	4.00	490,031	70,004
50	2.00	245,015	35,002
60	1.00	122,508	17,501

Fan permission criteria for the measurement after test :

1. For current, the limit is less than spec.(max.).
2. For speed, the allowable decrease is less than 15%.
3. For noise, the limit is less than spec.(max.). + 3 dB

Test Result

- Accept**
 Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL136	2710.00	2004/11/1 4:00 PM	Huiling.Fu	Even.Liu

Note: The test sample equivalent to STD, Part number: FFB0812SH-F00.



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FFB0812VH	FFB0812L		
FFB0812HH			
FFB0812H			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2003/9/25 10:00 PM	2004/11/1 3:33 PM	56	0	6956.0

Representative Test P/N :FFB0812SH-F00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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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. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	0.60Max.	0.60Max.		4140-4860	4140-4860		50.6Max	50.6Max	
1	0.45	0.45	0.0	4611	4563	-1.0	46.7	47.8	2.4
2	0.46	0.45	-2.2	4582	4566	-0.3	46.2	47.5	2.8
3	0.46	0.46	0.0	4575	4544	-0.7	47.0	47.1	0.2
4	0.48	0.46	-4.2	4509	4563	1.2	46.5	47.6	2.4
5	0.45	0.45	0.0	4557	4495	-1.4	46.6	47.4	1.7
6	0.44	0.45	2.3	4622	4503	-2.6	46.2	47.7	3.2
7	0.46	0.46	0.0	4596	4567	-0.6	47.1	48.0	1.9
8	0.48	0.46	-4.2	4610	4518	-2.0	47.6	47.8	0.4
9	0.47	0.45	-4.3	4561	4573	0.3	47.9	48.1	0.4
10	0.49	0.48	-2.0	4628	4434	-4.2	46.9	47.6	1.5
11	0.46	0.44	-4.3	4571	4556	-0.3	46.7	48.3	3.4
12	0.45	0.45	0.0	4585	4519	-1.4	47.2	48.5	2.8
13	0.45	0.45	0.0	4651	4538	-2.4	47.4	47.9	1.1
14	0.44	0.43	-2.3	4510	4574	1.4	47.0	48.2	2.6
15	0.47	0.46	-2.1	4570	4646	1.7	46.9	48.0	2.3
16	0.45	0.45	0.0	4588	4563	-0.5	47.1	47.7	1.3
17	0.46	0.46	0.0	4618	4583	-0.8	47.3	47.2	-0.2
18	0.48	0.46	-4.2	4627	4574	-1.1	47.0	47.6	1.3
19	0.48	0.46	-4.2	4540	4573	0.7	48.0	47.4	-1.3
20	0.45	0.46	2.2	4557	4555	0.0	47.7	48.5	1.7
21	0.44	0.42	-4.5	4566	4351	-4.7	47.5	47.1	-0.8
22	0.46	0.46	0.0	4670	4572	-2.1	47.6	48.1	1.1
23	0.45	0.45	0.0	4523	4540	0.4	46.7	47.8	2.4
24	0.46	0.44	-4.3	4548	4497	-1.1	46.2	47.5	2.8
25	0.44	0.45	2.3	4599	4588	-0.2	46.9	48.2	2.8
26	0.46	0.45	-2.2	4549	4535	-0.3	47.4	48.5	2.3
27	0.47	0.45	-4.3	4567	4462	-2.3	47.1	47.8	1.5
28	0.45	0.45	0.0	4634	4593	-0.9	47.0	47.4	0.9
29	0.45	0.46	2.2	4596	4509	-1.9	46.2	47.6	3.0
30	0.46	0.46	0.0	4545	4553	0.2	46.9	48.1	2.6
31	0.47	0.46	-2.1	4453	4625	3.9	47.4	47.8	0.8
32	0.45	0.46	2.2	4538	4512	-0.6	47.5	48.6	2.3
33	0.45	0.45	0.0	4608	4603	-0.1	47.6	47.7	0.2
34	0.44	0.45	2.3	4608	4535	-1.6	46.7	47.8	2.4
35	0.46	0.46	0.0	4596	4572	-0.5	46.9	48.0	2.3

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL136	2710.00	2004/11/1 4:00 PM	Huiling.Fu	Even.Liu



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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.	
	(A) 0.60Max.	(A) 0.60Max.		(RPM) 4140-4860	(RPM) 4140-4860		(dB A) 50.6Max	(dB A) 50.6Max	
36	0.46	0.45	-2.2	4508	4479	-0.6	47.5	47.5	0.0
37	0.47	0.45	-4.3	4626	4557	-1.5	47.2	47.9	1.5
38	0.47	0.45	-4.3	4677	4523	-3.3	47.0	47.4	0.9
39	0.44	0.48	9.1	4586	4605	0.4	47.7	48.1	0.8
40	0.48	0.46	-4.2	4637	4503	-2.9	47.9	47.8	-0.2
41	0.44	0.44	0.0	4573	4527	-1.0	47.6	47.8	0.4
42	0.45	0.46	2.2	4677	4526	-3.2	46.7	48.0	2.8
43	0.45	0.46	2.2	4572	4535	-0.8	46.5	47.2	1.5
44	0.46	0.46	0.0	4585	4544	-0.9	46.4	47.9	3.2
45	0.48	0.45	-6.2	4711	4546	-3.5	46.9	47.1	0.4
46	0.45	0.45	0.0	4589	4580	-0.2	47.8	47.8	0.0
47	0.46	0.45	-2.2	4563	4562	0.0	47.4	47.6	0.4
48	0.47	0.45	-4.3	4533	4521	-0.3	47.2	47.9	1.5
49	0.45	0.44	-2.2	4543	4515	-0.6	47.5	48.5	2.1
50	0.46	0.45	-2.2	4558	4500	-1.3	47.4	47.7	0.6
51	0.48	0.46	-4.2	4621	4561	-1.3	47.4	47.9	1.1
52	0.49	0.48	-2.0	4587	4593	0.1	47.8	48.0	0.4
53	0.44	0.44	0.0	4541	4536	-0.1	47.5	48.3	1.7
54	0.45	0.44	-2.2	4541	4498	-0.9	46.9	47.4	1.1
55	0.45	0.44	-2.2	4540	4561	0.5	47.8	48.4	1.3
56	0.45	0.46	2.2	4604	4575	-0.6	47.2	47.9	1.5
X-Bar	0.459	0.453	-	4583.5	4543.0	-	47.1	47.82	-
σ	0.014	0.011	-	47.681	47.487	-	0.476	0.379	-

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