



# 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 <b>PFB60x60x38.0</b> mm series as the right table	PFB0624SHE-TZNY				

<b>Representative Test P/N : PFB0624GHE-F00</b>	
<b>Equipment: 1.Oven: E24-F0036</b>	On/Off Cycles: Every 500 hours

⊙ **L<sub>10</sub> Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40°C**  
 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%).

Stress/Elevated Temperature Ts (°C) (Actual Test Temperature)	Unstress Temperature Tu (°C)	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 °C (hours)	Verified L <sub>10</sub> 40 °C (hours)
60	40	4.00	56	2.303	4,968	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)
2005/8/29 2:00 AM	2006/7/18 9:45 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' L<sub>10</sub> 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.)

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

Temperature for MTTF Estimation (°C)	Acceleration Factor A <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (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

<b>Test Result</b>	<input checked="" type="checkbox"/> <b>Accept</b>
	<input type="checkbox"/> <b>Reject</b>

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL201	2803.50	2006/10/9 5:30 PM	Nan.Yang	Gx.Xu



# DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 PFB60x60x38.0 mm series as the right table

PFB0624SHE-TZNY				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2005/8/29 2:00 AM	2006/7/18 9:45 PM	56	0	<b>6956.0</b>

Representative Test P/N : PFB0624GHE-F00	<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-F0036 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 Check. (dB A)	
	<b>0.58Max.</b>	<b>0.58Max.</b>		<b>9000-11000</b>	<b>9000-11000</b>		<b>61.5Max</b>	<b>61.5Max</b>	
1	0.45	0.45	0.4	10293	10237	-0.5	57.8	57.9	0.2
2	0.45	0.45	0.2	10361	10244	-1.1	57.6	58.3	1.2
3	0.47	0.47	-0.8	10447	10354	-0.9	57.5	57.7	0.3
4	0.47	0.44	-6.6	10330	10144	-1.8	57.7	57.8	0.2
5	0.44	0.45	4.1	10212	10237	0.2	57.3	58.0	1.2
6	0.46	0.43	-7.6	10221	10171	-0.5	58.1	58.2	0.2
7	0.44	0.44	0.2	10228	10124	-1.0	57.5	57.5	0.0
8	0.43	0.43	0.5	10220	10085	-1.3	57.9	57.9	0.0
9	0.45	0.46	2.9	10136	10418	2.8	57.6	57.7	0.2
10	0.46	0.45	-1.7	10264	10217	-0.5	57.8	58.1	0.5
11	0.44	0.47	8.7	10233	10392	1.6	57.3	57.9	1.0
12	0.44	0.44	0.2	10309	10197	-1.1	57.8	57.6	-0.3
13	0.45	0.45	0.2	10495	10348	-1.4	57.5	58.1	1.0
14	0.47	0.47	-1.1	10360	10309	-0.5	58.2	57.8	-0.7
15	0.47	0.44	-7.4	10341	10254	-0.8	57.7	57.9	0.3
16	0.47	0.46	-2.1	10286	10316	0.3	57.6	57.6	0.0
17	0.47	0.47	0.0	10413	10338	-0.7	57.5	58.5	1.7
18	0.47	0.45	-5.3	10421	10228	-1.9	57.8	58.1	0.5
19	0.45	0.44	-1.6	10294	10277	-0.2	57.6	57.8	0.3
20	0.48	0.48	-1.0	10502	10431	-0.7	57.5	58.2	1.2
21	0.45	0.45	-0.2	10233	10136	-0.9	57.7	57.5	-0.3
22	0.45	0.47	4.2	10329	10420	0.9	58.0	57.9	-0.2
23	0.47	0.45	-4.9	10416	10283	-1.3	57.6	57.6	0.0
24	0.46	0.46	2.0	10504	10335	-1.6	57.7	57.8	0.2
25	0.44	0.46	3.2	10144	10289	1.4	57.5	57.5	0.0
26	0.44	0.43	-1.4	10154	10230	0.7	57.3	57.9	1.0
27	0.48	0.43	-11.4	10388	10203	-1.8	57.6	58.1	0.9
28	0.48	0.47	-2.1	10304	10370	0.6	57.8	57.6	-0.3
29	0.46	0.47	3.3	10318	10345	0.3	58.2	57.8	-0.7
30	0.45	0.45	1.1	10313	10262	-0.5	57.9	57.6	-0.5
31	0.45	0.44	-1.3	10427	10231	-1.9	57.4	57.8	0.7
32	0.48	0.44	-6.9	10297	10225	-0.7	57.6	58.1	0.9
33	0.45	0.45	-0.9	10324	10241	-0.8	57.7	58.3	1.0
34	0.46	0.46	0.4	10474	10289	-1.8	58.0	57.9	-0.2
35	0.45	0.44	-2.6	10144	10205	0.6	57.6	57.5	-0.2

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
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4,968	2005/8/29 2:00 AM	2006/7/18 9:45 PM	56	0	<b>6956.0</b>
Representative Test P/N : PFB0624GHE-F00			<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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### 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) <b>0.58Max.</b>	Current Spec. (A) <b>0.58Max.</b>		Speed Spec. (RPM) <b>9000-11000</b>	Speed Spec. (RPM) <b>9000-11000</b>		Noise Spec. (dB A) <b>61.5Max</b>	Noise Check. (dB A) <b>61.5Max</b>	
36	0.47	0.47	-0.8	10422	10313	-1.0	57.4	58.3	1.6
37	0.49	0.48	-1.2	10289	10256	-0.3	57.7	58.1	0.7
38	0.46	0.45	-1.1	10327	10284	-0.4	57.8	57.9	0.2
39	0.47	0.47	-1.1	10404	10384	-0.2	57.6	57.6	0.0
40	0.45	0.46	2.4	10274	10256	-0.2	57.5	58.4	1.6
41	0.48	0.47	-1.7	10406	10249	-1.5	57.3	58.1	1.4
42	0.48	0.47	-3.3	10314	10276	-0.4	57.6	57.9	0.5
43	0.44	0.47	8.7	10203	10447	2.4	57.7	57.6	-0.2
44	0.45	0.45	-2.0	10309	10293	-0.2	57.3	57.8	0.9
45	0.45	0.44	-2.0	10264	10273	0.1	57.8	58.3	0.9
46	0.48	0.48	-1.2	10439	10366	-0.7	57.6	58.1	0.9
47	0.47	0.51	8.1	10206	10462	2.5	57.4	57.8	0.7
48	0.47	0.46	-2.4	10346	10258	-0.9	57.2	58.3	1.9
49	0.51	0.44	-13.3	10619	10214	-3.8	57.8	57.5	-0.5
50	0.47	0.47	-0.4	10347	10262	-0.8	57.6	57.9	0.5
51	0.46	0.43	-7.3	10291	10157	-1.3	57.5	58.1	1.0
52	0.50	0.46	-7.5	10364	10237	-1.2	57.9	57.5	-0.7
53	0.45	0.48	7.6	10198	10377	1.8	57.7	57.8	0.2
54	0.45	0.46	2.4	10277	10221	-0.5	57.2	57.7	0.9
55	0.45	0.44	-2.4	10172	10243	0.7	58.0	58.3	0.5
56	0.45	0.44	-2.0	10056	10202	1.5	57.6	57.9	0.5
X-Bar	0.460	0.455	-	10315.4	10275.3	-	57.65	57.90	-
$\sigma$	0.016	0.016	-	108.162	83.455	-	0.233	0.267	-

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