



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 AFB70x70x15mm series as the right table	AFB0712VHB	AFB0712HHB	AFB0712HB	AFB0712MB	AFB0712LB

Representative Test P/N : AFB0712VHB-F00

Equipment: 1.Oven: E24-F0052

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)
2004/5/27 5:30 PM	2005/8/9 2:33 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
DG04FNL160	3577.50	2005/8/9 3:00 PM	Guie.Lin	gx.xu

Note: The test sample equivalent to STD, Part number: AFB0712VHB-F00.



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)
6,956	2004/5/27 5:30 PM	2005/8/9 2:33 PM	56	0	6956.0
Representative Test P/N : AFB0712VHB-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-F0052 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)	
	0.42Max.	0.42Max.		4784-5616	4784-5616		48.0Max	48.0Max	
1	0.41	0.40	-2.4	4947	5076	2.6	43.7	44.1	0.9
2	0.40	0.41	2.5	5183	5289	2.0	43.9	43.8	-0.2
3	0.40	0.41	2.5	5207	5176	-0.6	44.0	44.1	0.2
4	0.38	0.39	2.6	5354	5302	-1.0	44.6	44.7	0.2
5	0.37	0.38	2.7	5286	5277	-0.2	44.4	44.5	0.2
6	0.38	0.38	0.0	5267	5254	-0.2	44.8	44.9	0.2
7	0.36	0.36	0.0	5274	5300	0.5	44.6	44.7	0.2
8	0.39	0.40	2.6	5260	5261	0.0	44.8	45.0	0.4
9	0.40	0.41	2.5	5275	5225	-0.9	44.2	44.4	0.5
10	0.36	0.37	2.8	5204	5250	0.9	44.4	44.6	0.5
11	0.36	0.37	2.8	5266	5260	-0.1	44.9	45.1	0.4
12	0.38	0.40	5.3	5347	5237	-2.1	44.0	44.3	0.7
13	0.37	0.38	2.7	5286	5209	-1.5	44.5	44.6	0.2
14	0.36	0.37	2.8	5276	5188	-1.7	44.2	44.4	0.5
15	0.37	0.39	5.4	5283	5234	-0.9	44.4	44.7	0.7
16	0.38	0.40	5.3	5267	5176	-1.7	44.7	44.9	0.4
17	0.37	0.39	5.4	5234	5243	0.2	44.1	44.3	0.5
18	0.37	0.38	2.7	5315	5288	-0.5	44.3	44.5	0.5
19	0.38	0.40	5.3	5287	5263	-0.5	43.8	44.2	0.9
20	0.38	0.39	2.6	5257	5197	-1.1	44.2	44.6	0.9
21	0.36	0.37	2.8	5276	5239	-0.7	43.8	44.4	1.4
22	0.36	0.36	0.0	5283	5276	-0.1	44.5	44.6	0.2
23	0.37	0.37	0.0	5261	5260	0.0	44.8	44.9	0.2
24	0.36	0.36	0.0	5251	5183	-1.3	44.4	44.6	0.5
25	0.37	0.38	2.7	5307	5249	-1.1	43.7	44.0	0.7
26	0.37	0.37	0.0	5276	5174	-1.9	44.5	44.7	0.4
27	0.36	0.37	2.8	5283	5266	-0.3	43.5	44.1	1.4
28	0.38	0.38	0.0	5167	5217	1.0	44.0	44.2	0.5
29	0.37	0.37	0.0	5272	5234	-0.7	43.9	44.3	0.9
30	0.37	0.38	2.7	5266	5257	-0.2	43.5	43.9	0.9
31	0.36	0.37	2.8	5331	5169	-3.0	43.2	43.7	1.2
32	0.42	0.41	-2.4	5125	5236	2.2	43.5	44.0	1.1
33	0.41	0.40	-2.4	5176	5251	1.4	43.3	44.4	2.5
34	0.38	0.39	2.6	5225	5283	1.1	44.4	44.6	0.5
35	0.39	0.40	2.6	5176	5245	1.3	44.0	44.3	0.7

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL160	3577.50	2005/8/9 3:00 PM	Guie.Lin	gx.xu



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)
6,956	2004/5/27 5:30 PM	2005/8/9 2:33 PM	56	0	6956.0

Representative Test P/N : AFB0712VHB-F00	Current Test Status	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	In process	In process (exceed requested)	Termination	

Equipment: 1.Oven: E24-F0052	On/Off Cycles: Every 500 hours
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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. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	0.42Max.	0.42Max.		4784-5616	4784-5616		48.0Max	48.0Max	
36	0.36	0.37	2.8	5236	5277	0.8	43.5	44.1	1.4
37	0.39	0.38	-2.6	5267	5283	0.3	43.4	43.6	0.5
38	0.41	0.40	-2.4	5174	5265	1.8	43.6	44.1	1.1
39	0.37	0.39	5.4	5267	5243	-0.5	43.4	44.0	1.4
40	0.36	0.37	2.8	5175	5257	1.6	43.6	43.9	0.7
41	0.37	0.37	0.0	5276	5264	-0.2	42.8	43.0	0.5
42	0.36	0.37	2.8	5257	5238	-0.4	43.0	43.5	1.2
43	0.37	0.36	-2.7	5235	5271	0.7	44.2	44.5	0.7
44	0.39	0.40	2.6	5187	5205	0.3	43.9	44.0	0.2
45	0.40	0.40	0.0	5227	5261	0.7	44.5	44.7	0.4
46	0.39	0.39	0.0	5236	5234	0.0	43.7	44.1	0.9
47	0.37	0.38	2.7	5170	5250	1.5	44.0	44.5	1.1
48	0.38	0.40	5.3	5296	5219	-1.5	44.5	44.6	0.2
49	0.37	0.38	2.7	5274	5189	-1.6	44.3	44.5	0.5
50	0.38	0.39	2.6	5263	5237	-0.5	44.6	44.7	0.2
51	0.37	0.37	0.0	5254	5229	-0.5	43.7	43.9	0.5
52	0.37	0.38	2.7	5207	5255	0.9	44.1	44.3	0.5
53	0.38	0.39	2.6	5266	5263	-0.1	44.3	44.5	0.5
54	0.37	0.37	0.0	5234	5277	0.8	44.0	44.2	0.5
55	0.36	0.37	2.8	5250	5194	-1.1	44.3	44.5	0.5
56	0.37	0.38	2.7	5283	5283	0.0	44.5	44.7	0.4
X-Bar	0.377	0.383	-	5245.6	5241.2	-	0.492	0.403	-
σ	0.015	0.014	-	62.358	39.987	-	0.486	0.398	-

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DG04FNL160	3577.50	2005/8/9 3:00 PM	Guie.Lin	gx.xu