

DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed by ARxx or AFxx series suffixes. This test report applies to PFB90x90x38.0 mm series as the right table	PFB0912UHE-F00	PFB0912EHE	PFB0912DHE-6X39	
	PFB0912GHE	PFB0912SHE		
	PFB0912DHE	PFB0912VHE		
		PFB0912HHE		

Representative Test P/N :PFB0912DHE-F00

Equipment:1.Oven: E24-F0055 On/Off Cycles: Every 500 hours

L₁₀ Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40

According to the equation for **Weibull distribution**, **MTTF 7×L10 = 350,000 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	4,968	8,360.0	588,939	84,134

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/2/23 3:30 PM	2006/8/21 3:15 AM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	8360.0

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	1,665,770	237,967
30	8.00	1,177,878	168,268
40	4.00	588,939	84,134
50	2.00	294,469	42,067
60	1.00	147,235	21,034

- 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
DG05FNL033	8075.50	2007/1/9 11:00 AM	Nan.Yang	Gx.Xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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PFB0912GHE	PFB0912SHE		
PFB0912DHE	PFB0912VHE		
	PFB0912HHE		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2005/2/23 3:30 PM	2006/8/21 3:15 AM	56	0	8360.0

Representative Test P/N :PFB0912DHE-F00	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment:1.Oven: E24-F0055 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)	
	3.72Max.	3.72Max.		7360-8640	7360-8640		71.5Max	71.5Max	
	3.08	3.12	1.3	8105	8046	-0.7	64.7	65.3	0.9
	3.02	3.08	2.1	8186	7929	-3.1	65.3	65.7	0.6
	2.96	3.10	4.7	8164	7971	-2.4	64.8	65.5	1.1
	3.03	3.09	2.0	8216	7971	-3.0	64.9	65.4	0.8
	3.01	3.12	3.8	8124	7869	-3.1	65.1	65.5	0.6
	3.11	2.91	-6.3	8243	7941	-3.7	64.7	65.3	0.9
	3.10	3.08	-0.4	8002	7839	-2.0	65.5	65.8	0.5
	2.95	2.92	-1.1	8161	7975	-2.3	64.8	65.2	0.6
	3.02	3.07	1.8	8116	7863	-3.1	64.7	65.6	1.4
	3.00	3.05	1.4	8047	7884	-2.0	64.9	65.3	0.6
	2.94	2.98	1.5	8083	8016	-0.8	64.6	65.3	1.1
	2.91	2.94	1.2	8036	7921	-1.4	64.3	65.1	1.2
	2.95	3.07	4.1	8066	7916	-1.9	64.8	65.7	1.4
	2.97	3.13	5.1	8158	8021	-1.7	64.7	65.4	1.1
	3.00	3.15	4.9	8134	7963	-2.1	65.3	65.5	0.3
	3.06	3.21	5.0	8174	8025	-1.8	65.1	65.2	0.2
	3.05	3.03	-0.8	8067	8059	-0.1	64.9	65.8	1.4
	2.99	3.04	1.7	8097	7875	-2.7	64.4	65.3	1.4
	3.12	3.26	4.4	8234	8027	-2.5	64.7	65.7	1.5
	2.87	2.87	0.1	8129	7737	-4.8	65.2	65.2	0.0
	2.97	3.03	2.0	8134	8025	-1.3	64.6	65.5	1.4
	3.06	2.90	-5.2	8175	7726	-5.5	65.0	65.9	1.4
	3.00	3.02	0.8	8124	7936	-2.3	64.6	65.5	1.4
	2.97	2.96	-0.2	8035	8016	-0.2	65.4	65.3	-0.2
	3.06	3.06	0.0	8169	8012	-1.9	64.9	65.7	1.2
	2.97	3.08	3.9	8049	7879	-2.1	64.9	65.3	0.6
	3.00	3.10	3.4	8141	7876	-3.3	65.7	65.5	-0.3
	3.09	2.98	-3.4	8157	8082	-0.9	65.1	65.1	0.0
	2.96	2.96	-0.3	8066	7968	-1.2	64.8	65.5	1.1
	3.10	3.19	2.7	8158	7995	-2.0	64.5	65.2	1.1
	2.93	2.98	1.7	8048	7972	-0.9	64.9	65.8	1.4
	2.89	2.92	1.0	8012	7972	-0.5	65.3	65.3	0.0
	3.02	3.00	-0.7	8173	7993	-2.2	64.6	65.7	1.7
	2.96	3.06	3.7	8177	8029	-1.8	64.8	65.3	0.8
	2.99	3.10	3.9	8133	7986	-1.8	65.5	65.9	0.6

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL033	8075.50	2007/1/9 11:00 AM	Nan.Yang	Gx.Xu



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	3.72Max.	3.72Max.		7360-8640	7360-8640		71.5Max	71.5Max	
	3.00	3.05	1.8	8139	8049	-1.1	65.1	65.5	0.6
	3.02	2.96	-1.9	8213	7963	-3.0	64.7	65.8	1.7
	3.06	3.15	2.8	7938	8054	1.5	64.9	65.3	0.6
	2.94	2.97	0.9	8165	7921	-3.0	65.0	65.6	0.9
	3.02	3.07	1.5	8105	7869	-2.9	64.6	65.2	0.9
	3.17	3.14	-0.8	8188	8088	-1.2	65.3	65.8	0.8
	2.97	3.06	3.0	8125	7992	-1.6	65.0	65.3	0.5
	3.08	3.20	3.7	8253	8106	-1.8	64.4	65.4	1.6
	3.17	3.18	0.4	8315	8095	-2.6	65.3	65.7	0.6
	3.00	3.07	2.2	8034	7869	-2.1	64.8	65.1	0.5
	2.97	2.99	0.7	8136	7769	-4.5	64.7	65.5	1.2
	3.04	3.04	0.0	7922	7955	0.4	65.2	65.2	0.0
	3.03	2.96	-2.2	8247	7854	-4.8	65.1	65.9	1.2
	2.97	3.08	3.9	7968	8038	0.9	64.5	65.3	1.2
	2.85	3.05	6.9	7880	7875	-0.1	64.9	65.7	1.2
	3.02	2.88	-4.8	8130	8036	-1.2	65.0	65.4	0.6
	3.00	2.97	-1.0	7909	7852	-0.7	64.7	65.8	1.7
	3.08	3.06	-0.9	8154	8078	-0.9	65.8	65.3	-0.8
	3.02	2.97	-1.8	8035	8012	-0.3	64.9	65.5	0.9
	2.85	2.88	1.1	7986	7934	-0.7	65.2	65.9	1.1
	2.94	3.24	10.4	7925	8031	1.3	65.1	65.3	0.3
X-Bar	3.005	3.045	-	8108.2	7959.9	-	64.93	65.48	-
σ	0.070	0.093	-	93.510	88.186	-	0.323	0.236	-

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