

# 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 AFB50x50x20 mm series as the right table	AFB0512VHD-SE12	AFB0524VHD-TZW5		
	AFB0512VHD-SE25			
	AFB0512VHD			
	AFB0512VHD-TZW4			

**Representative Test P/N :AFB0512VHD-F00**

<b>Equipment: 1.Oven: E24-F0031</b>	On/Off Cycles: Every 500 hours
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⊙ **L<sub>10</sub> 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<sub>r;c</sub>) 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 <sub>s</sub> (°C) ( Actual Test Temperature )	Unstress Temperature T <sub>u</sub> (°C)	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r;c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 °C (hours)	Verified L <sub>10</sub> 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)
2005/5/14 4:00 PM	2005/10/29 4:46 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' L<sub>10</sub> 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 <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (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

<b>Test Result</b>	<input checked="" type="checkbox"/> <b>Accept</b> <input type="checkbox"/> <b>Reject</b>
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL098	555.00	2005/10/29 5:00 PM	Guie.Lin	Gx.Xu



# DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

Available for these models with lower speed and same physical structure.  
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AFB0512VHD-SE12	AFB0524VHD-TZW5		
AFB0512VHD-SE25			
AFB0512VHD			
AFB0512VHD-TZW4			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2005/5/14 4:00 PM	2005/10/29 4:46 PM	56	0	<b>3478.0</b>
Representative Test P/N :AFB0512VHD-F00			<b>Current Test Status</b> <input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination		
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)	
	<b>0.24Max.</b>	<b>0.24Max.</b>		<b>6300-7700</b>	<b>6300-7700</b>		<b>44.0Max</b>	<b>44.0Max</b>	
1	0.18	0.19	5.6	7463	7325	-1.8	39.2	40.7	3.8
2	0.18	0.19	5.6	7350	7272	-1.1	39.7	40.2	1.3
3	0.19	0.20	5.3	7485	7520	0.5	38.5	40.5	5.2
4	0.18	0.19	5.6	7459	7389	-0.9	39.3	40.9	4.1
5	0.18	0.19	5.6	7409	7473	0.9	39.5	40.4	2.3
6	0.18	0.19	5.6	7336	7396	0.8	38.9	40.6	4.4
7	0.19	0.20	5.3	7469	7438	-0.4	39.0	40.8	4.6
8	0.19	0.20	5.3	7474	7365	-1.5	39.4	40.5	2.8
9	0.18	0.20	11.1	7316	7280	-0.5	38.7	40.7	5.2
10	0.19	0.20	5.3	7435	7319	-1.6	39.6	40.3	1.8
11	0.19	0.20	5.3	7365	7505	1.9	39.2	41.0	4.6
12	0.19	0.19	0.0	7422	7418	-0.1	38.8	40.6	4.6
13	0.19	0.19	0.0	7383	7435	0.7	39.5	40.2	1.8
14	0.18	0.19	5.6	7295	7392	1.3	39.7	40.5	2.0
15	0.19	0.19	0.0	7497	7513	0.2	38.8	40.9	5.4
16	0.18	0.19	5.6	7386	7399	0.2	38.5	40.7	5.7
17	0.19	0.20	5.3	7435	7399	-0.5	39.2	40.4	3.1
18	0.19	0.20	5.3	7482	7482	0.0	39.7	40.3	1.5
19	0.20	0.20	0.0	7363	7499	1.8	39.9	40.6	1.8
20	0.18	0.20	11.1	7428	7343	-1.1	39.2	40.5	3.3
21	0.18	0.19	5.6	7461	7427	-0.5	39.4	40.8	3.6
22	0.19	0.20	5.3	7418	7401	-0.2	40.1	40.6	1.2
23	0.19	0.20	5.3	7481	7529	0.6	40.1	41.1	2.5
24	0.19	0.20	5.3	7368	7455	1.2	38.9	40.7	4.6
25	0.19	0.20	5.3	7369	7418	0.7	38.7	40.4	4.4
26	0.18	0.20	11.1	7507	7324	-2.4	39.1	40.9	4.6
27	0.20	0.21	5.0	7450	7520	0.9	39.5	40.6	2.8
28	0.19	0.20	5.3	7437	7470	0.4	38.9	40.3	3.6
29	0.19	0.20	5.3	7316	7340	0.3	40.5	40.6	0.2
30	0.19	0.20	5.3	7514	7465	-0.7	40.0	40.2	0.5
31	0.18	0.20	11.1	7326	7404	1.1	39.9	40.8	2.3
32	0.19	0.18	-5.3	7366	7237	-1.8	39.2	40.6	3.6
33	0.18	0.20	11.1	7434	7297	-1.8	39.4	40.5	2.8
34	0.19	0.20	5.3	7479	7344	-1.8	39.3	40.9	4.1
35	0.19	0.20	5.3	7462	7360	-1.4	39.2	40.3	2.8

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL098	555.00	2005/10/29 5:00 PM	Guie.Lin	Gx.Xu



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	AFB0512VHD-SE25			
	AFB0512VHD			
	AFB0512VHD-TZW4			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2005/5/14 4:00 PM	2005/10/29 4:46 PM	56	0	<b>3478.0</b>

Representative Test P/N :AFB0512VHD-F00	<b>Current Test Status</b>	<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
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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)	
	<b>0.24Max.</b>	<b>0.24Max.</b>		<b>6300-7700</b>	<b>6300-7700</b>		<b>44.0Max</b>	<b>44.0Max</b>	
36	0.18	0.20	11.1	7488	7351	-1.8	39.7	40.7	2.5
37	0.19	0.20	5.3	7472	7345	-1.7	38.9	41.0	5.4
38	0.18	0.20	11.1	7479	7326	-2.0	39.1	40.5	3.6
39	0.19	0.19	0.0	7481	7373	-1.4	39.6	40.8	3.0
40	0.19	0.20	5.3	7443	7463	0.3	39.8	40.3	1.3
41	0.18	0.20	11.1	7474	7391	-1.1	38.7	40.7	5.2
42	0.19	0.20	5.3	7485	7518	0.4	40.1	40.4	0.7
43	0.18	0.19	5.6	7418	7464	0.6	39.5	40.6	2.8
44	0.19	0.20	5.3	7365	7438	1.0	39.4	40.3	2.3
45	0.19	0.20	5.3	7499	7459	-0.5	40.3	40.5	0.5
46	0.18	0.18	0.0	7334	7277	-0.8	39.6	40.9	3.3
47	0.18	0.19	5.6	7414	7369	-0.6	39.7	40.2	1.3
48	0.18	0.19	5.6	7400	7334	-0.9	38.9	40.6	4.4
49	0.19	0.19	0.0	7362	7272	-1.2	40.3	40.4	0.2
50	0.18	0.19	5.6	7321	7333	0.2	39.1	40.7	4.1
51	0.19	0.20	5.3	7469	7287	-2.4	39.5	40.3	2.0
52	0.18	0.20	11.1	7390	7405	0.2	39.9	40.5	1.5
53	0.19	0.21	10.5	7547	7441	-1.4	38.7	40.8	5.4
54	0.19	0.20	5.3	7445	7452	0.1	39.4	40.7	3.3
55	0.18	0.19	5.6	7452	7451	0.0	39.6	40.4	2.0
56	0.19	0.20	5.3	7445	7480	0.5	40.2	40.6	1.0
X-Bar	0.186	0.196	-	7423.9	7401.1	-	39.40	40.58	-
$\sigma$	0.006	0.006	-	59.720	75.342	-	0.488	0.228	-

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<b>DG05FNL098</b>	<b>555.00</b>	<b>2005/10/29 5:00 PM</b>	<b>Guie.Lin</b>	<b>Gx.Xu</b>