



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 BFB120x120x32mm series as the right table	BFB1212EH-A	BFB1224EH-A		
	BFB1212SH-A	BFB1224SH-A		
	BFB1212VH-A	BFB1224VH-A		
	BFB1212GH-A	BFB1224GH-A		

Representative Test P/N :BFB1212GH-AF00

Equipment: On/Off Cycles: Every 500 hours

L₁₀ Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40
 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 () (Actual Test Temperature)	Unstress Temperature Tu ()	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 (hours)	Verified L ₁₀ 40 (hours)
60	40	4.00	56	2.303	4,968	6,956.0	490,031	70,004

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2004/8/17 12:00 PM	2005/10/17 1:45 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	6956.0

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.**)

Temperature for MTTF Estimation ()	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	11.31	1,386,017	198,002
30	8.00	980,062	140,009
40	4.00	490,031	70,004
50	2.00	245,015	35,002
60	1.00	122,508	17,501

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

Accept

Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL198	5257.50	2006/1/8 9:30 AM	Guie.Lin	gx.xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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	BFB1212VH-A	BFB1224VH-A			
	BFB1212GH-A	BFB1224GH-A			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2004/8/17 12:00 PM	2005/10/17 1:45 PM	56	0	6956.0

Representative Test P/N :BFB1212GH-AF00	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: _____ 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 Spec. (dB A)	Noise Spec. (dB A)	
	3.96Max.	3.96Max.		4048-4752	4048-4752		69.0+3Max	69.0+3Max	
	3.16	3.27	3.5	4361	4397	0.8	71.8	71.8	0.0
	3.14	3.18	1.3	4455	4429	-0.6	68.9	74.2	7.7
	3.26	3.35	2.8	4401	4474	1.7	68.6	69.5	1.3
	3.24	3.21	-0.9	4472	4469	-0.1	67.4	73.2	8.6
	3.00	2.97	-1.0	4373	4275	-2.2	69.5	72.6	4.5
	3.07	3.14	2.3	4377	4397	0.5	70.9	74.0	4.4
	3.42	3.55	3.8	4500	4473	-0.6	67.7	71.2	5.2
	3.20	3.27	2.2	4420	4412	-0.2	72.9	69.8	-4.3
	3.20	3.22	0.6	4440	4491	1.1	69.8	73.5	5.3
	3.06	3.19	4.2	4517	4372	-3.2	71.0	71.8	1.1
	3.62	3.54	-2.2	4470	4478	0.2	69.8	69.2	-0.9
	3.51	3.60	2.6	4492	4421	-1.6	67.4	73.2	8.6
	3.55	3.55	0.0	4407	4395	-0.3	66.3	71.8	8.3
	3.11	3.07	-1.3	4357	4472	2.6	69.6	73.9	6.2
	3.27	3.15	-3.7	4468	4392	-1.7	68.1	73.1	7.3
	3.04	3.02	-0.7	4342	4386	1.0	70.4	75.0	6.5
	3.31	3.14	-5.1	4358	4363	0.1	69.3	75.7	9.2
	3.55	3.47	-2.3	4342	4421	1.8	70.4	69.8	-0.9
	3.21	3.21	0.0	4426	4396	-0.7	71.2	76.8	7.9
	2.92	2.95	1.0	4333	4437	2.4	69.1	69.3	0.3
	3.42	3.46	1.2	4468	4392	-1.7	68.9	70.1	1.7
	3.22	3.17	-1.6	4385	4405	0.5	71.7	70.8	-1.3
	3.23	3.06	-5.3	4312	4476	3.8	68.1	72.5	6.5
	3.27	3.14	-4.0	4448	4427	-0.5	69.8	73.4	5.2
	3.03	3.02	-0.3	4420	4500	1.8	71.3	71.8	0.7
	3.27	3.28	0.3	4455	4417	-0.9	69.5	72.6	4.5
	3.08	3.11	1.0	4380	4529	3.4	70.5	74.0	5.0
	3.12	3.46	10.9	4542	4545	0.1	68.7	70.2	2.2
	3.20	3.17	-0.9	4509	4396	-2.5	70.1	71.4	1.9
	3.30	3.29	-0.3	4362	4373	0.3	68.9	71.8	4.2
	3.20	3.07	-4.1	4347	4285	-1.4	69.4	73.4	5.8
	3.12	3.11	-0.3	4258	4467	4.9	70.5	70.1	-0.6
	3.18	3.24	1.9	4469	4392	-1.7	69.5	72.3	4.0
	3.26	3.25	-0.3	4354	4457	2.4	69.1	69.4	0.4
	3.13	3.11	-0.6	4520	4510	-0.2	68.9	74.3	7.8

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL198	5257.50	2006/1/8 9:30 AM	Guie.Lin	gx.xu



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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)	
	3.96Max.	3.96Max.		4048-4752	4048-4752		69.0+3Max	69.0+3Max	
	3.38	3.47	2.7	4476	4510	0.8	70.3	72.1	2.6
	3.20	3.21	0.3	4438	4497	1.3	69.6	75.3	8.2
	3.24	3.27	0.9	4520	4565	1.0	72.9	69.4	-4.8
	3.29	3.27	-0.6	4398	4396	0.0	68.9	71.7	4.1
	3.17	3.24	2.2	4465	4412	-1.2	66.2	72.0	8.8
	2.98	3.07	3.0	4382	4349	-0.8	70.6	70.1	-0.7
	3.23	3.29	1.9	4398	4397	0.0	69.1	72.7	5.2
	3.21	3.19	-0.6	4406	4414	0.2	70.1	74.1	5.7
	3.00	3.06	2.0	4334	4396	1.4	70.7	70.8	0.1
	3.05	3.07	0.7	4414	4475	1.4	68.6	73.8	7.6
	2.90	3.09	6.6	4580	4395	-4.0	71.4	71.2	-0.3
	3.09	3.07	-0.6	4411	4517	2.4	70.7	74.8	5.8
	3.81	3.74	-1.8	4368	4546	4.1	70.3	70.1	-0.3
	3.00	3.28	9.3	4302	4541	5.6	71.3	73.4	2.9
	2.99	2.94	-1.7	4403	4496	2.1	69.5	71.8	3.3
	3.13	3.09	-1.3	4402	4472	1.6	68.6	74.6	8.7
	3.16	3.12	-1.3	4533	4511	-0.5	70.9	70.2	-1.0
	3.03	3.00	-1.0	4356	4394	0.9	68.7	71.3	3.8
	3.08	3.06	-0.6	4385	4399	0.3	71.1	74.1	4.2
	3.15	3.14	-0.3	4421	4428	0.2	69.9	69.8	-0.1
	3.27	3.25	-0.6	4448	4478	0.7	69.1	72.3	4.6
X-Bar	3.201	3.213	-	4416.8	4438.0	-	69.71	72.20	-
σ	0.175	0.174	-	67.306	62.492	-	1.389	1.870	-

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DG04FNL198	5257.50	2006/1/8 9:30 AM	Guie.Lin	gx.xu