

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 FFB90x90x25.4mm series as the right table	FFB0948VH			
	FFB0948HH			
	FFB0924VH			
	FFB0924HH			

Representative Test P/N :FFB0948VH

Equipment: 1.Oven: E24-F0036 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)
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)
2004/7/20 9:30 PM	2005/7/20 4:03 AM	<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
DG04FNL195	1787.00	2005/7/20 4:30 AM	Guie.Lin	gx.xu

Note: The test sample equivalent to STD, Part number: FFB0948VH.



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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FFB0948VH				
FFB0948HH				
FFB0924VH				
FFB0924HH				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2004/7/20 9:30 PM	2005/7/20 4:03 AM	56	0	6956.0

Representative Test P/N :FFB0948VH	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-F0036 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)	
	0.20Max.	0.20Max.		3404-3996	3404-3996		52.2Max	52.2Max	
1	0.14	0.14	0.0	3742	3735	-0.2	49.2	49.5	0.6
2	0.14	0.13	-7.1	3706	3815	2.9	49.6	49.3	-0.6
3	0.14	0.14	0.0	3701	3769	1.8	49.3	48.7	-1.2
4	0.14	0.14	0.0	3703	3770	1.8	49.1	49.2	0.2
5	0.14	0.14	0.0	3661	3807	4.0	49.5	49.5	0.0
6	0.14	0.14	0.0	3655	3778	3.4	49.3	49.3	0.0
7	0.14	0.14	0.0	3718	3759	1.1	49.2	49.0	-0.4
8	0.14	0.14	0.0	3778	3787	0.2	49.2	48.8	-0.8
9	0.14	0.14	0.0	3678	3701	0.6	49.6	49.1	-1.0
10	0.14	0.14	0.0	3667	3749	2.2	49.3	49.3	0.0
11	0.14	0.14	0.0	3662	3791	3.5	49.3	49.5	0.4
12	0.14	0.14	0.0	3694	3725	0.8	49.1	49.2	0.2
13	0.14	0.14	0.0	3684	3779	2.6	49.5	48.5	-2.0
14	0.14	0.14	0.0	3747	3769	0.6	49.3	48.7	-1.2
15	0.14	0.14	0.0	3678	3749	1.9	49.2	49.3	0.2
16	0.14	0.13	-7.1	3667	3813	4.0	49.3	49.2	-0.2
17	0.14	0.14	0.0	3716	3717	0.0	49.1	48.6	-1.0
18	0.14	0.14	0.0	3640	3719	2.2	49.5	49.2	-0.6
19	0.14	0.14	0.0	3605	3725	3.3	49.7	48.9	-1.6
20	0.14	0.14	0.0	3693	3791	2.7	49.1	49.3	0.4
21	0.14	0.14	0.0	3730	3767	1.0	49.8	48.9	-1.8
22	0.14	0.14	0.0	3690	3713	0.6	49.6	49.0	-1.2
23	0.14	0.14	0.0	3680	3729	1.3	49.5	48.7	-1.6
24	0.14	0.14	0.0	3677	3755	2.1	49.3	49.1	-0.4
25	0.14	0.14	0.0	3719	3758	1.0	49.1	49.3	0.4
26	0.14	0.14	0.0	3741	3775	0.9	49.1	48.8	-0.6
27	0.14	0.13	-7.1	3681	3797	3.2	49.8	49.0	-1.6
28	0.14	0.14	0.0	3641	3724	2.3	49.2	49.2	0.0
29	0.14	0.14	0.0	3730	3717	-0.3	49.3	49.4	0.2
30	0.14	0.14	0.0	3732	3783	1.4	49.5	48.7	-1.6
31	0.14	0.14	0.0	3750	3734	-0.4	49.2	49.1	-0.2
32	0.14	0.14	0.0	3525	3771	7.0	49.1	49.3	0.4
33	0.14	0.14	0.0	3788	3736	-1.4	49.5	48.5	-2.0
34	0.14	0.14	0.0	3678	3712	0.9	49.6	49.5	-0.2
35	0.14	0.14	0.0	3671	3785	3.1	49.3	49.3	0.0

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL195	1787.00	2005/7/20 4:30 AM	Guie.Lin	gx.xu



DC FAN FUNCTION TEST RECORD

FOR LIFE EXPERIMENT

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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)	
	0.20Max.	0.20Max.		3404-3996	3404-3996		52.2Max	52.2Max	
36	0.14	0.14	0.0	3790	3772	-0.5	49.3	49.6	0.6
37	0.14	0.13	-7.1	3719	3773	1.5	49.2	49.5	0.6
38	0.14	0.14	0.0	3638	3793	4.3	49.1	49.1	0.0
39	0.14	0.14	0.0	3672	3788	3.2	49.6	49.3	-0.6
40	0.14	0.14	0.0	3612	3796	5.1	49.5	48.6	-1.8
41	0.14	0.14	0.0	3712	3775	1.7	49.3	48.9	-0.8
42	0.14	0.13	-7.1	3625	3750	3.4	49.1	49.1	0.0
43	0.14	0.14	0.0	3700	3733	0.9	49.2	49.3	0.2
44	0.14	0.14	0.0	3759	3781	0.6	49.5	49.5	0.0
45	0.14	0.14	0.0	3689	3749	1.6	49.3	48.7	-1.2
46	0.14	0.14	0.0	3745	3729	-0.4	49.6	48.8	-1.6
47	0.14	0.14	0.0	3733	3752	0.5	49.2	49.3	0.2
48	0.14	0.14	0.0	3814	3787	-0.7	49.1	49.6	1.0
49	0.14	0.14	0.0	3723	3759	1.0	49.3	49.0	-0.6
50	0.14	0.14	0.0	3659	3773	3.1	49.7	48.6	-2.2
51	0.14	0.14	0.0	3719	3713	-0.2	49.5	49.2	-0.6
52	0.14	0.14	0.0	3665	3782	3.2	49.3	49.5	0.4
53	0.14	0.14	0.0	3717	3739	0.6	49.3	49.4	0.2
54	0.14	0.14	0.0	3681	3738	1.5	49.2	48.7	-1.0
55	0.14	0.14	0.0	3620	3799	4.9	49.3	48.5	-1.6
56	0.14	0.14	0.0	3716	3746	0.8	49.2	49.3	0.2
X-Bar	0.140	0.139	-	3694.5	49.0	-	49.34	49.10	-
σ	0.000	0.003	-	50.508	29.466	-	0.197	0.318	-

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