



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 AFB60x60x25.4mm series as the right table	AFB0612GH	AFB0612DH-AF00	AFB0612DH-CN23	AFB0612DH-TZUT	
	AFB0612SH-F00	AFB0612EH-SP96	AFB0612GH-AR00		
	AFB0612DH-A	AFB0612DH-CS53	AFB0612DHA01		
	AFB0612DH-8X12	AFB0612DH-AR29	AFB0612VHX03		

Representative Test P/N :AFB0612DH-ABF00

Equipment: 1.Oven: E24-F0031 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)
2004/11/20 8:30 PM	2005/5/3 7:46 AM	<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
DG04FNL331	445.50	2005/5/3 8:00 AM	Guie.Lin	Gx.Xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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AFB0612SH-F00	AFB0612EH-SP96	AFB0612GH-AR00	
AFB0612DH-A	AFB0612DH-CS53	AFB0612DHA01	
AFB0612DH-8X12	AFB0612DH-AR29	AFB0612VHX03	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2004/11/20 8:30 PM	2005/5/3 7:46 AM	56	0	3478.0

Representative Test P/N :AFB0612DH-ABF00	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-F0031 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)	
	0.92Max.	0.92Max.		8280-9720	8280-9720		59.0Max	59.0Max	
1	0.71	0.69	-2.8	8740	8843	1.2	56.2	54.6	-2.8
2	0.73	0.73	0.0	8938	9040	1.1	56.0	54.1	-3.4
3	0.72	0.72	0.0	8645	8951	3.5	56.1	54.4	-3.0
4	0.81	0.81	0.0	9078	9152	0.8	55.8	54.8	-1.8
5	0.73	0.73	0.0	8971	8981	0.1	55.9	54.6	-2.3
6	0.72	0.72	0.0	8677	9024	4.0	56.3	54.9	-2.5
7	0.78	0.77	-1.3	8853	9060	2.3	56.3	54.9	-2.5
8	0.76	0.75	-1.3	9001	9067	0.7	56.2	54.1	-3.7
9	0.76	0.75	-1.3	8809	9035	2.6	56.1	54.4	-3.0
10	0.78	0.77	-1.3	9015	9178	1.8	55.9	54.4	-2.7
11	0.77	0.76	-1.3	9031	9104	0.8	55.8	54.9	-1.6
12	0.73	0.72	-1.4	8789	9057	3.0	56.0	54.6	-2.5
13	0.75	0.74	-1.3	8906	9003	1.1	56.2	54.7	-2.7
14	0.72	0.71	-1.4	8799	8899	1.1	56.0	54.2	-3.2
15	0.71	0.70	-1.4	8680	8834	1.8	55.8	54.1	-3.0
16	0.73	0.72	-1.4	8881	8962	0.9	56.1	54.5	-2.9
17	0.77	0.77	0.0	8866	8992	1.4	55.9	54.7	-2.1
18	0.75	0.74	-1.3	8839	8945	1.2	56.3	54.5	-3.2
19	0.76	0.76	0.0	8842	9021	2.0	56.2	54.4	-3.2
20	0.79	0.79	0.0	8904	8966	0.7	55.9	54.8	-2.0
21	0.76	0.75	-1.3	8867	9064	2.2	55.9	54.9	-1.8
22	0.78	0.78	0.0	8979	9013	0.4	56.0	54.8	-2.1
23	0.76	0.75	-1.3	8773	8861	1.0	56.1	54.5	-2.9
24	0.73	0.72	-1.4	8847	8926	0.9	55.7	54.6	-2.0
25	0.75	0.73	-2.7	8867	8958	1.0	55.8	54.3	-2.7
26	0.77	0.76	-1.3	9025	9096	0.8	55.8	54.8	-1.8
27	0.77	0.75	-2.6	8951	9034	0.9	56.2	54.3	-3.4
28	0.70	0.69	-1.4	8720	8768	0.6	56.1	54.2	-3.4
29	0.82	0.81	-1.2	9142	9169	0.3	55.9	54.4	-2.7
30	0.73	0.72	-1.4	8960	8963	0.0	56.0	54.7	-2.3
31	0.75	0.73	-2.7	8841	9041	2.3	56.1	54.5	-2.9
32	0.76	0.74	-2.6	8894	9024	1.5	56.0	54.3	-3.0
33	0.73	0.71	-2.7	8817	8904	1.0	56.4	54.7	-3.0
34	0.78	0.77	-1.3	8941	9211	3.0	56.5	54.7	-3.2
35	0.79	0.78	-1.3	8979	9088	1.2	56.1	54.6	-2.7

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)	
	0.92Max.	0.92Max.		8280-9720	8280-9720		59.0Max	59.0Max	
36	0.73	0.73	0.0	8817	8903	1.0	56.0	54.6	-2.5
37	0.78	0.78	0.0	9058	9102	0.5	55.7	54.1	-2.9
38	0.75	0.75	0.0	8922	9158	2.6	55.6	54.4	-2.2
39	0.77	0.76	-1.3	8956	9155	2.2	55.9	54.2	-3.0
40	0.70	0.73	4.3	8635	9102	5.4	55.8	54.9	-1.6
41	0.77	0.76	-1.3	8901	9152	2.8	55.7	54.8	-1.6
42	0.75	0.75	0.0	8903	8967	0.7	56.1	54.6	-2.7
43	0.77	0.75	-2.6	8909	9075	1.9	56.2	54.1	-3.7
44	0.76	0.75	-1.3	8962	9021	0.7	55.9	54.5	-2.5
45	0.76	0.77	1.3	8957	9107	1.7	56.1	54.5	-2.9
46	0.74	0.75	1.4	8846	8809	-0.4	55.7	54.8	-1.6
47	0.78	0.78	0.0	8977	9047	0.8	55.7	54.4	-2.3
48	0.8	0.78	-2.5	8990	9190	2.2	56.0	54.1	-3.4
49	0.73	0.72	-1.4	8852	8886	0.4	56.1	54.6	-2.7
50	0.77	0.76	-1.3	8944	9090	1.6	55.8	54.2	-2.9
51	0.7	0.68	-2.9	8704	8775	0.8	55.7	54.5	-2.2
52	0.75	0.74	-1.3	9003	9027	0.3	56.3	54.0	-4.1
53	0.74	0.72	-2.7	8778	8866	1.0	56.7	54.6	-3.7
54	0.77	0.76	-1.3	8889	9108	2.5	55.9	54.6	-2.3
55	0.77	0.74	-3.9	8941	9010	0.8	56.1	54.1	-3.6
56	0.73	0.71	-2.7	8752	8850	1.1	55.9	54.7	-2.1
X-Bar	0.753	0.745	-	8885.1	9011.3	-	56.01	54.50	-
σ	0.027	0.028	-	110.932	109.007	-	0.221	0.256	-

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