



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 BFB 42x45x19mm series as the right table	BFB0412HHE	BFB0412HE	BFB0412ME	BFB0412LE	
	BFB0405HE	BFB0405ME	BFB0405LE		

Representative Test P/N : BFB0412HHE

Instruments used: 1.Oven: F00-5, E24-T057 2. DC Source: GW GPC-3060D 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 \doteq 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%), and

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 (hours)	Verified L ₁₀ (hours)
80	40	16.00	20	2.303	1,902	5,000	552,052	78,865

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
1999/1/14 4:00 PM	1999/5/7 6:59 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	5000.0

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

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

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	45.25	1,561,439	223,063
30	32.00	1,104,104	157,729
40	16.00	552,052	78,865
50	8.00	276,026	39,432
60	4.00	138,013	19,716
70	2.00	69,007	9,858
80	1.00	34,503	4,929

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
A132L	801.00	1999/9/13 9:00 AM	<i>Bonnie Cheng</i>	<i>Robert Sun</i>

