



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 AFB92x92x25.4 mm series as the right table	AFB0924SH	AFB0924VH	AFB0924HH	AFB0924H	AFB0924M
	AFB0924L	AFB0912SH	AFB0912VH	AFB0912HH	AFB0912H
	AFB0912M	AFB0912L			

Representative Test P/N : AFB0924SH-AF00	
Equipment: 1.Oven: E24-F0030	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 Ts (°C) (Actual Test Temperature)	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)
70	40	8.00	56	2.303	3,478	3,478.0	490,031	70,004

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/12/4 6:00 PM	2006/5/14 9:46 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	3478.0

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	1,386,017	198,002
30	16.00	980,062	140,009
40	8.00	490,031	70,004
50	4.00	245,015	35,002
60	2.00	122,508	17,501
70	1.00	61,254	8,751

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	<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
DG05FNL287	390.00	2006/5/14 10:00 PM	Nan.Yang	Gx.Xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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AFB0924SH	AFB0924VH	AFB0924HH	AFB0924H	AFB0924M
AFB0924L	AFB0912SH	AFB0912VH	AFB0912HH	AFB0912H
AFB0912M	AFB0912L			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2005/12/4 6:00 PM	2006/5/14 9:46 PM	56	0	3478.0

Representative Test P/N : AFB0924SH-AF00	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-F0030 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)	
	0.50Max.	0.50Max.		4320-5280	4320-5280		57.0Max	57.0Max	
1	0.37	0.37	0.0	4957	4963	0.1	54.7	54.7	0.0
2	0.36	0.36	0.0	4861	4864	0.1	54.4	54.9	0.9
3	0.37	0.37	0.0	4904	4942	0.8	55.0	54.6	-0.7
4	0.36	0.36	0.0	4880	4985	2.2	54.6	55.2	1.1
5	0.36	0.35	-2.8	4911	4936	0.5	54.8	54.5	-0.5
6	0.36	0.36	0.0	4931	4941	0.2	55.2	54.9	-0.5
7	0.36	0.36	0.0	5015	4977	-0.8	54.7	54.7	0.0
8	0.36	0.37	1.7	4933	4994	1.2	55.0	55.0	0.0
9	0.35	0.35	0.0	4849	4810	-0.8	55.2	54.8	-0.7
10	0.36	0.36	0.0	4817	4868	1.1	54.9	54.8	-0.2
11	0.33	0.33	0.0	4764	4812	1.0	54.4	54.6	0.4
12	0.34	0.34	0.0	4757	4867	2.3	54.7	54.9	0.4
13	0.34	0.35	2.9	4925	4935	0.2	54.9	54.7	-0.4
14	0.35	0.36	2.9	4909	4932	0.5	54.8	55.0	0.4
15	0.39	0.39	0.0	5058	5021	-0.7	54.9	54.6	-0.5
16	0.35	0.36	2.9	4875	4895	0.4	55.2	54.9	-0.5
17	0.38	0.38	0.0	4832	5020	3.9	54.7	54.7	0.0
18	0.36	0.36	0.0	4975	4926	-1.0	55.1	54.7	-0.7
19	0.38	0.38	0.0	5045	5009	-0.7	54.6	55.1	0.9
20	0.33	0.33	0.0	4815	4842	0.6	54.7	54.5	-0.4
21	0.37	0.37	0.0	4952	4921	-0.6	55.3	54.8	-0.9
22	0.38	0.37	-2.6	4890	5032	2.9	55.0	54.6	-0.7
23	0.36	0.36	0.0	4889	4935	0.9	54.8	54.9	0.2
24	0.38	0.37	-2.6	5047	5042	-0.1	54.6	55.1	0.9
25	0.36	0.36	0.0	4871	4935	1.3	54.7	54.7	0.0
26	0.36	0.36	0.0	4853	4937	1.7	54.9	55.1	0.4
27	0.35	0.37	5.7	4822	4921	2.1	54.4	54.5	0.2
28	0.36	0.36	0.0	4970	4927	-0.9	54.7	54.7	0.0
29	0.35	0.35	0.0	4859	4850	-0.2	55.2	55.3	0.2
30	0.36	0.36	0.0	4889	4900	0.2	54.7	54.7	0.0
31	0.33	0.35	6.1	4803	4821	0.4	54.9	54.7	-0.4
32	0.35	0.37	5.7	4853	4917	1.3	55.0	55.0	0.0
33	0.34	0.37	8.8	4878	4945	1.4	54.7	54.5	-0.4
34	0.36	0.36	0.0	4938	5000	1.3	54.9	54.9	0.0
35	0.35	0.35	0.0	4901	4867	-0.7	55.1	54.6	-0.9

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
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	Current Spec. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	0.50Max.	0.50Max.		4320-5280	4320-5280		57.0Max	57.0Max	
36	0.37	0.37	0.0	4929	4968	0.8	54.8	54.8	0.0
37	0.35	0.36	2.9	4991	4941	-1.0	55.0	54.5	-0.9
38	0.35	0.35	0.0	4949	4942	-0.1	54.7	54.7	0.0
39	0.34	0.34	0.0	4772	4801	0.6	54.6	54.5	-0.2
40	0.35	0.36	2.9	4876	4836	-0.8	54.9	54.9	0.0
41	0.36	0.36	0.0	4800	4978	3.7	54.4	54.7	0.6
42	0.36	0.36	0.0	4977	4973	-0.1	55.3	55.1	-0.4
43	0.36	0.36	0.0	4853	4967	2.3	54.8	54.6	-0.4
44	0.33	0.33	0.0	4747	4807	1.3	55.4	54.9	-0.9
45	0.35	0.34	-2.9	4821	4924	2.1	55.0	54.5	-0.9
46	0.35	0.36	2.9	4815	4948	2.8	54.7	54.8	0.2
47	0.37	0.37	0.0	4937	4987	1.0	55.2	54.6	-1.1
48	0.37	0.37	0.0	4948	4974	0.5	55.0	55.1	0.2
49	0.36	0.36	0.0	4738	4895	3.3	54.7	54.9	0.4
50	0.34	0.35	2.9	4855	4871	0.3	54.9	54.6	-0.5
51	0.34	0.34	0.0	4889	4865	-0.5	55.1	54.5	-1.1
52	0.33	0.33	0.0	4726	4933	4.4	54.8	54.8	0.0
53	0.37	0.37	0.0	4879	4983	2.1	55.0	54.6	-0.7
54	0.37	0.37	0.0	4890	5051	3.3	54.6	55.1	0.9
55	0.37	0.37	0.0	5025	5020	-0.1	54.9	54.7	-0.4
56	0.36	0.37	2.8	4864	4955	1.9	55.3	55.3	0.0
X-Bar	0.359	0.359	-	4928.1	4933.5	-	54.83	54.69	-
σ	0.013	0.014	-	88.548	60.706	-	0.208	0.217	-

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