



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 PFB 92x92x38 mm series as the right table	PFB0924UHE-F00	PFB0924GHE	PFB0924DHEP0	
	PFB0924GHE-F00	PFB0924EHE	PFB0924UHEE2V	
	PFB0924DHE-9E35	PFB0948UHE-CQ1D		
	PFB0948UHE-6E39	PFB0924SHECCV		

Representative Test P/N : PFB0924DHE-F00

Equipment: 1.Oven: E24-T0161

⊙ **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,

$$t = 1.119 \times \text{MTTF} \times [(B_{r,c}) \div n]^{0.33} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

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 (°C) (Actual Test Temperature)	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 40 °C (hours)	Verified L ₁₀ 40 °C (hours)
60	40	4.00	56	2.303	6,956	13,956.0	983,161	140,452

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/3/14 11:30 PM	2007/10/30 8:33 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	13956.0

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.

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	11.31	2,780,800	397,257
30	8.00	1,966,323	280,903
40	4.00	983,161	140,452
50	2.00	491,581	70,226
60	1.00	245,790	35,113

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
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL050	16069.50	2008/8/17 1:00 AM	Nan Yang	Zenny Lei

BGN (dBA) : 16.3

Temp (°C) : 21.2



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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				PFB0924DHE-9E35	PFB0948UHE-CQ1D				
				PFB0948UHE-6E39	PFB0924SHECCV				
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)				
6,956	2005/3/14 11:30 PM	2007/10/30 8:33 AM	56	0	13956.0				
Representative Test P/N :PFB0924DHE-F00			Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination			
Equipment: 1.Oven: E24-T0161									
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test Current Spec. (A) 1.74Max.	Final Test Current Spec. (A) 1.74Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 7360-8640	Final Test Speed Spec. (RPM) 7360-8640	Deviation (%)	Initial Test Noise Spec. (dB A) 71.5Max	Final Test Noise Spec. (dB A) 71.5Max	Deviation 3 dBMax.
1	1.43	1.46	2.1	8235	7800	-5.3	65.9	65.5	-0.6
2	1.42	1.45	1.9	8242	7900	-4.1	65.5	66.4	1.4
3	1.42	1.53	7.9	8247	8053	-2.4	65.1	65.6	0.8
4	1.43	1.41	-1.5	8229	7899	-4.0	65.7	65.4	-0.5
5	1.42	1.43	0.4	8245	8072	-2.1	65.4	66.1	1.1
6	1.45	1.47	1.4	8159	7909	-3.1	65.9	65.3	-0.9
7	1.45	1.42	-1.8	8174	8003	-2.1	65.2	65.6	0.6
8	1.50	1.44	-3.9	8282	7961	-3.9	65.8	66.2	0.6
9	1.43	1.41	-1.3	8221	7875	-4.2	65.1	65.9	1.2
10	1.52	1.43	-5.7	8224	7939	-3.5	66.3	65.8	-0.8
11	1.44	1.40	-2.7	8216	7809	-5.0	65.7	65.8	0.2
12	1.51	1.48	-2.3	8259	7953	-3.7	65.5	66.2	1.1
13	1.42	1.40	-1.4	8259	8082	-2.1	65.3	66.1	1.3
14	1.49	1.42	-4.4	8274	8017	-3.1	65.7	65.0	-1.1
15	1.41	1.51	6.8	8283	8114	-2.0	66.0	65.7	-0.5
16	1.50	1.53	1.9	8232	7970	-3.2	65.9	66.2	0.5
17	1.41	1.42	0.8	8269	8013	-3.1	65.3	65.7	0.6
18	1.51	1.44	-4.6	8232	7940	-3.5	65.9	65.9	0.0
19	1.52	1.51	-0.9	8231	7841	-4.7	66.0	66.1	0.2
20	1.40	1.43	1.8	8177	8036	-1.7	65.4	66.0	0.9
21	1.51	1.49	-1.4	8245	8016	-2.8	65.7	65.8	0.2
22	1.39	1.43	3.1	8210	7850	-4.4	65.9	65.7	-0.3
23	1.51	1.41	-7.0	8242	8024	-2.6	65.5	66.1	0.9
24	1.39	1.49	7.4	8181	7995	-2.3	65.8	65.4	-0.6
25	1.46	1.49	1.9	8104	7909	-2.4	65.9	66.1	0.3
26	1.55	1.38	-10.8	8093	7866	-2.8	65.7	65.6	-0.2
27	1.52	1.40	-8.1	7940	7861	-1.0	65.7	66.2	0.8
28	1.58	1.47	-7.2	8047	7889	-2.0	65.5	66.3	1.2
29	1.57	1.44	-8.2	8072	8046	-0.3	65.3	65.7	0.6
30	1.50	1.47	-2.1	8012	7970	-0.5	65.8	65.8	0.0
31	1.55	1.41	-9.1	8091	7967	-1.5	65.7	65.4	-0.5
32	1.49	1.49	-0.3	8003	7959	-0.5	65.3	66.0	1.1
QE File No.	Time-out for function test or others (hours)			Issued Date		Reported By		Approved By	
DG05FNL050	16069.50			2008/8/17		Nan Yang		Zenny Lei	



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Representative Test P/N :PFB0924DHE-F00			Current Test Status		<input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination
Equipment: 1.Oven: E24-T0161					

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 1.74Max.	Final Test Current Spec. (A) 1.74Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 7360-8640	Final Test Speed Spec. (RPM) 7360-8640	Deviation (%)	Initial Test Noise Spec. (dB A) 71.5Max	Final Test Noise Spec. (dB A) 71.5Max	Deviation 3 dBMax.
33	1.55	1.47	-5.5	8073	7967	-1.3	65.9	66.3	0.6
34	1.52	1.42	-6.3	8104	7896	-2.6	66.2	65.7	-0.8
35	1.48	1.40	-5.5	8044	8158	1.4	65.7	65.5	-0.3
36	1.53	1.50	-2.0	8101	7984	-1.4	65.5	66.1	0.6
37	1.46	1.50	2.7	8078	8121	0.5	65.9	65.9	0.0
38	1.54	1.46	-5.1	8078	7972	-1.3	65.7	65.7	0.0
39	1.57	1.47	-6.6	8109	7841	-3.3	65.4	66.2	0.8
40	1.52	1.46	-4.1	8103	7924	-2.2	66.2	66.0	-0.2
41	1.56	1.44	-7.6	8078	7883	-2.4	65.9	65.8	-0.1
42	1.54	1.41	-8.8	8074	7875	-2.5	65.8	66.3	0.5
43	1.57	1.48	-5.8	8074	7927	-1.8	65.5	66.1	0.6
44	1.52	1.40	-8.2	8104	7917	-2.3	65.3	65.9	0.6
45	1.56	1.41	-9.7	8093	7899	-2.4	65.7	66.1	0.4
46	1.51	1.45	-3.8	8091	7984	-1.3	65.4	65.7	0.3
47	1.54	1.47	-4.7	8120	8017	-1.3	65.5	66.3	0.8
48	1.53	1.50	-1.8	8062	7963	-1.2	65.9	65.9	0.0
49	1.54	1.44	-6.6	8120	7901	-2.7	65.3	66.0	0.7
50	1.52	1.47	-3.5	8074	8017	-0.7	66.1	65.5	-0.6
51	1.55	1.46	-5.9	8082	7939	-1.8	65.8	65.8	0.0
52	1.51	1.47	-3.0	8070	7915	-1.9	66.1	66.0	-0.1
53	1.55	1.49	-3.6	8070	7965	-1.3	65.4	66.1	0.7
54	1.52	1.42	-6.8	8052	8087	0.4	65.7	65.5	-0.2
55	1.60	1.38	-13.8	8027	7923	-1.3	65.3	65.7	0.4
56	1.60	1.46	-8.6	8017	8018	0.0	65.8	66.1	0.3
X-Bar	1.500	1.449	-	8139.79	7957.70	-	65.67	65.87	-
σ	0.056	0.038	-	87.63	77.23	-	0.29	0.29	-

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DG05FNL050	16069.50	2008/8/17	Nan Yang	Zenny Lei