



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 FFB120x120x25.4mm series as the right table	FFB1248EH			
	FFB1248SH			
	FFB1248VH			
	FFB1248HH			

Representative Test P/N :FFB1248EH-F00

Equipment: 1.Oven: E24-F0036 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)
60	40	4.00	56	2.303	6,956	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)
2003/7/1 5:00 PM	2004/7/13 4:33 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 (°C)	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
DG03FNL076	2116.00	2004/7/13 5:00 PM	Huiling.Fu	Even.Liu

Note: The test sample equivalent to STD , Part number: FFB1248EH-F00 .



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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FFB1248EH			
FFB1248SH			
FFB1248VH			
FFB1248HH			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2003/7/1 5:00 PM	2004/7/13 4:33 PM	56	0	6956.0

Representative Test P/N :FFB1248EH-F00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: E24-F0036 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 Check. (dB A)	Noise Spec. (dB A)	
	0.38Max.	0.38Max.		3800-4200	3800-4200		60.4Max	60.4Max	
1	0.33	0.31	-6.1	4032	4048	0.4	OK	57.5	
2	0.31	0.31	0.0	4041	4074	0.8	OK	57.4	
3	0.34	0.33	-2.9	4056	4040	-0.4	OK	58.1	
4	0.33	0.32	-3.0	4072	4058	-0.3	OK	58.0	
5	0.33	0.33	0.0	4049	4059	0.2	OK	57.3	
6	0.32	0.32	0.0	4027	4042	0.4	OK	57.5	
7	0.33	0.33	0.0	4079	4096	0.4	OK	57.7	
8	0.32	0.33	3.1	4070	4056	-0.3	OK	57.5	
9	0.31	0.31	0.0	4014	4026	0.3	OK	57.7	
10	0.33	0.32	-3.0	4039	4058	0.5	OK	57.4	
11	0.32	0.32	0.0	4072	4012	-1.5	OK	57.6	
12	0.32	0.32	0.0	4049	4046	-0.1	OK	57.8	
13	0.33	0.33	0.0	4067	4066	0.0	OK	57.5	
14	0.33	0.32	-3.0	4092	4072	-0.5	OK	57.6	
15	0.32	0.32	0.0	4067	4064	-0.1	OK	57.3	
16	0.32	0.32	0.0	4011	4017	0.1	OK	58.1	
17	0.33	0.33	0.0	4049	4032	-0.4	OK	57.8	
18	0.31	0.31	0.0	4036	4070	0.8	OK	57.3	
19	0.32	0.31	-3.1	4030	4030	0.0	OK	57.3	
20	0.33	0.33	0.0	4086	3965	-3.0	OK	58.1	
21	0.32	0.32	0.0	4072	4061	-0.3	OK	58.0	
22	0.32	0.31	-3.1	4040	4060	0.5	OK	57.4	
23	0.33	0.33	0.0	4043	4027	-0.4	OK	58.3	
24	0.33	0.33	0.0	4017	4019	0.0	OK	57.4	
25	0.32	0.32	0.0	4072	4037	-0.9	OK	57.5	
26	0.32	0.32	0.0	4069	4062	-0.2	OK	57.5	
27	0.32	0.31	-3.1	4095	4080	-0.4	OK	57.2	
28	0.31	0.31	0.0	4045	4049	0.1	OK	57.4	
29	0.32	0.32	0.0	4049	4074	0.6	OK	57.3	
30	0.32	0.32	0.0	4072	4071	0.0	OK	58.0	
31	0.32	0.32	0.0	4035	4067	0.8	OK	57.6	
32	0.32	0.32	0.0	4067	4086	0.5	OK	57.4	
33	0.33	0.33	0.0	4023	4031	0.2	OK	57.3	
34	0.34	0.32	-5.9	4020	4047	0.7	OK	58.2	
35	0.33	0.33	0.0	4057	4012	-1.1	OK	57.9	

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL076	2116.00	2004/7/13 5:00 PM	Huiling.Fu	Even.Liu



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	FFB1248VH				
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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2003/7/1 5:00 PM	2004/7/13 4:33 PM	56	0	6956.0

Representative Test P/N :FFB1248EH-F00	Current Test Status	<input checked="" type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-F0036 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) 0.38Max.	Current Spec. (A) 0.38Max.		Speed Spec. (RPM) 3800-4200	Speed Spec. (RPM) 3800-4200		Noise Check. (dB A) 60.4Max	Noise Spec. (dB A) 60.4Max	
36	0.32	0.32	0.0	4074	4012	-1.5	OK	58.0	
37	0.32	0.31	-3.1	4025	4078	1.3	OK	57.5	
38	0.32	0.31	-3.1	4060	4082	0.5	OK	57.4	
39	0.32	0.32	0.0	4076	4065	-0.3	OK	57.4	
40	0.33	0.31	-6.1	4053	4068	0.4	OK	58.1	
41	0.33	0.33	0.0	4076	4069	-0.2	OK	58.3	
42	0.33	0.33	0.0	4039	4058	0.5	OK	57.5	
43	0.33	0.33	0.0	4094	4090	-0.1	OK	57.4	
44	0.32	0.31	-3.1	3993	4045	1.3	OK	57.6	
45	0.33	0.33	0.0	4017	4019	0.0	OK	57.9	
46	0.32	0.32	0.0	4042	4039	-0.1	OK	58.1	
47	0.32	0.32	0.0	4004	4067	1.6	OK	57.7	
48	0.32	0.32	0.0	4079	4071	-0.2	OK	58.0	
49	0.31	0.31	0.0	4053	4041	-0.3	OK	57.5	
50	0.32	0.31	-3.1	4072	4032	-1.0	OK	57.4	
51	0.31	0.32	3.2	4024	4023	0.0	OK	57.6	
52	0.33	0.33	0.0	4014	4072	1.4	OK	57.9	
53	0.33	0.33	0.0	4086	4069	-0.4	OK	58.1	
54	0.33	0.33	0.0	4094	4037	-1.4	OK	58.0	
55	0.33	0.32	-3.0	4028	4038	0.2	OK	57.4	
56	0.32	0.32	0.0	4029	4017	-0.3	OK	57.9	
X-Bar	0.324	0.321	-	4050.5	4049.9	-		57.67	-
σ	0.007	0.008	-	25.810	25.002	-		0.308	-

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DG03FNL076	2116.00	2004/7/13 5:00 PM	Huling.Fu	Even.Liu