



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 AFC92x92x38 mm series as the right table	AFC0912DE-7X60			
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Representative Test P/N :AFC0912DE-AF00	
Equipment: 1.Oven: E24-F0054	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)
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	2005/4/24 4:16 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
DG04FNL232	2428.50	2005/4/24 4:30 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)
3,478	2004/8/21 2:00 PM	2005/4/24 4:16 PM	56	0	3478.0

Representative Test P/N :AFC0912DE-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-F0054	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)	
	3.00Max.	3.00Max.		5520-6480	5520-6480		67.0Max	67.0Max	
1	2.55	2.52	-1.2	5970	6053	1.4	61.3	62.3	1.6
2	2.56	2.45	-4.3	5899	6077	3.0	61.7	62.0	0.5
3	2.60	2.52	-3.1	5935	6165	3.9	60.9	61.8	1.5
4	2.43	2.35	-3.3	5780	5971	3.3	61.2	62.0	1.3
5	2.48	2.43	-2.0	5792	5980	3.2	61.0	61.9	1.5
6	2.40	2.37	-1.2	5844	6041	3.4	61.8	62.2	0.6
7	2.53	2.46	-2.8	5984	6124	2.3	61.1	62.1	1.6
8	2.45	2.42	-1.2	5826	6041	3.7	60.8	62.3	2.5
9	2.52	2.46	-2.4	5908	6102	3.3	60.2	61.7	2.5
10	2.31	2.28	-1.3	5759	5847	1.5	61.7	62.4	1.1
11	2.60	2.57	-1.2	5947	6151	3.4	61.5	62.2	1.1
12	2.66	2.64	-0.8	5964	6113	2.5	61.2	62.0	1.3
13	2.43	2.38	-2.1	5825	5990	2.8	61.4	62.3	1.5
14	2.61	2.56	-1.9	5988	6108	2.0	61.7	62.1	0.6
15	2.36	2.32	-1.7	5791	5903	1.9	60.5	62.3	3.0
16	2.81	2.79	-0.7	5903	6014	1.9	60.7	62.3	2.6
17	2.49	2.43	-2.4	5877	6040	2.8	60.8	62.1	2.1
18	2.44	2.37	-2.9	5773	5946	3.0	61.5	62.0	0.8
19	2.49	2.46	-1.2	5897	6010	1.9	61.2	61.7	0.8
20	2.48	2.42	-2.4	5806	5997	3.3	60.5	61.8	2.1
21	2.51	2.49	-0.8	5912	6048	2.3	61.5	62.0	0.8
22	2.48	2.44	-1.6	5908	6088	3.0	61.4	61.8	0.7
23	2.58	2.53	-1.9	5799	5991	3.3	61.3	61.8	0.8
24	2.45	2.38	-2.9	5829	5975	2.5	61.7	62.1	0.6
25	2.51	2.44	-2.8	5866	6023	2.7	61	62.3	2.1
26	2.53	2.48	-2.0	5923	6086	2.8	61.5	62.1	1.0
27	2.42	2.36	-2.5	5849	5995	2.5	61.4	62.0	1.0
28	2.43	2.35	-3.3	5879	5922	0.7	61.7	61.8	0.2
29	2.57	2.51	-2.3	5946	6090	2.4	61.5	62.1	1.0
30	2.58	2.53	-1.9	5951	6076	2.1	61.2	61.9	1.1
31	2.51	2.49	-0.8	5883	6031	2.5	60.8	62.2	2.3
32	2.57	2.52	-1.9	5963	6034	1.2	61.7	62.1	0.6
33	2.50	2.44	-2.4	5796	6066	4.7	61.4	62.3	1.5
34	2.41	2.39	-0.8	5789	5917	2.2	61	62.0	1.6
35	2.58	2.52	-2.3	5920	6078	2.7	61.7	61.9	0.3

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL232	2428.50	2005/4/24 4:30 PM	Guie.Lin	Gx.Xu



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3,478	2004/8/21 2:00 PM	2005/4/24 4:16 PM	56	0	3478.0
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Representative Test P/N :AFC0912DE-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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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	2.56	2.52	-1.6	5905	6087	3.1	61.1	62.3	2.0
37	2.18	2.17	-0.5	5723	5800	1.3	60.6	62.2	2.6
38	2.59	2.54	-1.9	5911	6090	3.0	60.8	62.0	2.0
39	2.54	2.48	-2.4	5920	6053	2.2	60.9	62.3	2.3
40	2.54	2.45	-3.5	5925	6160	4.0	61.5	61.9	0.7
41	2.36	2.3	-2.5	5777	5903	2.2	61.2	61.8	1.0
42	2.54	2.5	-1.6	5912	6060	2.5	61.8	62.0	0.3
43	2.52	2.48	-1.6	5899	5994	1.6	61.5	62.4	1.5
44	2.53	2.48	-2.0	5889	6004	2.0	61.9	62.3	0.6
45	2.57	2.54	-1.2	5945	6060	1.9	60.5	62.3	3.0
46	2.43	2.38	-2.1	5825	5973	2.5	60.7	62.1	2.3
47	2.36	2.37	0.4	5863	6004	2.4	61.5	62.2	1.1
48	2.35	2.29	-2.6	5772	5900	2.2	61.2	62.1	1.5
49	2.57	2.56	-0.4	6063	6065	0.0	61	62.1	1.8
50	2.53	2.45	-3.2	5834	6008	3.0	61.3	62.0	1.1
51	2.59	2.53	-2.3	5927	6142	3.6	61.7	62.3	1.0
52	2.49	2.47	-0.8	5919	5984	1.1	60.8	62.2	2.3
53	2.53	2.5	-1.2	5953	6046	1.6	61.5	62.3	1.3
54	2.56	2.5	-2.3	5875	6009	2.3	61.5	62.0	0.8
55	2.51	2.48	-1.2	5888	5989	1.7	60.9	62.2	2.1
56	2.63	2.59	-1.5	5956	6092	2.3	61.4	62.3	1.5
X-Bar	2.506	2.458	-	5881.5	6027.1	-	61.23	62.09	-
σ	0.097	0.098	-	70.110	75.722	-	0.402	0.188	-

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