



DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed by ARxx or AFxx series suffixes. This test report applies to BFB60x60x25.4 mm series as the right table	BFB0612HH			
	BFB0612H			
	BFB0612M			
	BFB0612L			

Representative Test P/N :BFB0612H-F00	
Equipment:1.Oven: E24-F0030	On/Off Cycles: Every 500 hours

◎ **L₁₀ Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40°C**
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 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_{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	2,484	2,485.0	350,123	50,018

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2004/9/14 9:00 PM	2005/1/10 2:07 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	2485.0

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	990,296	141,471
30	16.00	700,245	100,035
40	8.00	350,123	50,018
50	4.00	175,061	25,009
60	2.00	87,531	12,504
70	1.00	43,765	6,252

- 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

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
DG04FNL265	341.00	2005/1/10 3:00 PM	Guie.Lin	Even.Liu



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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)
2,484	2004/9/14 9:00 PM	2005/1/10 2:07 PM	56	0	2485.0

Representative Test P/N :BFB0612H-F00	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-F0030	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. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	0.29Max.	0.29Max.		3700-15%	3700-15%		39.0Max	39.0Max	
1	0.21	0.21	0.0	3969	3989	0.5	36.7	37.3	1.6
2	0.21	0.21	0.0	3826	3944	3.1	38.7	34.8	-10.1
3	0.21	0.21	0.0	3866	3923	1.5	36.4	37.0	1.6
4	0.21	0.21	0.0	3951	4011	1.5	36.8	36.3	-1.4
5	0.21	0.21	0.0	3934	4011	2.0	36.6	36.9	0.8
6	0.21	0.21	0.0	3912	3980	1.7	36.7	35.7	-2.7
7	0.21	0.21	0.0	3899	3949	1.3	36.5	37.2	1.9
8	0.21	0.20	-4.8	3923	3985	1.6	37.2	36.6	-1.6
9	0.21	0.21	0.0	3960	3990	0.8	36.9	37.5	1.6
10	0.21	0.21	0.0	3940	3910	-0.8	36.7	34.9	-4.9
11	0.21	0.21	0.0	3990	3972	-0.5	37.5	36.3	-3.2
12	0.21	0.21	0.0	3921	3916	-0.1	36.9	37.2	0.8
13	0.21	0.21	0.0	3963	3901	-1.6	36.7	36.5	-0.5
14	0.21	0.20	-4.8	3970	4025	1.4	36.5	37.7	3.3
15	0.21	0.21	0.0	3914	3999	2.2	37.2	36.8	-1.1
16	0.21	0.21	0.0	3889	3835	-1.4	38.0	38.5	1.3
17	0.21	0.21	0.0	3902	3863	-1.0	36.4	38.2	4.9
18	0.21	0.21	0.0	3900	3937	0.9	37.1	35.6	-4.0
19	0.21	0.21	0.0	3938	3970	0.8	36.0	37.3	3.6
20	0.21	0.21	0.0	3907	3823	-2.1	37.5	37.1	-1.1
21	0.21	0.21	0.0	3878	3976	2.5	36.2	36.8	1.7
22	0.21	0.21	0.0	3989	3942	-1.2	35.9	38.5	7.2
23	0.21	0.21	0.0	3963	3970	0.2	36.9	37.6	1.9
24	0.21	0.21	0.0	3939	3983	1.1	35.8	37.2	3.9
25	0.21	0.20	-4.8	3912	3981	1.8	36.1	35.9	-0.6
26	0.21	0.21	0.0	3884	4036	3.9	36.7	38.0	3.5
27	0.21	0.21	0.0	3919	3895	-0.6	37.1	37.9	2.2
28	0.21	0.21	0.0	3854	3796	-1.5	37.5	35.4	-5.6
29	0.23	0.24	4.3	3960	4077	3.0	36.4	35.5	-2.5
30	0.21	0.21	0.0	3805	3924	3.1	36.9	36.2	-1.9
31	0.21	0.21	0.0	3864	3929	1.7	36.0	36.5	1.4
32	0.21	0.21	0.0	3867	3892	0.6	37.6	37.7	0.3
33	0.21	0.21	0.0	3884	4093	5.4	37.2	37.2	0.0
34	0.21	0.21	0.0	3908	3869	-1.0	36.8	38.1	3.5
35	0.21	0.21	0.0	3967	3927	-1.0	36.2	38.3	5.8

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL265	341.00	2005/1/10 3:00 PM	Guie.Lin	Even.Liu



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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 Spec. (dB A)	Noise Spec. (dB A)	
	0.29Max.	0.29Max.		3700-15%	3700-15%		39.0Max	39.0Max	
36	0.21	0.21	0.0	3886	3896	0.3	36.2	36.2	0.0
37	0.21	0.21	0.0	3883	3946	1.6	36.9	36.7	-0.5
38	0.21	0.21	0.0	3910	3832	-2.0	37.4	37.3	-0.3
39	0.21	0.21	0.0	3889	3848	-1.1	38.6	38.2	-1.0
40	0.21	0.21	0.0	3901	3847	-1.4	36.4	37.5	3.0
41	0.21	0.21	0.0	3920	3810	-2.8	36.9	34.9	-5.4
42	0.21	0.21	0.0	3873	3811	-1.6	37.4	38.1	1.9
43	0.21	0.21	0.0	3970	3909	-1.5	37.9	38.9	2.6
44	0.21	0.21	0.0	3892	3889	-0.1	36.5	38.3	4.9
45	0.21	0.21	0.0	3938	3895	-1.1	37.4	37.8	1.1
46	0.21	0.22	4.8	3888	3870	-0.5	37.8	37.2	-1.6
47	0.21	0.20	-4.8	3911	3973	1.6	36.3	36.5	0.6
48	0.21	0.20	-4.8	3944	4006	1.6	36.8	36.8	0.0
49	0.21	0.21	0.0	3889	3883	-0.2	37.1	37.3	0.5
50	0.21	0.21	0.0	3951	3965	0.4	36.2	37.7	4.1
51	0.21	0.21	0.0	3889	3932	1.1	37.4	36.8	-1.6
52	0.21	0.21	0.0	3956	3993	0.9	36.1	37.0	2.5
53	0.21	0.21	0.0	3924	3958	0.9	36.5	37.2	1.9
54	0.21	0.21	0.0	3914	3956	1.1	36.8	37.3	1.4
55	0.21	0.21	0.0	3908	3854	-1.4	37.1	35.4	-4.6
56	0.21	0.21	0.0	3872	3885	0.3	36.8	36.8	0.0
X-Bar	0.211	0.210	-	3854.2	4438.9	-	35.56	36.93	-
σ	0.006	0.004	-	55.332	3906.887	-	1.200	0.759	-

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