

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 FFB90x90x25.4 mm series as the right table	FFB0912HH			
	FFB0912VH			

Representative Test P/N :FFB0912SH

Equipment: 1.Oven: E24-F0037 On/Off Cycles: Every 500 hours

L₁₀ Expectancy: 70,000 hours minimum @ fan rated voltage and the temperature of 40

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 () (Actual Test Temperature)	Unstress Temperature Tu ()	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 (hours)	Verified L ₁₀ 40 (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)
2004/8/25 8:00 PM	2005/8/5 1:03 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 ()	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
DG04FNL244	1317.50	2005/8/5 1:30 PM	Guie.Lin	gx.xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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FFB0912HH

FFB0912VH

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2004/8/25 8:00 PM	2005/8/5 1:03 PM	56	0	6956.0

Representative Test P/N :FFB0912SH	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-F0037 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)	
	1.04Max.	1.04Max.		3772-4428	3772-4428		54.0Max	54.0Max	
	0.68	0.68	0.0	4070	4266	4.8	51.4	51.7	0.6
	0.66	0.68	3.0	4020	4114	2.3	51.6	51.3	-0.6
	0.68	0.67	-1.5	4031	4087	1.4	51.7	51.6	-0.2
	0.69	0.67	-2.9	4068	4077	0.2	51.3	51.1	-0.4
	0.67	0.67	0.0	4044	4115	1.8	51.9	51.3	-1.2
	0.68	0.67	-1.5	4036	4105	1.7	51.5	50.9	-1.2
	0.68	0.67	-1.5	4046	4052	0.1	51.2	51.2	0.0
	0.68	0.67	-1.5	4008	4043	0.9	51.8	51.0	-1.5
	0.69	0.67	-2.9	4042	4088	1.1	51.7	51.3	-0.8
	0.68	0.66	-2.9	4105	4140	0.9	51.4	51.1	-0.6
	0.68	0.66	-2.9	4067	4133	1.6	51.0	51.6	1.2
	0.68	0.66	-2.9	4065	4146	2.0	51.3	51.3	0.0
	0.66	0.67	1.5	4051	4108	1.4	51.5	51.0	-1.0
	0.69	0.66	-4.3	4004	4074	1.7	51.7	50.9	-1.5
	0.68	0.69	1.5	4091	4094	0.1	51.9	51.6	-0.6
	0.69	0.68	-1.4	4050	4027	-0.6	51.2	51.4	0.4
	0.68	0.68	0.0	4051	4049	0.0	51.5	51.6	0.2
	0.67	0.65	-3.0	4051	4103	1.3	51.4	51.4	0.0
	0.69	0.69	0.0	4015	4127	2.8	51.6	51.3	-0.6
	0.70	0.68	-2.9	4063	4122	1.5	51.8	51.2	-1.2
	0.66	0.65	-1.5	4043	4012	-0.8	51.9	51.7	-0.4
	0.68	0.68	0.0	4025	4107	2.0	51.0	51.6	1.2
	0.67	0.66	-1.5	4013	4083	1.7	51.4	51.2	-0.4
	0.68	0.69	1.5	4022	4116	2.3	51.3	51.0	-0.6
	0.66	0.61	-7.6	4067	4019	-1.2	51.0	50.9	-0.2
	0.66	0.59	-10.6	4025	4026	0.0	51.6	51.3	-0.6
	0.66	0.66	0.0	4073	4024	-1.2	51.5	51.6	0.2
	0.68	0.66	-2.9	4039	4095	1.4	51.7	51.3	-0.8
	0.66	0.67	1.5	4037	4066	0.7	51.3	51.2	-0.2
	0.67	0.69	3.0	4059	4122	1.6	51.2	51.4	0.4
	0.68	0.68	0.0	4034	4052	0.4	51.7	51.7	0.0
	0.67	0.67	0.0	4019	4186	4.2	51.5	51.2	-0.6
	0.67	0.68	1.5	4028	4045	0.4	51.3	51.3	0.0
	0.67	0.68	1.5	4038	4148	2.7	51.5	51.5	0.0
	0.69	0.70	1.4	4069	4132	1.5	51.2	51.4	0.4

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG04FNL244	1317.50	2005/8/5 1:30 PM	Guie.Lin	gx.xu



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Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)
	Current Spec. (A) 1.04Max.	Current Spec. (A) 1.04Max.		Speed Spec. (RPM) 3772-4428	Speed Spec. (RPM) 3772-4428		Noise Spec. (dB A) 54.0Max	Noise Spec. (dB A) 54.0Max	
	0.68	0.67	-1.5	4098	4132	0.8	51.7	50.9	-1.5
	0.68	0.67	-1.5	4078	4095	0.4	51.5	51.2	-0.6
	0.68	0.66	-2.9	4037	4085	1.2	51.3	51.0	-0.6
	0.68	0.67	-1.5	4014	4069	1.4	51.8	51.4	-0.8
	0.68	0.68	0.0	4042	4068	0.6	51.1	51.5	0.8
	0.66	0.66	0.0	4035	4137	2.5	51.3	51.7	0.8
	0.66	0.68	3.0	4113	4040	-1.8	51.8	51.6	-0.4
	0.68	0.68	0.0	4036	4042	0.1	51.4	51.7	0.6
	0.68	0.68	0.0	4079	4165	2.1	51.3	51.2	-0.2
	0.69	0.70	1.4	4089	4118	0.7	51.7	51.3	-0.8
	0.68	0.69	1.5	4046	4179	3.3	51.0	50.9	-0.2
	0.67	0.68	1.5	4004	4073	1.7	51.6	51.1	-1.0
	0.67	0.66	-1.5	4056	4110	1.3	51.4	51.5	0.2
	0.68	0.67	-1.5	4029	4141	2.8	51.9	50.9	-1.9
	0.68	0.67	-1.5	4044	4124	2.0	51.7	51.2	-1.0
	0.68	0.67	-1.5	4043	4064	0.5	51.2	51.4	0.4
	0.68	0.67	-1.5	4007	4078	1.8	51.7	51.6	-0.2
	0.69	0.69	0.0	4084	4165	2.0	51.2	51.3	0.2
	0.69	0.66	-4.3	4084	4106	0.5	51.4	51.5	0.2
	0.68	0.66	-2.9	4052	4223	4.2	51.7	51.2	-1.0
	0.66	0.67	1.5	4058	4091	0.8	51.7	50.9	-1.5
X-Bar	0.677	0.670	-	4048.161	4100.143	-	51.48	51.31	-
σ	0.010	0.018	-	26.196	50.401	-	0.254	0.250	-

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