

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 BFB120x120x32 mm series as the right table	BFB1248VH-A			
	BFB1248HH-A			
	BFB1248SH-A			
	BFB1248GH-A			

Representative Test P/N :BFB1248GH-AF00

Equipment:	On/Off Cycles: Every 500 hours
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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	3,360.0	236,703	33,815

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2004/8/25 3:30 PM	2005/12/4 11:45 AM	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	3360.0

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	669,496	95,642
30	8.00	473,405	67,629
40	4.00	236,703	33,815
50	2.00	118,351	16,907
60	1.00	59,176	8,454

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

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL224	6212.00	2005/9/28 11:30 AM	Guie.Lin	gx.xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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- BFB1248VH-A
- BFB1248HH-A
- BFB1248SH-A
- BFB1248GH-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	2004/8/25 3:30 PM	2005/12/4 11:45 AM	56	0	3360.0
Representative Test P/N :BFB1248GH-AF00			Current Test Status <input checked="" type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input type="checkbox"/> Termination		
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)	
	0.96Max.	0.96Max.		4048-4752	4048-4752		69.0+3Max	69.0+3Max	
	0.69	0.69	0.0	4294	4373	1.8	70.4	68.4	-2.8
	0.71	0.71	0.0	4290	4308	0.4	67.5	68.7	1.8
	0.69	0.70	1.4	4272	4317	1.1	64.9	68.1	4.9
	0.69	0.69	0.0	4302	4336	0.8	67.3	68.3	1.5
	0.73	0.74	1.4	4371	4525	3.5	69.3	67.9	-2.0
	0.70	0.71	1.4	4319	4357	0.9	67.5	65.8	-2.5
	0.68	0.67	-1.5	4230	4324	2.2	70.2	68.0	-3.1
	0.70	0.70	0.0	4292	4358	1.5	69.0	68.4	-0.9
	0.71	0.70	-1.4	4365	4476	2.5	70.1	68.3	-2.6
	0.71	0.72	1.4	4324	4406	1.9	69.3	67.7	-2.3
	0.76	0.76	0.0	4385	4444	1.3	67.7	68.5	1.2
	0.67	0.68	1.5	4233	4386	3.6	67.9	68.0	0.1
	0.70	0.69	-1.4	4306	4334	0.7	65.3	68.3	4.6
	0.70	0.70	0.0	4445	4384	-1.4	65.9	67.9	3.0
	0.73	0.72	-1.4	4376	4486	2.5	66.3	67.4	1.7
	0.74	0.73	-1.4	4405	4416	0.2	67.2	68.9	2.5
	0.74	0.73	-1.4	4440	4428	-0.3	67.5	68.7	1.8
	0.69	0.68	-1.4	4350	4378	0.6	70.1	68.1	-2.9
	0.78	0.78	0.0	4481	4427	-1.2	67.2	68.3	1.6
	0.68	0.68	0.0	4279	4345	1.5	66.9	67.5	0.9
	0.75	0.76	1.3	4418	4491	1.7	68.2	68.4	0.3
	0.72	0.72	0.0	4433	4421	-0.3	68.5	66.4	-3.1
	0.72	0.72	0.0	4303	4408	2.4	67.7	68.2	0.7
	0.72	0.75	4.2	4644	4388	-5.5	65.8	68.0	3.3
	0.76	0.74	-2.6	4466	4455	-0.2	67.9	67.4	-0.7
	0.76	0.76	0.0	4372	4450	1.8	67.2	65.9	-1.9
	0.71	0.71	0.0	4301	4331	0.7	68.1	67.8	-0.4
	0.72	0.71	-1.4	4317	4369	1.2	69.3	67.4	-2.7
	0.71	0.71	0.0	4338	4402	1.5	70.1	68.0	-3.0
	0.76	0.75	-1.3	4425	4460	0.8	69.3	68.0	-1.9
	0.72	0.72	0.0	4335	4415	1.8	65.8	68.2	3.6
	0.73	0.74	1.4	4353	4414	1.4	67.5	68.5	1.5
	0.70	0.70	0.0	4316	4346	0.7	67.7	67.8	0.2
	0.73	0.72	-1.4	4427	4441	0.3	65.7	68.7	4.6
	0.72	0.76	5.6	4380	4437	1.3	65.9	68.0	3.2

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
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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)	
	0.96Max.	0.96Max.		4048-4752	4048-4752		69.0+3Max	69.0+3Max	
	0.72	0.72	0.0	4379	4425	1.1	66.3	68.2	2.9
	0.76	0.77	1.3	4414	4387	-0.6	67.2	68.3	1.6
	0.72	0.71	-1.4	4308	4352	1.0	67.5	68.5	1.5
	0.76	0.77	1.3	4396	4426	0.7	68.5	68.7	0.3
	0.71	0.70	-1.4	4300	4415	2.7	69.2	68.5	-1.0
	0.75	0.74	-1.3	4479	4382	-2.2	69.0	68.2	-1.2
	0.69	0.69	0.0	4374	4403	0.7	69.3	67.4	-2.7
	0.70	0.70	0.0	4253	4350	2.3	65.8	68.0	3.3
	0.76	0.77	1.3	4396	4474	1.8	65.9	68.1	3.3
	0.75	0.76	1.3	4423	4487	1.4	68.2	68.5	0.4
	0.75	0.76	1.3	4414	4456	1.0	67.3	68.2	1.3
	0.70	0.70	0.0	4392	4344	-1.1	64.7	67.5	4.3
	0.73	0.78	6.8	4380	4340	-0.9	67.5	68.0	0.7
	0.68	0.68	0.0	4272	4349	1.8	68.1	67.8	-0.4
	0.74	0.74	0.0	4369	4420	1.2	68.3	68.3	0.0
	0.71	0.71	0.0	4346	4339	-0.2	67.2	68.2	1.5
	0.76	0.72	-5.3	4324	4347	0.5	67.7	67.9	0.3
	0.73	0.75	2.7	4434	4459	0.6	68.3	68.3	0.0
	0.72	0.73	1.4	4374	4459	1.9	69.2	68.1	-1.6
	0.72	0.71	-1.4	4354	4417	1.4	70.1	68.5	-2.3
	0.69	0.70	1.4	4396	4375	-0.5	69.7	68.0	-2.4
X-Bar	0.721	0.723	-	4363.5	4399.9	-	67.81	68.02	-
σ	0.026	0.029	-	72.674	51.863	-	1.459	0.597	-

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