



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 BFB35x35x10 mm series as the right table	BFB03505MA-AR00	BFB03512HHA-A	
	BFB03505MA-AA34R	BFB03512HA-A	
	BFB03505MA-AA35R	BFB03512MA-A	
		BFB03512LA-A	

Representative Test P/N : BFB03505HHA-A

Equipment: 1.Oven: E24-F0031 On/Off Cycles: Every 500 hours

◎ **L₁₀ Expectancy: 30,000 hours minimum @ fan rated voltage and the temperature of 40 °C**
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 210,000 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	1,490	1,491.0	210,074	30,011

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2006/7/20 2:00 PM	2006/10/19 9:58 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	1491.0

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 MTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	594,178	84,883
30	16.00	420,147	60,021
40	8.00	210,074	30,011
50	4.00	105,037	15,005
60	2.00	52,518	7,503
70	1.00	26,259	3,751

- Fan permission criteria for the measurement after test :
1. Speed can not drop of ≥ 15% below the original measured rpm.
 2. Current cannot increase > 15% of original measure current.
 3. Noise cannot >3dB over the original measure noise.

Test Result	<input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG06FNL170	701.50	2006/10/25	Nan.Yang	Gx.Xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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BFB03505MA-AA34R	BFB03512HA-A
BFB03505MA-AA35R	BFB03512MA-A
	BFB03512LA-A

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,490	2006/7/20 2:00 PM	2006/10/19 9:58 PM	56	0	1491.0

Representative Test P/N : BFB03505HHA-A	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. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	230Max.	230Max.		7225-9350	7225-9380		36.0Max	36.0Max	3 dBMax.
1	85	83	-2.4	7396	8012	8.3	31.7	32.7	1.0
2	84	81	-3.6	7420	8385	13.0	31.4	32.4	1.0
3	86	77	-10.5	7337	8176	11.4	31.9	32.7	0.8
4	85	79	-7.1	7436	8366	12.5	31.5	33.1	1.6
5	85	78	-8.2	7467	8375	12.2	31.8	32.3	0.5
6	86	81	-5.8	7395	8225	11.2	31.7	32.5	0.8
7	90	87	-3.3	7414	8343	12.5	32.1	32.1	0.0
8	86	80	-7.0	7471	8490	13.6	31.4	32.6	1.2
9	90	85	-5.6	7709	8592	11.5	31.7	32.2	0.5
10	87	84	-3.4	7652	8595	12.3	31.4	32.7	1.3
11	85	82	-3.5	7368	8320	12.9	31.6	32.4	0.8
12	87	83	-4.6	7526	8312	10.4	31.8	33.0	1.2
13	85	85	0.0	7348	8317	13.2	31.5	31.9	0.4
14	91	89	-2.2	7502	8461	12.8	31.7	32.7	1.0
15	86	88	2.3	7324	8121	10.9	31.6	32.3	0.7
16	91	81	-11.0	7514	8468	12.7	31.9	32.6	0.7
17	86	81	-5.8	7313	8289	13.3	31.4	32.1	0.7
18	88	86	-2.3	7457	8435	13.1	31.8	32.3	0.5
19	86	81	-5.8	7507	8400	11.9	31.5	32.4	0.9
20	86	77	-10.5	7295	8364	14.7	31.9	31.8	-0.1
21	87	84	-3.4	7533	8313	10.4	31.4	32.6	1.2
22	88	82	-6.8	7447	8463	13.6	31.0	32.3	1.3
23	75	80	6.7	8403	8421	0.2	30.8	32.8	2.0
24	87	80	-8.0	7339	8372	14.1	31.4	31.9	0.5
25	88	81	-8.0	7565	8301	9.7	30.5	32.3	1.8
26	86	82	-4.7	7428	8334	12.2	30.1	32.7	2.6
27	85	79	-7.1	7402	8327	12.5	30.9	31.8	0.9
28	91	86	-5.5	7445	8324	11.8	30.5	32.3	1.8
29	87	81	-6.9	7389	8412	13.8	31.4	32.5	1.1
30	87	82	-5.7	7415	8464	14.1	30.5	33.9	3.4
31	88	82	-6.8	7519	8445	12.3	30.9	32.1	1.2
32	87	86	-1.1	7366	8224	11.6	31.3	32.4	1.1
33	88	86	-2.3	7475	8311	11.2	30.7	32.3	1.6
34	87	81	-6.9	7355	8296	12.8	31.0	32.6	1.6
35	86	83	-3.5	7410	8332	12.4	30.9	31.9	1.0

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG06FNL170	701.50	2006/10/25	Nan.Yang	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)
1,490	2006/7/20 2:00 PM	2006/10/19 9:58 PM	56	0	1491.0

Representative Test P/N : BFB03505HHA-A	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
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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.	Current Spec.		Speed Spec.	Speed Spec.		Noise Spec.	Noise Spec.	
	(mA) 230Max.	(mA) 230Max.		(RPM) 7225-9350	(RPM) 7225-9380		(dB A) 36.0Max	(dB A) 36.0Max	
36	92	83	-9.8	7465	8312	11.3	30.5	32.3	1.8
37	89	82	-7.9	7343	8291	12.9	30.8	32.5	1.7
38	92	86	-6.5	7529	8200	8.9	31.4	32.7	1.3
39	84	80	-4.8	7479	8347	11.6	31.0	32.7	1.7
40	85	82	-3.5	7365	8356	13.5	30.7	33.1	2.4
41	88	77	-12.5	7460	8359	12.1	30.4	31.9	1.5
42	87	87	0.0	7451	8210	10.2	30.8	32.7	1.9
43	89	86	-3.4	7563	8433	11.5	31.1	32.3	1.2
44	90	85	-5.6	7364	8324	13.0	30.7	32.5	1.8
45	84	86	2.4	7515	8283	10.2	30.4	32.9	2.5
46	86	76	-11.6	7399	8391	13.4	30.9	32.4	1.5
47	83	80	-3.6	7813	8435	8.0	31.5	32.7	1.3
48	87	83	-4.6	7434	8351	12.3	31.0	31.8	0.8
49	94	90	-4.3	7614	8511	11.8	30.8	32.2	1.4
50	90	82	-8.9	7535	8476	12.5	30.4	32.6	2.2
51	84	76	-9.5	7399	8442	14.1	31.1	32.1	1.0
52	87	80	-8.0	7363	8337	13.2	30.2	33.1	2.9
53	88	84	-4.5	7469	8409	12.6	30.8	32.7	1.9
54	85	82	-3.5	7612	8417	10.6	30.5	32.2	1.7
55	87	79	-9.2	7409	8372	13.0	31.2	32.8	1.6
56	85	82	-3.5	7384	8264	11.9	30.7	32.5	1.8
X-Bar	86.9	82.3	-	7469.8	8355.4	-	31.13	32.46	-
σ	2.828	3.221	-	161.415	104.360	-	0.505	0.387	-

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