



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 **BFB50x50x10 mm** series as the right table

BFB0505HHA	BFB0505HA	BFB0505MA	BFB0505LA	
BFB0512HHA	BFB0512HA	BFB0512MA	BFB0512LA	

Representative Test P/N :BFB0505HHA-A

Equipment:1.Oven: E24-F0030

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 ≅ 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%).

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	1,490	1,490.0	209,933	29,990

Test Progress:

Date for Test Beginning	Date for Test Termination (at	Current Test Status			Current Total Test Time (hours)
2006/6/16 2:00 PM	2006/8/29 2:28 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	1490.0

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 (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	593,779	84,826
30	16.00	419,865	59,981
40	8.00	209,933	29,990
50	4.00	104,966	14,995
60	2.00	52,483	7,498
70	1.00	26,242	3,749

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
DG06FNL125	286.00	2006/8/29 2:00 PM	Nan.Yang	gx.xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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BFB0512HHA	BFB0512HA	BFB0512MA	BFB0512LA	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,490	2006/6/16 2:00 PM	2006/8/29 2:28 PM	56	0	1490.0

Representative Test P/N :BFB0505HHA-A	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

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. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	240Max.	240Max.		5525-7150	5525-7150		43.5Max	43.5Max	
1	138	130	-5.8	5810	5894	1.4	35.1	34.4	-2.0
2	142	131	-7.7	5922	5960	0.6	34.7	35.1	1.2
3	122	134	9.8	5967	5812	-2.6	35.3	35.9	1.7
4	137	132	-3.6	6052	5820	-3.8	35.1	34.9	-0.6
5	116	124	6.9	5912	6011	1.7	35.4	34.6	-2.3
6	119	124	4.2	5987	5922	-1.1	34.9	34.9	0.0
7	126	130	3.2	5712	5899	3.3	35.2	35.2	0.0
8	133	138	3.8	5746	6019	4.8	34.8	35.6	2.3
9	132	129	-2.3	6102	6022	-1.3	35.1	34.2	-2.6
10	137	132	-3.6	6009	6020	0.2	34.9	34.9	0.0
11	144	143	-0.7	5951	5822	-2.2	35.3	35.2	-0.3
12	122	128	4.9	5914	5875	-0.7	35.1	34.9	-0.6
13	118	128	8.5	5998	6007	0.2	34.7	34.8	0.3
14	123	131	6.5	5972	6132	2.7	35.0	34.4	-1.7
15	137	134	-2.2	6013	5888	-2.1	35.2	35.1	-0.3
16	121	128	5.8	5874	6047	2.9	34.8	34.6	-0.6
17	130	124	-4.6	5915	6019	1.8	35.1	34.8	-0.9
18	124	135	8.9	5835	5734	-1.7	35.3	35.2	-0.3
19	147	141	-4.1	5701	5909	3.6	34.7	34.9	0.6
20	129	141	9.3	5807	5688	-2.0	35.1	34.4	-2.0
21	124	133	7.3	6007	6039	0.5	35.0	34.5	-1.4
22	135	130	-3.7	6059	6112	0.9	34.9	34.6	-0.9
23	122	135	10.7	6049	5896	-2.5	35.2	34.3	-2.6
24	130	122	-6.2	6060	5909	-2.5	35.1	34.5	-1.7
25	121	129	6.6	6014	6135	2.0	35.1	34.8	-0.9
26	120	130	8.3	5988	5976	-0.2	34.8	34.6	-0.6
27	130	125	-3.8	6063	5919	-2.4	35.3	35.1	-0.6
28	119	127	6.7	6001	6060	1.0	35.0	34.6	-1.1
29	124	134	8.1	5951	5986	0.6	34.9	35.2	0.9
30	147	145	-1.4	5851	5759	-1.6	35.1	34.5	-1.7
31	117	125	6.8	5999	6051	0.9	35.3	34.4	-2.5
32	141	137	-2.8	5814	5752	-1.1	34.7	34.6	-0.3
33	122	126	3.3	5933	5684	-4.2	35.0	34.8	-0.6
34	120	127	5.8	5999	6015	0.3	35.0	34.6	-1.1
35	126	131	4.0	6020	6142	2.0	35.2	34.7	-1.4

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. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	240Max.	240Max.		5525-7150	5525-7150		40.5Max	40.5Max	
36	134	132	-1.5	6161	5984	-2.9	34.9	35.1	0.6
37	125	128	2.4	5861	5801	-1.0	35.1	35.0	-0.3
38	135	127	-5.9	6036	6078	0.7	35.4	34.6	-2.3
39	119	133	11.8	5874	5923	0.8	35.2	34.8	-1.1
40	123	128	4.1	5988	6106	2.0	35.2	35.0	-0.6
41	120	128	6.7	5844	6035	3.3	34.8	34.6	-0.6
42	130	145	11.5	6121	6013	-1.8	35.2	34.7	-1.4
43	137	145	5.8	5872	5759	-1.9	35.0	34.4	-1.7
44	145	139	-4.1	5974	5836	-2.3	34.9	34.6	-0.9
45	141	128	-9.2	5877	5952	1.3	34.8	34.8	0.0
46	131	128	-2.3	6057	5861	-3.2	35.3	34.6	-2.0
47	132	128	-3.0	6204	6032	-2.8	35.1	35.0	-0.3
48	117	128	9.4	6111	5926	-3.0	35.4	35.1	-0.8
49	119	128	7.6	5897	6024	2.2	34.7	34.8	0.3
50	119	133	11.8	6076	5914	-2.7	35.1	35.1	0.0
51	132	136	3.0	6141	5959	-3.0	34.9	34.6	-0.9
52	124	132	6.5	5921	5722	-3.4	35.2	34.8	-1.1
53	139	128	-7.9	6047	5720	-5.4	34.7	34.9	0.6
54	130	138	6.2	5889	5901	0.2	35.3	35.1	-0.5
55	137	126	-8.0	6046	6060	0.2	35.1	34.6	-1.4
56	141	130	-7.8	5952	6045	1.6	34.9	34.8	-0.3
X-Bar	129.018	131.446	-	5963.5	5939.0	-	35.05	34.80	-
σ	8.771	5.621	-	109.150	121.318	-	0.203	0.317	-

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