

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 AFB70x70x20 mm series as the right table	AFB0712VHD			
	AFB0712HHD			
	AFB0712HD			
	AFB0712MD			

Representative Test P/N :AFB0712VHD-F00				
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%), and

Stress/Elevated Temperature T _s (°C)	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)
2003/1/24 2:00 PM	2003/12/22 9:33 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	<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
DG03FNL010	1020.00	2003/12/22 10:00 PM	Huiling.Fu	Rengen.Liu

Note: The test sample equivalent to STD, Part number:AFB0712VHD-F00.



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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AFB0712VHD
AFB0712HHD
AFB0712HD
AFB0712MD

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2003/1/24 2:00 PM	2003/12/22 9:33 PM	56	0	6956.0
Representative Test P/N :AFB0712VHD-F00			Current Test Status		<input type="checkbox"/> In process <input checked="" type="checkbox"/> In process (exceed requested) <input type="checkbox"/> Termination
Equipment: 1.Oven: E24-F0030				On/Off Cycles: Every 500 hours	

Test Data Between Initial Test and Final Test

Sample	Initial Test	Final Test	Deviation	Initial Test	Final Test	Deviation	Initial Test	Final Test	Deviation
	Current Spec. 0.40Max.	Current Spec. 0.40Max.		Speed Spec. 4600-5400	Speed Spec. 4600-5400		Noise Check 48.3Max.	Noise Spec. 48.3 Max.	
1	0.33	0.33	0.0	5075	5129	1.1	OK	44.0	
2	0.34	0.34	0.0	4963	5051	1.8	OK	44.2	
3	0.34	0.34	0.0	5076	5062	-0.3	OK	43.9	
4	0.33	0.33	0.0	5069	5076	0.1	OK	43.7	
5	0.34	0.34	0.0	4952	4986	0.7	OK	44.3	
6	0.34	0.34	0.0	4975	4984	0.2	OK	44.2	
7	0.33	0.33	0.0	4988	4962	-0.5	OK	44.5	
8	0.34	0.34	0.0	4967	5057	1.8	OK	44.1	
9	0.34	0.34	0.0	5008	5016	0.2	OK	44.3	
10	0.34	0.34	0.0	5098	5094	-0.1	OK	44.2	
11	0.34	0.34	0.0	4976	5076	2.0	OK	44.5	
12	0.34	0.34	0.0	4971	5007	0.7	OK	44.0	
13	0.34	0.34	0.0	5098	5074	-0.5	OK	43.9	
14	0.34	0.34	0.0	5035	5062	0.5	OK	43.8	
15	0.33	0.33	0.0	4985	5006	0.4	OK	44.2	
16	0.34	0.34	0.0	5092	5094	0.0	OK	44.1	
17	0.34	0.34	0.0	5071	5163	1.8	OK	44.2	
18	0.34	0.34	0.0	5013	5098	1.7	OK	44.0	
19	0.33	0.33	0.0	5020	5026	0.1	OK	43.8	
20	0.33	0.33	0.0	5075	5077	0.0	OK	44.2	
21	0.33	0.33	0.0	5050	5058	0.2	OK	44.2	
22	0.33	0.33	0.0	5083	5093	0.2	OK	44.3	
23	0.33	0.33	0.0	5038	5062	0.5	OK	44.6	
24	0.33	0.33	0.0	5039	5094	1.1	OK	44.1	
25	0.34	0.34	0.0	4987	5001	0.3	OK	44.2	
26	0.34	0.34	0.0	5019	5042	0.5	OK	43.9	
27	0.34	0.34	0.0	5026	5036	0.2	OK	43.8	
28	0.33	0.33	0.0	5084	5096	0.2	OK	44.3	
29	0.34	0.34	0.0	4961	5007	0.9	OK	44.2	
30	0.33	0.33	0.0	5089	5097	0.2	OK	44.0	
31	0.34	0.34	0.0	4994	5002	0.2	OK	43.8	
32	0.34	0.34	0.0	5045	5049	0.1	OK	44.1	
33	0.34	0.33	-2.9	4991	5006	0.3	OK	44.2	
34	0.33	0.33	0.0	5045	5047	0.0	OK	44.0	
35	0.35	0.35	0.0	5035	5049	0.3	OK	44.3	

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL010	1020.00	2003/12/22 10:00 PM	Huiling.Fu	Rengen.Liu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 AFB70x70x20 mm series as the right table	AFB0712VHD				
	AFB0712HHD				
	AFB0712HD				
	AFB0712MD				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2003/1/24 2:00 PM	2003/12/22 9:33 PM	56	0	6956.0

Representative Test P/N :AFB0712VHD-F00	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process <small>(exceed requested)</small>	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-F0030	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) 0.40Max.	Current Spec. (A) 0.40Max.		Speed Spec. (RPM) 4600-5400	Speed Spec. (RPM) 4600-5400		Noise Check (dB A) 48.3Max.	Noise Spec. (dB A) 48.3 Max.	
36	0.34	0.34	0.0	5101	5172	1.4	OK	44.2	
37	0.33	0.33	0.0	5095	5167	1.4	OK	44.0	
38	0.33	0.33	0.0	5046	5074	0.6	OK	44.1	
39	0.34	0.34	0.0	4992	5067	1.5	OK	43.8	
40	0.33	0.33	0.0	5094	5174	1.6	OK	44.5	
41	0.34	0.34	0.0	5055	5057	0.0	OK	44.2	
42	0.34	0.34	0.0	5061	5034	-0.5	OK	43.8	
43	0.34	0.34	0.0	5049	5068	0.4	OK	43.7	
44	0.34	0.34	0.0	5037	5076	0.8	OK	44.0	
45	0.33	0.33	0.0	5049	5057	0.2	OK	43.9	
46	0.33	0.33	0.0	5000	5007	0.1	OK	44.3	
47	0.34	0.34	0.0	5049	5049	0.0	OK	44.4	
48	0.34	0.34	0.0	4975	4982	0.1	OK	44.0	
49	0.34	0.34	0.0	5020	5029	0.2	OK	44.2	
50	0.35	0.35	0.0	5047	5064	0.3	OK	43.9	
51	0.34	0.34	0.0	4942	5007	1.3	OK	44.1	
52	0.34	0.34	0.0	4961	4976	0.3	OK	44.0	
53	0.33	0.33	0.0	5073	5086	0.3	OK	44.2	
54	0.34	0.34	0.0	5059	5062	0.1	OK	43.8	
55	0.33	0.34	3.0	4932	5008	1.5	OK	43.9	
56	0.33	0.33	0.0	5051	5059	0.2	OK	43.8	
X-Bar	0.337	0.337	-	5029.4	5054.5	-		44.09	-
	0.005	0.005	-	46.797	48.265	-		0.217	-

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DG03FNL010	1020.00	2003/12/22 10:00 PM	Huiling.Fu	Rengen.Liu