



# 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 PFB90x90x38mm series as the right table	PFB0948GHE-7G03		PFB0912EHE	PFB0912HHE	
	PFB0924GHE	PFB0948EHE	PFB0912SHE		
	PFB0912GHE	PFB0924EHE	PFB0912VHE		

**Representative Test P/N :PFB0948GHE-R00**

**L<sub>10</sub> Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40**  
**Equipment: 1.Oven: E24-W520**  
 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<sub>r,c</sub>) 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 <sub>s</sub> ( ) (Actual Test Temperature)	Unstress Temperature T <sub>u</sub> ( )	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r,c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 (hours)	Verified L <sub>10</sub> 40 (hours)
60	40	4.00	56	2.303	4,968	7,968.0	561,323	80,189

### Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2006/6/1 9:00 AM	2007/4/3 8:15 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	7968.0

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 <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	11.31	1,587,662	226,809
30	8.00	1,122,647	160,378
40	4.00	561,323	80,189
50	2.00	280,662	40,095
60	1.00	140,331	20,047

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

<b>Test Result</b>	<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
WJQFML-2006057	2375.00	2007/8/6 8:00 AM	XINHONG.YANG	FLY.SHI



## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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	PFB0924GHE	PFB0948EHE	PFB0912SHE		
	PFB0912GHE	PFB0924EHE	PFB0912VHE		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2006/6/1 9:00 AM	2007/4/3 8:15 AM	56	0	<b>7968.0</b>

Representative Test P/N :PFB0948GHE-R00	<b>Current Test Status</b>	<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-W520

### 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 Check. (dB A)	
	<b>0.42max.</b>	<b>0.42max.</b>		<b>6000±8%</b>	<b>6000-15%</b>		<b>64.5max.</b>	<b>64.5+3max.</b>	
1	0.33	0.33	0.3	6001	6030	0.5	58.6	59.9	2.2
2	0.32	0.33	2.8	5979	5898	1.4	58.4	59.0	1.0
3	0.33	0.34	1.8	6035	6022	0.2	58.1	60.1	3.4
4	0.33	0.35	5.8	6046	5961	1.4	58.4	59.7	2.2
5	0.32	0.34	5.0	5963	5835	2.1	58.1	59.3	2.1
6	0.33	0.34	2.1	6012	5987	0.4	58.1	59.0	1.5
7	0.33	0.34	2.1	6034	5995	0.6	58.2	59.3	1.9
8	0.33	0.33	0.3	6032	6095	1.0	58.7	59.7	1.7
9	0.31	0.32	2.6	5962	5954	0.1	57.9	59.3	2.4
10	0.32	0.32	0.0	5953	6045	1.5	58.5	60.0	2.6
11	0.31	0.32	3.9	5936	5879	1.0	58.1	59.2	1.9
12	0.33	0.34	2.4	5988	5927	1.0	57.9	59.6	2.9
13	0.32	0.33	2.8	6001	6011	0.2	58.3	59.3	1.7
14	0.31	0.31	1.3	5937	5959	0.4	58.1	59.0	1.5
15	0.33	0.33	1.5	6005	5956	0.8	58.1	60.1	3.4
16	0.33	0.33	0.9	6034	6102	1.1	58.3	59.7	2.4
17	0.34	0.35	2.6	6046	5964	1.4	58.5	59.4	1.5
18	0.33	0.35	4.8	6046	5935	1.8	58.2	58.7	0.9
19	0.32	0.32	0.6	5948	5891	1.0	57.8	59.1	2.2
20	0.31	0.32	2.9	5942	5930	0.2	58.1	58.3	0.3
21	0.33	0.34	1.5	6044	6053	0.1	58.8	60.1	2.2
22	0.34	0.35	2.9	6056	6022	0.6	58.7	59.9	2.0
23	0.33	0.34	3.6	6045	5979	1.1	58.4	59.8	2.4
24	0.33	0.34	2.4	6053	6003	0.8	58.4	59.1	1.2
25	0.34	0.34	0.0	6045	6041	0.1	58.7	59.3	1.0
26	0.33	0.32	3.9	5995	5980	0.3	58.3	59.0	1.2
27	0.33	0.33	1.2	6053	6022	0.5	57.5	59.7	3.8
28	0.33	0.34	1.5	5993	5972	0.4	58.0	60.1	3.6
29	0.33	0.33	0.3	5989	5950	0.7	58.1	59.4	2.2
30	0.33	0.33	1.5	6008	6074	1.1	58.0	58.9	1.6
31	0.32	0.32	0.9	5977	5996	0.3	58.0	59.1	1.9
32	0.33	0.32	2.1	5968	6109	2.4	57.6	58.7	1.9
33	0.32	0.33	4.4	6101	5970	2.1	58.1	60.0	3.3
34	0.31	0.31	1.0	6030	5965	1.1	57.8	58.6	1.4
35	0.31	0.31	0.3	5874	5904	0.5	57.7	59.5	3.1

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQFML-2006057	2375.00	2007/8/6 8:00 AM	XINHONG.YANG	FLY.SHI



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	PFB0924GHE	PFB0948EHE	PFB0912SHE		
	PFB0912GHE	PFB0924EHE	PFB0912VHE		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2006/6/1 9:00 AM	2007/4/3 8:15 AM	56	0	<b>7968.0</b>
Representative Test P/N :PFB0948GHE-R00			<b>Current Test Status</b>		<input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination
Equipment: 1.Oven: E24-W520					

### 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 Check. (dB A)	
	<b>0.42max.</b>	<b>0.42max.</b>		<b>6000±8%</b>	<b>6000-15%</b>		<b>64.5max.</b>	<b>64.5+3max.</b>	
36	0.30	0.32	6.0	6013	5877	2.3	57.9	58.5	1.0
37	0.31	0.32	2.3	6004	5968	0.6	57.5	59.4	3.3
38	0.32	0.32	0.3	6050	6032	0.3	58.2	60.0	3.1
39	0.30	0.31	2.3	6075	6020	0.9	58.3	59.7	2.4
40	0.31	0.33	7.4	6114	5957	2.6	58.2	59.5	2.2
41	0.31	0.32	4.2	6026	5956	1.2	58.1	58.8	1.2
42	0.31	0.32	2.9	6043	6057	0.2	58.2	59.6	2.4
43	0.30	0.31	4.3	6013	5954	1.0	58.1	59.0	1.5
44	0.30	0.31	4.0	5982	5868	1.9	58.1	60.0	3.3
45	0.30	0.31	2.0	6001	6010	0.1	57.6	59.5	3.3
46	0.32	0.33	1.9	6019	5921	1.6	58.2	58.8	1.0
47	0.31	0.31	1.0	6026	5978	0.8	57.9	59.6	2.9
48	0.30	0.31	4.0	6021	5972	0.8	57.8	59.7	3.3
49	0.32	0.31	2.2	6060	6083	0.4	58.1	59.3	2.1
50	0.31	0.32	1.6	6042	5971	1.2	58.4	60.0	2.7
51	0.31	0.32	3.9	6056	5886	2.8	58.1	59.0	1.5
52	0.31	0.32	4.5	6033	5891	2.4	58.3	58.9	1.0
53	0.31	0.32	3.9	5984	5836	2.5	57.8	59.5	2.9
54	0.32	0.32	0.9	6092	6014	1.3	58.1	60.0	3.3
55	0.31	0.32	1.6	6014	5962	0.9	58.0	59.7	2.9
56	0.32	0.32	0.3	6076	6025	0.8	58.2	59.4	2.1
Mean (X-Bar)	0.320	0.325	-	6015.6	5976.0	-	58.1	59.4	-
Standard Deviation	0.011	0.011	-	44.876	64.637	-	0.293	0.462	-

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQFML-2006057	2375.00	2007/8/6 8:00 AM	XINHONG.YANG	FLY.SHI