



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 AFB90x90x38 mm series as the right table	AFB0912EHE-A			
	AFB0912GHE-A			

Representative Test P/N :AFB0912UHE-AF00

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
 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 () (Actual Test Temperature)	Unstress Temperature Tu ()	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 (hours)	Verified L ₁₀ 40 (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)
2004/8/21 2:00 PM	2005/6/13 10:46 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. **Basically , MTBF is equal to MTTF , they use same formula to work out a life data.)**

Temperature for MTTF Estimation ()	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
DG04FNL238	3635.00	2005/6/13 11:00 PM	Guie.Lin	gx.xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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AFB0912EHE-A	
AFB0912GHE-A	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2004/8/21 2:00 PM	2005/6/13 10:46 PM	56	0	3478.0

Representative Test P/N :AFB0912UHE-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-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)	
	3.00Max.	3.00Max.		5520-6480	5520-6480		67.0Max	67.0Max	
1	2.49	2.52	1.2	6000	6052	0.9	61.7	61.9	0.3
2	2.45	2.38	-2.9	6005	6047	0.7	62.3	62.1	-0.3
3	2.39	2.39	0.0	5891	5937	0.8	61.5	62.4	1.5
4	2.59	2.56	-1.2	6043	6124	1.3	62.2	62.7	0.8
5	2.42	2.44	0.8	6001	6074	1.2	63.0	61.9	-1.7
6	2.20	2.50	13.6	5720	6084	6.4	65.8	62.3	-5.3
7	2.35	2.45	4.3	6015	6072	0.9	61.7	62.0	0.5
8	2.50	2.41	-3.6	5023	5991	19.3	61.3	62.3	1.6
9	2.62	2.54	-3.1	5012	6139	22.5	61.7	62.5	1.3
10	2.42	2.37	-2.1	5912	6047	2.3	61.5	62.0	0.8
11	2.48	2.42	-2.4	5953	6116	2.7	62.3	62.4	0.2
12	2.43	2.39	-1.6	5960	6107	2.5	62.0	62.1	0.2
13	2.55	2.53	-0.8	5972	6106	2.2	62.2	62.2	0.0
14	2.55	2.47	-3.1	5983	6126	2.4	63.0	62.5	-0.8
15	2.52	2.47	-2.0	6039	6060	0.3	62.7	62.0	-1.1
16	2.39	2.36	-1.3	5972	5999	0.5	61.9	62.3	0.6
17	2.39	2.36	-1.3	5876	6054	3.0	61.3	62.6	2.1
18	2.58	2.53	-1.9	6033	6147	1.9	62.1	63.0	1.4
19	2.48	2.45	-1.2	5965	6019	0.9	61.7	62.4	1.1
20	2.41	2.40	-0.4	5863	6033	2.9	62.2	62.2	0.0
21	2.40	2.35	-2.1	5961	6002	0.7	62.5	62.0	-0.8
22	2.39	2.36	-1.3	5917	5931	0.2	63.0	62.5	-0.8
23	2.50	2.37	-5.2	5896	6037	2.4	62.7	62.1	-1.0
24	2.58	2.45	-5.0	6003	6118	1.9	61.8	62.3	0.8
25	2.40	2.35	-2.1	5977	6077	1.7	61.5	61.9	0.7
26	2.41	2.39	-0.8	5965	6021	0.9	61.3	62.6	2.1
27	2.52	2.44	-3.2	5915	6161	4.2	61.2	62.4	2.0
28	2.52	2.45	-2.8	5925	6024	1.7	61.4	62.2	1.3
29	2.42	2.41	-0.4	5860	6009	2.5	62.0	62.1	0.2
30	2.45	2.44	-0.4	5968	6003	0.6	60.8	61.9	1.8
31	2.44	2.37	-2.9	5851	6038	3.2	61.3	62.3	1.6
32	2.27	2.46	8.4	5715	6165	7.9	61.5	62.5	1.6
33	2.35	2.40	2.1	5770	6023	4.4	62.0	62.2	0.3
34	2.30	2.39	3.9	5758	6104	6.0	62.3	62.4	0.2
35	2.41	2.32	-3.7	5921	6049	2.2	62.7	62.7	0.0

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL238	3635.00	2005/6/13 11:00 PM	Guie.Lin	gx.xu



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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)	
	3.00Max.	3.00Max.		5520-6480	5520-6480		67.0Max	67.0Max	
36	2.41	2.42	0.4	5895	5973	1.3	61.8	62.1	0.5
37	2.58	2.59	0.4	6060	6147	1.4	61.3	62.3	1.6
38	2.42	2.38	-1.7	5886	5968	1.4	62.0	62.1	0.2
39	2.50	2.41	-3.6	5946	6029	1.4	63.5	62.4	-1.7
40	2.59	2.57	-0.8	6037	6129	1.5	62.3	62.6	0.5
41	2.43	2.39	-1.6	5868	6109	4.1	61.7	62.5	1.3
42	2.54	2.54	0.0	6030	6037	0.1	61.5	62.2	1.1
43	2.43	2.37	-2.5	5929	6005	1.3	62.1	62.7	1.0
44	2.43	2.39	-1.6	5998	5908	-1.5	60.9	62.4	2.5
45	2.50	2.51	0.4	5953	6128	2.9	62.3	62.3	0.0
46	2.48	2.41	-2.8	5957	6200	4.1	60.8	62.0	2.0
47	2.36	2.39	1.3	5879	6037	2.7	62.5	62.5	0.0
48	2.45	2.45	0.0	6000	6148	2.5	63.0	61.4	-2.5
49	2.31	2.61	13.0	5750	5951	3.5	62.6	62.2	-0.6
50	2.64	2.50	-5.3	6078	6261	3.0	61.8	62.5	1.1
51	2.54	2.57	1.2	6078	6256	2.9	62.2	62.3	0.2
52	2.64	2.47	-6.4	5947	6187	4.0	61.7	62.1	0.6
53	2.31	2.50	8.2	5726	6042	5.5	61.3	62.6	2.1
54	2.47	2.33	-5.7	5990	6060	1.2	62.0	62.0	0.0
55	2.52	2.36	-6.3	5976	6121	2.4	61.4	62.4	1.6
56	2.66	2.35	-11.7	5866	5910	0.8	61.8	62.3	0.8
X-Bar	2.460	2.436	-	5900.4	6066.9	-	62.01	62.28	-
	0.097	0.072	-	194.782	78.785	-	0.786	0.270	-

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