

# 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 <b>BFB60x60x15 mm</b> series as the right table	<b>BFB0612HB</b>			
	<b>BFB0612MB</b>			

<b>Representative Test P/N :BFB0612HB-NR00</b>	
<b>Equipment: 1.Oven: E24-F0028</b>	On/Off Cycles: Every 500 hours

**L<sub>10</sub> Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40**

According to the equation for **Weibull distribution**, **MTTF 7×L<sub>10</sub> = 350,000 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%), and

Stress/Elevated Temperature T <sub>s</sub> ( )	Unstress Temperature T <sub>u</sub> ( )	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 (hours)	Verified L <sub>10</sub> 40 (hours)
<b>90</b>	<b>40</b>	<b>32.00</b>	<b>56</b>	<b>2.303</b>	<b>621</b>	<b>1,000.0</b>	<b>563,578</b>	<b>80,511</b>

### Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
<b>2003/12/15 8:30 AM</b>	<b>2004/1/16 10:01 PM</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	<b>1000.0</b>

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. Basically, MTBF is equal to MTTF, they use same formula to work out a life data.)

Temperature for MTTF Estimation ( )	Acceleration Factor A <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	90.51	1,594,039	227,720
30	64.00	1,127,156	161,022
40	32.00	563,578	80,511
50	16.00	281,789	40,256
60	8.00	140,894	20,128
70	4.00	70,447	10,064
80	2.00	35,224	5,032
<b>90</b>	<b>1.00</b>	<b>17,612</b>	<b>2,516</b>

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
<b>DG03FNL209</b>	<b>160.50</b>	<b>2004/2/1 5:00 PM</b>	<b>Huiling.Fu</b>	<b>Even.Liu</b>

Note: The test sample equivalent to STD., Part number: BFB0612HB-NR00.



# DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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applies to BFB60x60x15 mm series as the right table

<b>BFB0612HB</b>				
<b>BFB0612MB</b>				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
621	2003/12/15 8:30 AM	2004/1/16 10:01 PM	56	0	1000.0

Representative Test P/N :BFB0612HB-NR00	Current Test Status	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		In process	In process (exceed requested)	Termination

Equipment: 1.Oven: E24-F0028 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 Check. (dB A)	Noise Spec. (dB A)	
	<b>0.18Max.</b>	<b>0.18Max.</b>		<b>4080-5520</b>	<b>4080-5520</b>		<b>41.0Max</b>	<b>41.0Max</b>	
1	0.16	0.16	0.0	5223	5380	3.0	OK	36.6	
2	0.16	0.16	0.0	5301	5342	0.8	OK	36.7	
3	0.16	0.16	0.0	5201	5370	3.2	OK	36.2	
4	0.16	0.16	0.0	5218	5241	0.4	OK	36.3	
5	0.16	0.15	-6.3	5094	5317	4.4	OK	36.2	
6	0.16	0.16	0.0	5225	5414	3.6	OK	36.1	
7	0.16	0.16	0.0	5227	5248	0.4	OK	35.8	
8	0.16	0.16	0.0	5206	5364	3.0	OK	35.9	
9	0.16	0.16	0.0	5167	5307	2.7	OK	36.0	
10	0.16	0.16	0.0	5200	5253	1.0	OK	36.1	
11	0.16	0.16	0.0	5190	5369	3.4	OK	36.2	
12	0.16	0.16	0.0	4713	5287	12.2	OK	36.3	
13	0.16	0.16	0.0	5238	5333	1.8	OK	36.0	
14	0.16	0.16	0.0	5277	5429	2.9	OK	35.9	
15	0.16	0.16	0.0	5269	5456	3.5	OK	35.8	
16	0.16	0.16	0.0	5107	5435	6.4	OK	36.1	
17	0.16	0.16	0.0	5062	5315	5.0	OK	36.2	
18	0.16	0.16	0.0	5297	5381	1.6	OK	36.3	
19	0.16	0.16	0.0	5154	5353	3.9	OK	36.2	
20	0.16	0.16	0.0	5203	5329	2.4	OK	35.8	
21	0.16	0.15	-6.3	5220	5342	2.3	OK	35.9	
22	0.16	0.16	0.0	5152	5238	1.7	OK	35.7	
23	0.16	0.16	0.0	5301	5398	1.8	OK	35.8	
24	0.16	0.16	0.0	5193	5317	2.4	OK	35.7	
25	0.16	0.16	0.0	5352	5391	0.7	OK	35.8	
26	0.16	0.16	0.0	5205	5257	1.0	OK	35.6	
27	0.16	0.16	0.0	5235	5327	1.8	OK	35.1	
28	0.16	0.16	0.0	5268	5348	1.5	OK	35.7	
29	0.16	0.16	0.0	5248	5391	2.7	OK	35.8	
30	0.16	0.16	0.0	5281	5357	1.4	OK	35.7	
31	0.16	0.16	0.0	5207	5383	3.4	OK	36.1	
32	0.16	0.16	0.0	5275	5298	0.4	OK	36.2	
33	0.16	0.16	0.0	5240	5383	2.7	OK	36.3	

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
<b>DG03FNL209</b>	<b>160.50</b>	<b>2004/2/1 5:00 PM</b>	<b>Huiling.Fu</b>	<b>Even.Liu</b>



# DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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<b>BFB0612HB</b>				
<b>BFB0612MB</b>				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
621	2003/12/15 8:30 AM	2004/1/16 10:01 PM	56	0	1000.0

Representative Test P/N :BFB0612HB-NR00	<b>Current Test Status</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		In process	In process (exceed requested)	Termination

Equipment: 1.Oven: E24-F0028 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) <b>0.18Max.</b>	Current Spec. (A) <b>0.18Max.</b>		Speed Spec. (RPM) <b>4080-5520</b>	Speed Spec. (RPM) <b>4080-5520</b>		Noise Check. (dB A) <b>41.0Max</b>	Noise Spec. (dB A) <b>41.0Max</b>	
34	0.16	0.16	0.0	5283	5335	1.0	OK	35.7	
35	0.16	0.16	0.0	5258	5355	1.8	OK	35.8	
36	0.16	0.16	0.0	5177	5346	3.3	OK	35.9	
37	0.16	0.16	0.0	5197	5311	2.2	OK	35.7	
38	0.16	0.16	0.0	5245	5409	3.1	OK	35.6	
39	0.16	0.16	0.0	5322	5318	-0.1	OK	35.1	
40	0.16	0.16	0.0	5158	5255	1.9	OK	35.2	
41	0.16	0.16	0.0	4868	5336	9.6	OK	35.3	
42	0.16	0.16	0.0	5115	5377	5.1	OK	35.1	
43	0.16	0.16	0.0	5277	5367	1.7	OK	35.8	
44	0.16	0.16	0.0	5327	5424	1.8	OK	35.7	
45	0.16	0.16	0.0	5297	5374	1.5	OK	35.6	
46	0.16	0.15	-6.3	5338	5377	0.7	OK	35.1	
47	0.16	0.15	-6.3	5203	5332	2.5	OK	35.7	
48	0.16	0.16	0.0	5180	5222	0.8	OK	35.1	
49	0.16	0.16	0.0	5255	5352	1.8	OK	35.6	
50	0.16	0.15	-6.3	5150	5302	3.0	OK	35.7	
51	0.16	0.16	0.0	5252	5430	3.4	OK	35.6	
52	0.16	0.16	0.0	5218	5374	3.0	OK	35.1	
53	0.16	0.16	0.0	5104	5264	3.1	OK	35.2	
54	0.16	0.16	0.0	5206	5412	4.0	OK	35.3	
55	0.16	0.16	0.0	5194	5318	2.4	OK	35.1	
56	0.16	0.16	0.0	5353	5400	0.9	OK	35.6	
X-Bar	0.160	0.159	-	5207.2	5346.6	-		35.78	-
	0.000	0.003	-	110.205	56.296	-		0.419	-

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