



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 PFC120x120x38mm series as the right table					
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Representative Test P/N :PFC1224DE-6L52

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 \cong 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)
70	40	8.00	56	2.303	2,484	14,962	2,108,063	301,152

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
19-Jan-07	20-Jun-07	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	14,962

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	22.63	5,962,501	851,786
30	16.00	4,216,125	602,304
40	8.00	2,108,063	301,152
50	4.00	1,054,031	150,576
60	2.00	527,016	75,288
70	1.00	263,508	37,644

Fan permission criteria for the measurement after test:

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

Test Result

Accept
 Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
TH06FNL170	1,155	21-Nov-08	Rotjana	Luc



DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
2,484	19-Jan-07	20-Jun-07	56	0	14,962
Representative Test P/N :PFC1224DE-6L52			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) 2.00 TYP	Current Spec. (A) 2.00 TYP		Speed Spec. (RPM) 5500 REF	Speed Spec. (RPM) 5500 REF		Noise Spec. (dB A) 70.5Max	Noise Check. (dB A) 70.5Max	
1	1.78	1.93	8.3	5704	5736	0.6	69.4	69.6	0.2
2	1.79	1.97	10.3	5574	5697	2.2	69.3	69.3	0.0
3	1.76	1.97	11.9	5565	5749	3.3	69.2	69.3	0.1
4	1.80	1.96	9.0	5548	5651	1.9	69.5	69.6	0.1
5	1.86	1.97	6.0	5550	5688	2.5	69.3	69.4	0.1
6	1.78	2.00	12.6	5555	5759	3.7	69.6	69.0	-0.6
7	1.79	2.02	12.7	5510	5748	4.3	69.3	69.9	0.6
8	1.83	2.05	12.2	5563	5682	2.1	69.3	69.7	0.4
9	1.84	2.02	9.9	5565	5541	-0.4	69.8	69.2	-0.6
10	1.77	2.01	13.6	5553	5674	2.2	69.2	69.1	-0.1
11	1.79	2.01	12.5	5471	5675	3.7	68.5	69.5	1.0
12	1.76	1.87	6.3	5513	5688	3.2	69.8	69.5	-0.3
13	1.80	1.99	10.6	5563	5729	3.0	69.2	69.6	0.4
14	1.90	1.95	2.8	5557	5683	2.3	69.6	69.3	-0.3
15	1.80	1.95	8.4	5481	5631	2.7	69.0	69.2	0.2
16	1.82	2.00	10.1	5544	5712	3.0	68.7	69.1	0.4
17	1.76	1.95	10.7	5483	5557	1.3	69.3	69.3	0.0
18	1.80	1.97	9.7	5494	5698	3.7	69.1	69.6	0.5
19	1.78	1.97	10.8	5565	5645	1.4	69.3	69.4	0.1
20	1.83	2.07	12.9	5406	5666	4.8	68.9	69.3	0.4
21	1.85	2.06	11.6	5521	5687	3.0	69.4	69.8	0.4
22	1.77	1.98	11.8	5368	5669	5.6	68.6	69.6	1.0
23	1.86	1.99	7.1	5534	5706	3.1	69.8	69.4	-0.4
24	1.87	1.96	4.9	5479	5651	3.1	69.6	69.5	-0.1
25	1.81	1.93	6.7	5434	5666	4.3	68.7	69.3	0.6
26	1.89	2.02	6.7	5519	5674	2.8	69.5	69.6	0.1
27	1.85	2.01	8.6	5534	5593	1.1	69.2	69.1	-0.1
28	1.87	2.10	12.4	5494	5691	3.6	69.6	69.2	-0.4
29	1.88	1.94	3.1	5515	5647	2.4	69.9	69.7	-0.2
30	1.74	1.92	10.1	5426	5547	2.2	68.7	69.5	0.8
31	1.86	2.00	7.6	5459	5696	4.3	68.8	69.3	0.5
32	1.85	1.99	7.3	5519	5755	4.3	69.3	69.2	-0.1
33	1.81	2.03	12.1	5428	5754	6.0	68.8	69.5	0.7
34	1.80	1.93	7.3	5416	5658	4.5	68.6	69.8	1.2
35	1.87	2.06	10.0	5448	5750	5.5	69.3	69.6	0.3

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
TH06FNL170	1,155	21-Nov-08	Rotjana	Luc



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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) 2.00 TYP	Current Spec. (A) 2.00 TYP		Speed Spec. (RPM) 5500 REF	Speed Spec. (RPM) 5500 REF		Noise Spec. (dB A) 70.5Max	Noise Check. (dB A) 70.5Max	
36	1.82	2.00	10.0	5488	5689	3.7	69.1	69.4	0.3
37	1.84	1.97	6.9	5398	5570	3.2	68.6	69.6	1.0
38	1.88	2.00	6.5	5521	5756	4.3	69.3	69.7	0.4
39	1.81	2.03	12.4	5471	5678	3.8	69.3	69.5	0.2
40	1.80	2.08	15.7	5500	5722	4.0	68.6	69.6	1.0
41	1.85	2.01	8.5	5492	5719	4.1	68.9	69.5	0.6
42	1.91	1.96	2.6	5550	5658	1.9	68.9	69.2	0.3
43	1.90	2.02	6.1	5506	5573	1.2	68.8	69.5	0.7
44	1.85	2.02	9.2	5434	5707	5.0	69.4	69.4	0.0
45	1.83	1.99	8.5	5426	5664	4.4	69.6	69.6	0.0
46	1.81	1.96	8.0	5515	5677	2.9	69.5	69.8	0.3
47	1.88	2.04	8.6	5529	5655	2.3	69.7	69.6	-0.1
48	1.82	1.96	7.7	5442	5647	3.8	69.7	70.2	0.5
49	1.82	2.04	12.2	5448	5704	4.7	69.1	68.8	-0.3
50	1.82	1.97	8.1	5384	5549	3.1	68.8	69.0	0.2
51	1.88	1.99	5.8	5496	5641	2.6	69.1	69.8	0.7
52	1.88	2.06	9.7	5459	5770	5.7	69.6	69.1	-0.5
53	1.81	2.01	11.0	5449	5710	4.8	68.9	69.3	0.4
54	1.82	1.97	8.0	5398	5727	6.1	68.7	69.8	1.1
55	1.86	1.97	5.9	5442	5530	1.6	69.1	69.6	0.5
56	1.91	2.02	5.9	5442	5726	5.2	69.5	69.7	0.2
X-Bar	1.83	1.99	-	5494	5675	-	69.2	69.5	-
σ	0.043	0.044	-	61	60	-	0.37	0.26	-
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