



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 AFC 152x152x25.4 mm series as the right table	AFB1548VH-BK62	AFB1548EH-BJ51	AFB1548VH-CA18	AFB1524EHDW9
	AFC1548D-AC79	AFB1548EH-BK1N	AFB1548EH-AM33	AFB1524EHD4E
	AFC1548D-AC80	AFB1548VH-AL1F	AFB1548VH-CE1L	AFB1524EHAXV
	AFB1548EH-SP12	AFB1548VH-BK62	AFB1512HH-TA50	AFB1548VH-CD8G

Representative Test P/N : AFC1548D-CF00

Equipment: 1.Oven: E24-T0170

☉ **L₁₀ Expectancy: 80,000 hours minimum @ fan rated voltage and the temperature of 40°C**

According to the equation for **Weibull distribution**, **MTTF \doteq 7×L10 = 560,000 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)	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	3,975	6,975.0	982,739	140,391

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2008/3/21 10:00 AM	2009/1/4 10:06 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	6975.0

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.

Fan permission criteria for the measurement after test:

- Speed can not drop of \geq 15% below the original measured rpm.
- Current cannot increase > 15% of original measure current.
- Noise cannot >3dB over the original measure noise.

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	2,779,605	397,086
30	16.00	1,965,477	280,782
40	8.00	982,739	140,391
50	4.00	491,369	70,196
60	2.00	245,685	35,098
70	1.00	122,842	17,549

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
DG08FNL029	2961.50	2009/5/12	Nan Yang	Zenny Lei



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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AFC1548D-AC79	AFB1548EH-BK1N	AFB1524EHAXV	AFB1524EHD4E
AFC1548D-AC80	AFB1548VH-AL1F	AFB1548VH-CE1L	AFB1524EHAXV
AFB1548EH-SP12	AFB1548VH-BK62	AFB1512HH-TA50	AFB1548VH-CD8G

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,975	2008/3/21 10:00 AM	2009/1/4 10:06 AM	56	0	6975.0

Representative Test P/N : AFC1548D-CF00	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-T0170

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)	
	1.44 Max.	1.44 Max.		5400-6600	5400-6600		73.0 Max	73.0 Max	3 dBMax.
1	1.27	1.23	-3.5	5792	5923	2.3	70.1	70.6	0.5
2	1.43	1.33	-7.2	5852	5887	0.6	70.3	70.1	-0.2
3	1.26	1.24	-1.6	5880	5869	-0.2	70.6	70.7	0.1
4	1.28	1.23	-3.9	5808	5869	1.1	70.5	70.9	0.4
5	1.26	1.23	-2.4	5849	5892	0.7	70.9	70.4	-0.5
6	1.26	1.23	-2.1	5802	5902	1.7	70.4	70.2	-0.2
7	1.28	1.23	-3.4	5908	5876	-0.5	70.3	70.5	0.2
8	1.24	1.23	-0.7	5811	5907	1.7	70.8	70.8	0.0
9	1.28	1.23	-3.8	5865	5914	0.8	70.5	70.4	-0.1
10	1.24	1.24	0.6	5817	5761	-1.0	70.2	70.7	0.5
11	1.25	1.24	-0.6	5821	5959	2.4	70.9	70.3	-0.6
12	1.29	1.26	-2.2	5794	5836	0.7	70.3	70.8	0.5
13	1.28	1.25	-2.1	5902	5878	-0.4	70.4	69.9	-0.5
14	1.22	1.24	1.6	5713	5819	1.9	70.6	70.9	0.3
15	1.32	1.24	-6.1	5932	5857	-1.3	71.5	70.6	-0.9
16	1.22	1.23	0.7	5761	5843	1.4	70.8	70.3	-0.5
17	1.26	1.24	-1.7	5768	5896	2.2	70.3	70.8	0.5
18	1.23	1.25	1.5	5825	5888	1.1	70.8	70.4	-0.4
19	1.24	1.23	-1.0	5830	5869	0.7	70.9	70.9	0.0
20	1.21	1.23	2.2	5713	5887	3.0	70.1	70.7	0.6
21	1.24	1.24	-0.6	5835	5831	-0.1	70.3	70.5	0.2
22	1.26	1.24	-1.9	5878	5923	0.8	70.6	71.1	0.5
23	1.23	1.26	2.2	5821	5963	2.4	70.6	70.6	0.0
24	1.22	1.25	2.8	5705	5896	3.3	70.7	70.9	0.2
25	1.22	1.22	0.1	5751	5854	1.8	70.9	71.2	0.3
26	1.23	1.21	-1.4	5714	5813	1.7	70.3	70.8	0.5
27	1.23	1.23	0.2	5745	5939	3.4	70.8	70.7	-0.1
28	1.29	1.25	-2.7	5824	5846	0.4	70.5	70.5	0.0
29	1.26	1.24	-1.2	5849	5875	0.4	70.3	70.5	0.2
30	1.25	1.22	-2.3	5821	5866	0.8	70.9	70.9	0.0
31	1.29	1.23	-4.3	5917	5879	-0.6	70.1	70.3	0.2
32	1.26	1.24	-1.7	5862	5824	-0.6	71.8	70.8	-1.0
33	1.23	1.24	1.4	5840	5899	1.0	70.2	70.4	0.2
34	1.22	1.24	1.9	5794	5885	1.6	70.6	69.9	-0.7
35	1.24	1.24	0.0	5834	5913	1.4	70.5	70.3	-0.2

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG08FNL029	2961.50	2009/5/12	Nan Yang	Zenny Lei



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AFB1548EH-SP12	AFB1548VH-BK62	AFB1512HH-TA50	AFB1548VH-CD8G

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,975	2008/3/21 10:00 AM	2009/1/4 10:06 AM	56	0	6975.0
Representative Test P/N : AFC1548D-CF00			Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination
Equipment: 1.Oven: E24-T0170					

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. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	1.44 Max.	1.44 Max.		5400-6600	5400-6600		73.0 Max	73.0 Max	3 dBMax.
36	1.24	1.21	-2.4	5766	5821	1.0	70.6	70.7	0.1
37	1.26	1.24	-1.7	5815	5935	2.1	70.3	70.6	0.3
38	1.28	1.24	-3.2	5885	5769	-2.0	70.6	71.0	0.4
39	1.26	1.23	-2.3	5845	5802	-0.7	70.1	70.5	0.4
40	1.25	1.21	-2.7	5780	5916	2.4	70.5	70.9	0.4
41	1.27	1.21	-4.6	5866	5916	0.9	70.8	70.8	0.0
42	1.29	1.24	-4.4	5866	5836	-0.5	70.2	70.6	0.4
43	1.28	1.24	-3.0	5868	5907	0.7	70.9	71.7	0.8
44	1.28	1.23	-3.5	5782	5812	0.5	70.2	70.5	0.3
45	1.26	1.22	-2.9	5837	5878	0.7	70.6	70.8	0.2
46	1.24	1.22	-1.5	5799	5887	1.5	70.2	70.6	0.4
47	1.25	1.23	-1.4	5831	5769	-1.1	70.7	70.4	-0.3
48	1.23	1.21	-1.1	5716	5869	2.7	70.5	71.3	0.8
49	1.28	1.23	-3.5	5901	5879	-0.4	70.5	70.5	0.0
50	1.27	1.24	-2.0	5850	5873	0.4	70.9	70.8	-0.1
51	1.28	1.24	-3.4	5849	5841	-0.1	70.5	71.1	0.6
52	1.26	1.23	-2.6	5842	5850	0.1	70.8	70.9	0.1
53	1.22	1.25	2.7	5802	5824	0.4	70.2	70.7	0.5
54	1.24	1.22	-1.5	5773	5819	0.8	70.9	71.3	0.4
55	1.24	1.22	-1.6	5842	5917	1.3	70.0	70.6	0.6
56	1.28	1.26	-1.9	5832	5789	-0.7	70.9	71.0	0.1
X-Bar	1.256	1.235	-	5821.1	5868.7	-	70.56	70.67	-
σ	0.034	0.018	-	53.664	46.370	-	0.342	0.333	-

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DG08FNL029	2961.50	2009/5/12	Nan Yang	Zenny Lei