

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 BFB30x30x10 mm series as the right table	BFB0305LA-A	BFB0305MA-A	BFB0305HA-A	BFB0305HHA-A	
	BFB0312LA-A	BFB0312MA-A	BFB0312HA-A	BFB0312HHA-A	
	BFB0305LA-C	BFB0305MA-C	BFB0305HA-C	BFB0305HHA-C	
	BFB0312LA-C	BFB0312MA-C	BFB0312HA-C	BFB0312HHA-C	
	BFB03505LA-C	BFB03505MA-C	BFB03505HA-C	BFB03505HHA-C	
	BFB03512LA-C	BFB03512MA-C	BFB03512HA-C	BFB03512HHA-C	

Representative Test P/N :BFB0305HHA-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)
2006/9/27 4:00 PM	2006/12/14 4:28 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 MTTF 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	v Accept Reject
--------------------	--------------------

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG06FNL207	382.00	2006/12/16	Nan.Yang	Gx.Xu



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 BFB30x30x10 mm series as the right table	BFB0305LA-A	BFB0305MA-A	BFB0305HA-A	BFB0305HHA-A	
	BFB0312LA-A	BFB0312MA-A	BFB0312HA-A	BFB0312HHA-A	
	BFB0305LA-C	BFB0305MA-C	BFB0305HA-C	BFB0305HHA-C	
	BFB0312LA-C	BFB0312MA-C	BFB0312HA-C	BFB0312HHA-C	
	BFB03505LA-C	BFB03505MA-C	BFB03505HA-C	BFB03505HHA-C	
	BFB03512LA-C	BFB03512MA-C	BFB03512HA-C	BFB03512HHA-C	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,490	2006/9/27 4:00 PM	2006/12/14 4:28 PM	56	0	1491.0

Representative Test P/N :BFB0305HHA-A	Current Test Status	<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. (mA) 230Max.	Current Spec. (mA) 230Max.		Speed Spec. (RPM) 7225-9350	Speed Spec. (RPM) 7225-9350		Noise Spec. (dB A) 36.0Max	Noise Spec. (dB A) 36.0Max	
1	85	76	-10.6	7440	8467	13.8	32.7	35.3	2.6
2	86	74	-14.0	7354	8415	14.4	33.5	35.1	1.6
3	88	76	-13.6	7488	8428	12.6	33.1	35.3	2.2
4	86	77	-10.5	7486	8450	12.9	33.8	34.8	1.0
5	88	77	-12.5	7457	8442	13.2	33.5	35.2	1.7
6	90	77	-14.4	7582	8476	11.8	33.7	35.4	1.7
7	91	79	-13.2	7488	8538	14.0	33.2	35.7	2.5
8	81	73	-9.9	7365	8223	11.6	33.5	35.6	2.1
9	86	75	-12.8	7695	8309	8.0	33.7	35.2	1.5
10	82	75	-8.5	7444	8430	13.2	33.8	35.4	1.6
11	76	67	-11.8	7483	8394	12.2	33.5	35.1	1.6
12	91	81	-11.0	7643	8465	10.8	33.8	35.3	1.5
13	86	77	-10.5	7592	8471	11.6	33.7	35.1	1.4
14	80	73	-8.8	7683	8275	7.7	33.5	35.4	1.9
15	83	78	-6.0	7435	8434	13.4	33.4	35.3	1.9
16	81	70	-13.6	7314	8166	11.6	33.7	35.5	1.8
17	88	77	-12.5	7447	8469	13.7	33.2	35.2	2.0
18	87	77	-11.5	7487	8346	11.5	32.7	34.9	2.2
19	85	75	-11.8	7551	8319	10.2	32.5	35.4	2.9
20	80	74	-7.5	7362	8281	12.5	33.0	35.0	2.0
21	78	70	-10.3	7388	8240	11.5	32.8	35.5	2.7
22	85	73	-14.1	7486	8401	12.2	32.5	35.2	2.7
23	83	73	-12.0	7391	8398	13.6	33.9	35.4	1.5
24	85	74	-12.9	7498	8421	12.3	32.7	35.0	2.3
25	86	76	-11.6	7621	8429	10.6	33.1	35.3	2.2
26	82	75	-8.5	7358	8391	14.0	33.5	35.6	2.1
27	90	80	-11.1	7477	8370	11.9	33.7	35.2	1.5
28	90	79	-12.2	7539	8440	12.0	33.0	35.5	2.5
29	91	79	-13.2	7498	8308	10.8	33.1	35.1	2.0
30	82	74	-9.8	7864	8370	6.4	32.8	35.6	2.8
31	85	78	-8.2	7534	8505	12.9	32.0	35.0	3.0
32	83	81	-2.4	7671	8658	12.9	33.7	35.2	1.5
33	81	70	-13.6	7646	8401	9.9	33.5	35.0	1.5
34	83	80	-3.6	7285	8155	11.9	32.5	35.3	2.8
35	82	73	-11.0	7449	8404	12.8	32.2	35.1	2.9

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG06FNL207	382.00	2006/12/16	Nan.Yang	Gx.Xu



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 BFB30x30x10 mm series as the right table

BFB0305LA-A	BFB0305MA-A	BFB0305HA-A	BFB0305HHA-A
BFB0312LA-A	BFB0312MA-A	BFB0312HA-A	BFB0312HHA-A
BFB0305LA-C	BFB0305MA-C	BFB0305HA-C	BFB0305HHA-C
BFB0312LA-C	BFB0312MA-C	BFB0312HA-C	BFB0312HHA-C
BFB03505LA-C	BFB03505MA-C	BFB03505HA-C	BFB03505HHA-C
BFB03512LA-C	BFB03512MA-C	BFB03512HA-C	BFB03512HHA-C

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,490	2006/9/27 4:00 PM	2006/12/14 4:28 PM	56	0	1491.0
Representative Test P/N :BFB0305HHA-A			Current Test Status	<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. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	230Max.	230Max.		7225-9350	7225-9350		36.0Max	36.0Max	3 dBMax.
36	86	76	-11.6	7426	8390	13.0	32.7	34.8	2.1
37	91	81	-11.0	7457	8310	11.4	32.5	35.0	2.5
38	81	71	-12.3	7567	8347	10.3	32.0	34.9	2.9
39	90	79	-12.2	7394	8414	13.8	32.0	34.8	2.8
40	82	73	-11.0	7714	8383	8.7	33.1	35.2	2.1
41	85	74	-12.9	7467	8446	13.1	33.1	35.3	2.2
42	88	80	-9.1	7474	8510	13.9	33.5	35.3	1.8
43	89	77	-13.5	7555	8427	11.5	33.0	35.1	2.1
44	82	73	-11.0	7602	8577	12.8	33.5	35.5	2.0
45	86	78	-9.3	7407	8463	14.3	33.0	35.0	2.0
46	80	77	-3.8	7551	8373	10.9	33.2	35.2	2.0
47	79	74	-6.3	7478	8439	12.9	33.5	34.7	1.2
48	86	75	-12.8	7548	8426	11.6	33.7	35.1	1.4
49	86	74	-14.0	7653	8523	11.4	33.2	35.4	2.2
50	82	77	-6.1	7508	8516	13.4	33.2	35.0	1.8
51	78	71	-9.0	7332	8121	10.8	33.8	35.3	1.5
52	85	77	-9.4	7445	8375	12.5	33.5	35.5	2.0
53	86	78	-9.3	7481	8388	12.1	33.7	35.2	1.5
54	86	74	-14.0	7429	8471	14.0	33.2	35.4	2.2
55	85	78	-8.2	7460	8414	12.8	32.1	34.5	2.4
56	75	70	-6.7	7390	8162	10.4	33.1	35.3	2.2
X-Bar	84.5	75.5	-	7497.1	8395.8	-	33.16	35.21	-
σ	3.889	3.168	-	111.637	103.883	-	0.521	0.245	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG06FNL207	382.00	2006/12/16	Nan.Yang	Gx.Xu