



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 FFB 60x60x38 mm series as the right table	FFB0612EHE	FFB0612SHE	FFB0612VHE	FFB0612HHE	
	FFB0624EHE	FFB0624SHE	FFB0624VHE	FFB0624HHE	
Representative Test P/N : FFB0612EHE , FFB0624EHE					
Instruments used: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D 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 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 (hours)	Verified L ₁₀ (hours)
80	40	16.00	53	2.303	1,828	2,250.0	603,040	86,149

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2001/10/11 8:00 AM	2002/2/21 7:14 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	2250.0

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	45.25	1,705,655	243,665
30	32.00	1,206,081	172,297
40	16.00	603,040	86,149
50	8.00	301,520	43,074
60	4.00	150,760	21,537
70	2.00	75,380	10,769
80	1.00	37,690	5,384

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

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
01FNS023-L	1375.00	2002/3/11 9:00 AM	Bonnie Cheng	



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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FFB0612EHE	FFB0612SHE	FFB0612VHE	FFB0612HHE
FFB0624EHE	FFB0624SHE	FFB0624VHE	FFB0624HHE

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,828	2001/10/11 8:00 AM	2002/2/21 7:14 PM	53	0	2250.0

Representative Test P/N : FFB0612EHE , FFB0624EHE	Current Test Status	<input type="checkbox"/>	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/>	Termination
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Instruments used: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample P/N : FFB0624EHE-F00

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)
	Current Spec. (A) 0.57 Max.	Current Spec. (A) 0.57 Max.		Speed Spec. (RPM) 8000 Ref.	Speed Spec. (RPM) 8000-15%		Noise Spec. (dB A) 58.5 Max.	Noise Spec. (dB A) 61.5 Max.	
1	0.40	0.45	12.5	8023	8220	2.5	54.7	56.6	3.5
2	0.44	0.39	-11.4	8164	8448	3.5	54.6	57.3	4.9
3	0.44	0.44	0.0	8190	8334	1.8	53.9	56.7	5.2
4	0.44	0.43	-2.3	8134	8334	2.5	54.6	56.4	3.3
5	0.42	0.44	4.8	8137	8334	2.4	54.0	57.2	5.9
6	0.44	0.41	-6.8	8155	8334	2.2	54.3	56.4	3.9
7	0.44	0.43	-2.3	8219	8334	1.4	54.5	56.3	3.3
8	0.44	0.43	-2.3	8195	8334	1.7	54.2	56.3	3.9
9	0.42	0.43	2.4	8158	8334	2.2	53.9	56.6	5.0
10	0.42	0.41	-2.4	8141	8334	2.4	54.0	57.7	6.9
11	0.43	0.42	-2.3	8186	8334	1.8	54.5	56.9	4.4
12	0.42	0.42	0.0	8094	8220	1.6	54.3	56.5	4.1
13	0.43	0.41	-4.7	8156	8334	2.2	54.7	57.4	4.9
14	0.43	0.42	-2.3	8185	8334	1.8	55.3	57.3	3.6
15	0.43	0.42	-2.3	8239	8334	1.2	55.6	56.1	0.9
16	0.43	0.42	-2.3	8174	8334	2.0	54.3	57.5	5.9
17	0.43	0.42	-2.3	8187	8448	3.2	55.3	57.5	4.0
18	0.46	0.41	-10.9	8258	8334	0.9	55.1	58.0	5.3
19	0.42	0.44	4.8	8243	8220	-0.3	55.0	55.0	0.0
20	0.40	0.42	5.0	8071	8220	1.8	53.7	57.2	6.5
21	0.41	0.39	-4.9	8248	8220	-0.3	54.8	57.7	5.3
22	0.38	0.42	10.5	8119	8334	2.6	55.0	57.8	5.1
23	0.42	0.39	-7.1	8165	8220	0.7	54.6	56.4	3.3
24	0.41	0.43	4.9	8157	8448	3.6	54.6	56.0	2.6
25	0.43	0.43	0.0	8153	8334	2.2	53.8	57.5	6.9
26	0.40	0.42	5.0	8179	8334	1.9	55.5	57.4	3.4
27	0.43	0.44	2.3	8236	8448	2.6	54.7	56.4	3.1
28	0.44	0.42	-4.5	8257	8334	0.9	55.6	57.3	3.1
29	0.40	0.43	7.5	8186	8334	1.8	54.7	56.8	3.8
30	0.40	0.43	7.5	8185	8448	3.2	54.7	57.5	5.1
X-Bar	0.42	0.41	-	8173.13	8330.20	-	54.62	56.92	-
σ	0.02	0.43	-	53.95	8333.87	-	0.53	0.67	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
01FNS023-L	1135.00	2002/2/8 8:00 AM	<i>Bonnie Cheng</i>	<i>[Signature]</i>