

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 EFB60x60x10 mm series as the right table	EFB0612HHA			
	EFB0612HA			
	EFB0612MA			
	EFB0612LA			

Representative Test P/N : EFB0612HHA-F00

Equipment: 1.Oven: E24-F0056 On/Off Cycles: Every 500 hours

© **L₁₀ Expectancy: 70,000 hours minimum @ fan rated voltage and the temperature of 40°C**
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 490,000 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 T _s (°C)	Unstress Temperature T _u (°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	3,478	3,478.0	490,031	70,004

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
		<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	
2003/10/23 11:30 PM	2004/4/8 4:46 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	3478.0

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	1,386,017	198,002
30	16.00	980,062	140,009
40	8.00	490,031	70,004
50	4.00	245,015	35,002
60	2.00	122,508	17,501
70	1.00	61,254	8,751

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
DG03FNL164	547.50	2004/4/8 5:00 PM	Huiling.Fu	Even.Liu

Note: The test sample equivalent to STD, Part number: EFB0612HHA-F00



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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EFB0612LA			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2003/10/23 11:30 PM	2004/4/8 4:46 PM	56	0	3478.0

Representative Test P/N :EFB0612HHA-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-F0056 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)	
	0.25Max.	0.25Max.		4416-5184	4416-5184		40.5Max	40.5Max	
1	0.15	0.15	0.0	4849	4964	2.4	36.9	36.6	-0.8
2	0.16	0.15	-6.3	4810	4872	1.3	37.0	36.8	-0.5
3	0.16	0.16	0.0	4780	4796	0.3	37.0	36.9	-0.3
4	0.15	0.15	0.0	4935	4937	0.0	36.8	36.5	-0.8
5	0.16	0.16	0.0	4999	4976	-0.5	37.0	36.8	-0.5
6	0.16	0.16	0.0	4836	4848	0.2	37.1	36.9	-0.5
7	0.16	0.16	0.0	4835	4874	0.8	36.7	36.7	0.0
8	0.16	0.16	0.0	4939	4967	0.6	36.9	36.5	-1.1
9	0.16	0.16	0.0	4931	4937	0.1	37.0	36.5	-1.4
10	0.15	0.15	0.0	4858	4859	0.0	37.0	36.9	-0.3
11	0.16	0.15	-6.3	4835	4872	0.8	36.9	37.1	0.5
12	0.16	0.16	0.0	4817	4837	0.4	37.2	36.9	-0.8
13	0.16	0.16	0.0	4927	4932	0.1	37.0	36.8	-0.5
14	0.16	0.16	0.0	4820	4827	0.1	36.6	36.8	0.5
15	0.16	0.16	0.0	4940	4940	0.0	36.9	36.5	-1.1
16	0.16	0.16	0.0	4850	4851	0.0	36.8	37.1	0.8
17	0.16	0.16	0.0	4855	4859	0.1	36.9	37.0	0.3
18	0.16	0.16	0.0	4820	4827	0.1	36.7	37.1	1.1
19	0.16	0.16	0.0	4989	4964	-0.5	36.8	36.9	0.3
20	0.16	0.16	0.0	4847	4907	1.2	37.0	36.8	-0.5
21	0.16	0.16	0.0	4892	4876	-0.3	36.9	36.9	0.0
22	0.16	0.16	0.0	4887	4889	0.0	36.9	37.1	0.5
23	0.16	0.16	0.0	4995	4965	-0.6	37.0	37.0	0.0
24	0.16	0.16	0.0	4927	4937	0.2	36.8	36.9	0.3
25	0.16	0.16	0.0	4926	4984	1.2	37.0	36.8	-0.5
26	0.16	0.16	0.0	4967	4976	0.2	37.1	36.9	-0.5
27	0.16	0.16	0.0	4954	4957	0.1	36.9	37.1	0.5
28	0.16	0.16	0.0	4984	4972	-0.2	36.6	37.0	1.1
29	0.16	0.16	0.0	4936	4921	-0.3	36.8	37.3	1.4
30	0.16	0.16	0.0	4921	4950	0.6	36.7	37.1	1.1
31	0.16	0.16	0.0	4894	4972	1.6	36.5	36.9	1.1
32	0.16	0.16	0.0	4963	4956	-0.1	36.9	36.8	-0.3
33	0.16	0.16	0.0	4903	4912	0.2	36.9	37.0	0.3
34	0.16	0.16	0.0	4916	4973	1.2	36.9	36.9	0.0
35	0.16	0.16	0.0	4874	4864	-0.2	36.8	37.2	1.1

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL164	547.50	2004/4/8 5:00 PM	Huiling.Fu	Even.Liu



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3,478	2003/10/23 11:30 PM	2004/4/8 4:46 PM	56	0	3478.0

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Equipment: 1.Oven: E24-F0056	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.	Current Spec.		Speed Spec.	Speed Spec.		Noise Spec.	Noise Spec.	
	(A)	(A)		(RPM)	(RPM)		(dB A)	(dB A)	
	0.25Max.	0.25Max.		4416-5184	4416-5184		40.5Max	40.5Max	
36	0.16	0.16	0.0	4982	4976	-0.1	36.8	37.1	0.8
37	0.16	0.16	0.0	4895	4886	-0.2	36.9	36.9	0.0
38	0.16	0.16	0.0	4831	4827	-0.1	36.9	37.0	0.3
39	0.16	0.16	0.0	4835	4837	0.0	36.9	37.2	0.8
40	0.16	0.16	0.0	4829	4832	0.1	36.9	37.1	0.5
41	0.16	0.16	0.0	4882	4897	0.3	37.0	37.2	0.5
42	0.16	0.16	0.0	4890	4892	0.0	37.0	36.9	-0.3
43	0.16	0.16	0.0	4919	4823	-2.0	37.1	36.8	-0.8
44	0.16	0.16	0.0	4867	4876	0.2	36.9	36.7	-0.5
45	0.15	0.16	6.7	4809	4879	1.5	36.9	36.5	-1.1
46	0.16	0.16	0.0	4861	4852	-0.2	36.7	36.8	0.3
47	0.16	0.16	0.0	4781	4796	0.3	36.5	36.9	1.1
48	0.16	0.16	0.0	4906	4937	0.6	36.9	37.0	0.3
49	0.16	0.16	0.0	4976	4972	-0.1	37.0	37.1	0.3
50	0.16	0.16	0.0	4869	4874	0.1	37.1	36.9	-0.5
51	0.16	0.16	0.0	4807	4862	1.1	36.8	37.2	1.1
52	0.16	0.16	0.0	4916	4933	0.3	36.7	36.9	0.5
53	0.16	0.16	0.0	4907	4909	0.0	36.9	36.9	0.0
54	0.16	0.16	0.0	4907	4947	0.8	36.8	36.8	0.0
55	0.16	0.16	0.0	4909	4962	1.1	36.8	37.0	0.5
56	0.16	0.16	0.0	4944	4957	0.3	36.9	36.9	0.0
X-Bar	0.159	0.159	-	4890.3	4903.6	-	36.88	36.91	-
σ	0.003	0.003	-	57.208	54.140	-	0.144	0.192	-

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