



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 PFC 80x80x38mm series as the right table	PFC0812DE-7F43			
	PFC0812DE-SP04			
	PFC0812DE-SP07			

Representative Test P/N :PFC0812DE-7F43

Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D

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

According to the equation for **Weibull distribution**, **MTTF** \doteq **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 T _s (°C) (Actual Test Temperature)	Unstress Temperature T _u (°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	4,968	9,564	673,757	96,251

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
20-Aug-07	4-Apr-08	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	9,564

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).

Fan permission criteria for the measurement after test:

1. Speed can not drop of \geq 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	11.31	1,905,673	272,239
30	8.00	1,347,514	192,502
40	4.00	673,757	96,251
45	2.83	476,418	68,060
50	2.00	336,879	48,126
60	1.00	168,439	24,063
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
TH07FNL034	508	13-Oct-08	Rotjana	Niranam



DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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				PFC0812DE-SP04					
				PFC0812DE-SP07					
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)				
4,968	20-Aug-07	4-Apr-08	56	0	9,564				
Representative Test P/N :PFC0812DE-7F43			Current Test Status		<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination		
Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D									
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 dB
	Current Spec. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Check. (dB A)	
	1.55 TYP	1.55 TYP	+15% Max	7500 REF	7500 REF	-15% Max	65Max	65Max	+3 dB Max
1	1.44	1.56	8.0	7150	7495	4.8	62.2	61.1	-1.1
2	1.41	1.54	8.8	7155	7442	4.0	61.4	61.7	0.3
3	1.45	1.54	6.5	7167	7529	5.1	62.1	61.2	-0.9
4	1.44	1.54	7.3	7193	7481	4.0	62.3	61.3	-1.0
5	1.44	1.55	7.7	7186	7420	3.3	61.7	61.0	-0.7
6	1.49	1.58	5.7	7167	7499	4.6	61.6	61.1	-0.5
7	1.43	1.54	7.7	7186	7482	4.1	62.8	61.7	-1.1
8	1.45	1.58	9.1	7136	7416	3.9	62.1	60.8	-1.3
9	1.45	1.56	7.9	7181	7429	3.5	62.2	61.3	-0.9
10	1.45	1.57	7.8	7152	7429	3.9	62.4	60.7	-1.7
11	1.43	1.52	6.9	7179	7465	4.0	62.1	60.8	-1.3
12	1.48	1.56	5.6	7195	7456	3.6	62.3	60.6	-1.7
13	1.46	1.60	9.6	7183	7409	3.1	60.9	61.0	0.1
14	1.47	1.57	7.5	7214	7451	3.3	61.3	60.3	-1.0
15	1.46	1.58	8.7	7148	7396	3.5	61.5	60.8	-0.7
16	1.45	1.58	8.7	7167	7429	3.7	61.9	61.1	-0.8
17	1.44	1.54	6.7	7190	7454	3.7	61.7	61.5	-0.2
18	1.46	1.61	10.2	7239	7428	2.6	62.3	61.2	-1.1
19	1.45	1.56	7.5	7145	7433	4.0	61.4	60.8	-0.6
20	1.47	1.48	0.7	7219	7260	0.6	61.3	61.0	-0.3
21	1.44	1.54	6.7	7183	7447	3.7	62.4	60.5	-1.9
22	1.44	1.57	9.2	7205	7448	3.4	62.5	61.2	-1.3
23	1.48	1.57	6.4	7231	7470	3.3	62.5	60.7	-1.8
24	1.48	1.58	6.7	7258	7512	3.5	62.6	61.1	-1.5
25	1.45	1.58	8.7	7201	7391	2.6	61.9	61.0	-0.9
26	1.46	1.58	8.5	7174	7498	4.5	61.6	61.0	-0.6
27	1.49	1.57	5.3	7148	7469	4.5	61.0	60.8	-0.2
28	1.45	1.53	5.5	7148	7430	3.9	61.2	61.0	-0.2
29	1.48	1.62	9.3	7227	7460	3.2	61.5	60.9	-0.6
30	1.45	1.58	8.7	7190	7511	4.5	61.7	60.8	-0.9
31	1.41	1.51	6.8	7136	7469	4.7	61.1	60.7	-0.4
32	1.45	1.54	6.0	7176	7541	5.1	60.8	61.2	0.4
33	1.45	1.55	7.1	7150	7521	5.2	61.1	61.3	0.2
34	1.46	1.61	10.4	7136	7441	4.3	61.7	61.3	-0.4
35	1.45	1.59	9.8	7205	7509	4.2	61.3	61.0	-0.3
QE File No.	Time-out for function test or others (hours)		Issued Date		Reported By		Approved By		
TH07FNL034	508		13-Oct-08		Rotjana		Niranam		



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Representative Test P/N :PFC0812DE-7F43				Current Test Status		<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	
Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D									
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test	Final Test	Deviation (%) +15% Max	Initial Test	Final Test	Deviation (%) -15% Max	Initial Test	Final Test	Deviation dB +3 dB Max
	Current Spec. (A) 1.55 TYP	Current Spec. (A) 1.55 TYP		Speed Spec. (RPM) 7500 REF	Speed Spec. (RPM) 7500 REF		Noise Spec. (dB A) 65Max	Noise Check. (dB A) 65Max	
36	1.45	1.56	7.5	7141	7477	4.7	61.2	61.2	0.0
37	1.46	1.58	8.9	7119	7472	5.0	61.2	60.9	-0.3
38	1.47	1.60	9.1	7188	7525	4.7	61.5	61.0	-0.5
39	1.47	1.60	8.9	7186	7520	4.6	61.3	61.3	0.0
40	1.48	1.58	6.2	7143	7521	5.3	61.5	60.7	-0.8
41	1.45	1.57	8.2	7103	7443	4.8	61.5	60.9	-0.6
42	1.51	1.61	6.9	7167	7596	6.0	61.6	61.2	-0.4
43	1.44	1.52	5.8	7094	7499	5.7	61.6	61.2	-0.4
44	1.49	1.64	10.0	7210	7545	4.6	61.4	60.9	-0.5
45	1.49	1.58	6.1	7105	7479	5.3	61.3	61.1	-0.2
46	1.50	1.60	6.6	7110	7487	5.3	61.2	61.0	-0.2
47	1.45	1.55	6.8	7133	7505	5.2	61.4	61.0	-0.4
48	1.46	1.61	10.3	7148	7424	3.9	61.8	60.6	-1.2
49	1.43	1.56	9.1	7179	7503	4.5	61.2	61.1	-0.1
50	1.47	1.63	10.5	7210	7550	4.7	61.1	60.8	-0.3
51	1.46	1.60	9.3	7174	7469	4.1	61.5	60.8	-0.7
52	1.44	1.54	6.8	7115	7438	4.5	61.3	60.6	-0.7
53	1.43	1.55	8.9	7138	7415	3.9	61.7	60.9	-0.8
54	1.42	1.54	8.4	7155	7483	4.6	61.9	61.0	-0.9
55	1.45	1.56	7.4	7157	7477	4.5	61.4	60.8	-0.6
56	1.46	1.59	8.9	7148	7447	4.2	61.7	61.0	-0.7
X-Bar	1.46	1.57	-	7169	7468	-	61.7	61.0	-
σ	0.021	0.031	-	36	51	-	0.47	0.27	-
QE File No.	Time-out for function test or others (hrs)			Issued Date		Reported By		Approved By	
TH07FNL034	508			13-Oct-08		Rotjana		Niranam	