



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 FFB92x92x38mm series as the right table	FFB0948EHE	FFB0948SHE	FFB0948VHE	FFB0948HHE	FFB0948HE
	FFB0948ME	FFB0948LE			

Representative Test P/N :FFB0948EHE-F00	
Equipment: 1.Oven: E24-F0053	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%).

Stress/Elevated Temperature Ts (°C)	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	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)
2004/4/16 5:30 PM	2004/10/4 6:46 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.)

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
DG04FNL091	627.50	2004/10/4 7:00 PM	Huiling.Fu	Even.Liu

Note: The test sample equivalent to STD, Part number: FFB0948EHE-F00.



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 FFB92x92x38mm series as the right table	FFB0948EHE	FFB0948SHE	FFB0948VHE	FFB0948HHE	FFB0948HE
	FFB0948ME	FFB0948LE			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2004/4/16 5:30 PM	2004/10/4 6:46 PM	56	0	3478.0

Representative Test P/N :FFB0948EHE-F00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
---	----------------------------	-------------------------------------	--	---

Equipment: 1.Oven: E24-F0053	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) 0.24Max.	Current Spec. (A) 0.24Max.		Speed Spec. (RPM) 4416-5184	Speed Spec. (RPM) 4116-5184		Noise Spec. (dB A) 59.0Max	Noise Spec. (dB A) 59.0Max	
1	0.19	0.19	0.0	4860	4829	-0.6	54.1	54.1	0.0
2	0.20	0.20	0.0	4857	4886	0.6	54.4	54.3	-0.2
3	0.20	0.20	0.0	4827	4792	-0.7	54.8	53.9	-1.6
4	0.20	0.20	0.0	4872	4890	0.4	54.6	54.5	-0.2
5	0.20	0.20	0.0	4830	4834	0.1	54.7	54.3	-0.7
6	0.21	0.20	-4.8	4850	4857	0.1	55.0	54.7	-0.5
7	0.19	0.20	5.3	4814	4785	-0.6	54.6	54.3	-0.5
8	0.19	0.19	0.0	4818	4740	-1.6	54.2	53.9	-0.6
9	0.19	0.19	0.0	4800	4757	-0.9	54.1	54.1	0.0
10	0.20	0.19	-5.0	4747	4708	-0.8	53.6	53.8	0.4
11	0.20	0.20	0.0	4826	4776	-1.0	54.5	54.3	-0.4
12	0.20	0.20	0.0	4804	4784	-0.4	54.3	53.9	-0.7
13	0.19	0.19	0.0	4783	4797	0.3	54.0	54.0	0.0
14	0.20	0.20	0.0	4818	4796	-0.5	54.4	54.2	-0.4
15	0.19	0.19	0.0	4824	4821	-0.1	54.0	54.0	0.0
16	0.20	0.20	0.0	4760	4767	0.1	53.9	54.3	0.7
17	0.18	0.19	5.6	4750	4757	0.1	54.2	53.7	-0.9
18	0.19	0.20	5.3	4793	4806	0.3	53.8	54.2	0.7
19	0.19	0.19	0.0	4800	4776	-0.5	54.2	54.0	-0.4
20	0.19	0.19	0.0	4820	4776	-0.9	54.0	53.6	-0.7
21	0.20	0.19	-5.0	4794	4781	-0.3	54.3	53.8	-0.9
22	0.20	0.20	0.0	4835	4782	-1.1	54.1	54.0	-0.2
23	0.21	0.20	-4.8	4866	4798	-1.4	54.3	53.9	-0.7
24	0.19	0.20	5.3	4805	4764	-0.9	53.9	54.2	0.6
25	0.20	0.20	0.0	4826	4806	-0.4	54.4	53.7	-1.3
26	0.20	0.19	-5.0	4853	4855	0.0	54.6	54.3	-0.5
27	0.20	0.20	0.0	4862	4867	0.1	54.2	53.9	-0.6
28	0.19	0.19	0.0	4752	4799	1.0	54.3	54.2	-0.2
29	0.19	0.19	0.0	4777	4776	0.0	54.1	54.1	0.0
30	0.20	0.20	0.0	4766	4767	0.0	54.0	53.9	-0.2
31	0.20	0.20	0.0	4794	4786	-0.2	54.3	54.0	-0.6
32	0.20	0.20	0.0	4813	4817	0.1	53.8	53.7	-0.2
33	0.20	0.19	-5.0	4809	4809	0.0	54.2	54.2	0.0
34	0.19	0.20	5.3	4805	4805	0.0	54.0	54.5	0.9
35	0.19	0.19	0.0	4816	4892	1.6	54.1	54.4	0.6

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL091	627.50	2004/10/4 7:00 PM	Huiling.Fu	Even.Liu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 FFB90x90x38mm series as the right table	FFB0948EHE	FFB0948SHE	FFB0948VHE	FFB0948HHE	FFB0948HE
	FFB0948ME	FFB0948LE			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2004/4/16 5:30 PM	2004/10/4 6:46 PM	56	0	3478.0

Representative Test P/N :FFB0948EHE-F00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
---	----------------------------	-------------------------------------	--	---

Equipment: 1.Oven: E24-F0053 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)	
	0.24Max.	0.24Max.		4416-5184	4116-5184		59.0Max	59.0Max	
36	0.19	0.19	0.0	4770	4739	-0.6	54.3	53.9	-0.7
37	0.19	0.20	5.3	4792	4797	0.1	54.0	54.3	0.6
38	0.19	0.19	0.0	4839	4834	-0.1	53.8	54.2	0.7
39	0.19	0.19	0.0	4826	4829	0.1	54.3	54.0	-0.6
40	0.19	0.20	5.3	4829	4785	-0.9	54.5	54.6	0.2
41	0.20	0.20	0.0	4806	4798	-0.2	54.3	53.9	-0.7
42	0.20	0.20	0.0	4831	4846	0.3	54.2	54.2	0.0
43	0.20	0.20	0.0	4828	4792	-0.7	54.3	54.0	-0.6
44	0.20	0.19	-5.0	4810	4881	1.5	54.0	54.3	0.6
45	0.20	0.20	0.0	4808	4897	1.9	54.2	54.4	0.4
46	0.20	0.20	0.0	4807	4826	0.4	54.4	53.9	-0.9
47	0.19	0.19	0.0	4842	4848	0.1	54.5	53.7	-1.5
48	0.20	0.20	0.0	4834	4807	-0.6	54.2	54.1	-0.2
49	0.18	0.20	11.1	4843	4765	-1.6	54.6	54.5	-0.2
50	0.19	0.19	0.0	4847	4846	0.0	54.0	54.3	0.6
51	0.20	0.20	0.0	4806	4792	-0.3	53.8	54.2	0.7
52	0.19	0.19	0.0	4813	4731	-1.7	54.0	53.9	-0.2
53	0.19	0.19	0.0	4807	4899	1.9	54.5	54.3	-0.4
54	0.20	0.20	0.0	4824	4827	0.1	54.2	54.0	-0.4
55	0.19	0.19	0.0	4776	4794	0.4	54.2	53.8	-0.7
56	0.20	0.19	-5.0	4820	4767	-1.1	54.2	54.0	-0.4
X-Bar	0.195	0.196	-	4813.3	4805.1	-	54.22	54.10	-
σ	0.006	0.005	-	29.092	43.695	-	0.272	0.249	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG04FNL091	627.50	2004/10/4 7:00 PM	Huiling.Fu	Even.Liu