





# 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>BFB 51x51x15.0 mm</b> series as the right table	BFB0512HH	BFB0512M	BFB0512LX01	
	BFB0524HH	BFB0524M	BFB0512HH-T50F	
	BFB0512H	BFB0512L		
	BFB0524H	BFB0524L		

**Representative Test P/N : BFB0512HH**

**Equipment: 1.Oven: E24-T0167** On/Off Cycles: Every 500 hours

☉ **L<sub>10</sub> Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40°C**  
 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%).

Stress/Elevated Temperature T <sub>s</sub> (°C)	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)
80	40	16.00	20	2.303	3,170	13,014.0	1,436,881	205,269

### Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
1998/7/7 8:00 AM	1999/5/7 12:00 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	13014.0

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	45.25	4,064,114	580,588
30	32.00	2,873,762	410,537
40	16.00	1,436,881	205,269
50	8.00	718,441	102,634
60	4.00	359,220	51,317
70	2.00	179,610	25,659
80	1.00	89,805	12,829

Fan permission criteria for the measurement after test :

1. Speed can not drop of  $\geq 15\%$  below the original measured rpm.
2. Current cannot increase  $> 15\%$  of original measure current.
3. Noise cannot  $> 3\text{dB}$  over the original measure noise.

<b>Test Result</b>	<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
A108L	220.00	2000/6/20	Bonnie Cheng	Robert Sun