



# DC FAN CUSTOMIZED LIFE EXPERIMENT TEST REPORT

Available for these models with lower speed and same physical structure. All model may be followed by ARxx or AFxx series suffixes. This test report applies to PFC120x120x38.0 mm series as the right table	PFB1212GHE	PFB1212HHE		
	PFB1212EHE	PFB1212UHE		
	PFB1212SHE	PFC1212DE-5G27		
	PFB1212VHE	PFB1212UHE-T50F		

**Representative Test P/N :PFC1212DE-F00**

**Equipment: 1.Oven: E24-T0160** **On/Off Cycles: Every 500 hours**

☉ **L<sub>10</sub> 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,

$$t = 1.036 \times \text{MTTF} \times [(B_{r;c}) \div n]^{0.91} \div A_F, \text{ and } A_F = 2^{(T_s - T_u)/10}$$

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)
<b>60</b>	<b>40</b>	<b>4.00</b>	<b>56</b>	<b>2.303</b>	<b>6,956</b>	<b>19,360.0</b>	<b>1,363,858</b>	<b>194,837</b>

**Test Progress:**

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
<b>2005/5/24 4:30 PM</b>	<b>2008/2/26 5:33 AM</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	<b>19360.0</b>

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. )

Temperature for MTTF Estimation (°C)	Acceleration Factor A <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
<b>25</b>	<b>11.31</b>	<b>3,857,573</b>	<b>551,082</b>
<b>30</b>	<b>8.00</b>	<b>2,727,716</b>	<b>389,674</b>
<b>40</b>	<b>4.00</b>	<b>1,363,858</b>	<b>194,837</b>
<b>50</b>	<b>2.00</b>	<b>681,929</b>	<b>97,418</b>
<b>60</b>	<b>1.00</b>	<b>340,965</b>	<b>48,709</b>

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**

- Accept**  
 **Reject**

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
<b>DG05FNL090</b>	<b>17225.50</b>	<b>2009/7/27 2:00 AM</b>	<b>Nan Yang</b>	<b>Zenny Lei</b>



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PFB1212GHE	PFB1212HHE		
PFB1212EHE	PFB1212UHE		
PFB1212SHE	PFC1212DE-5G27		
PFB1212VHE	PFB1212UHE-T50F		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2005/5/24 4:30 PM	2008/2/26 5:33 AM	56	0	<b>19360.0</b>

Representative Test P/N :PFC1212DE-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-T0160	<b>On/Off Cycles: Every 500 hours</b>
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### Test Data Between Initial Test and Final Test

Sample No.	Initial Test		Deviation (%)	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 Spec. (dB A)			
	<b>4.80Max.</b>	<b>4.80Max.</b>		<b>4950-6050</b>	<b>4950-6050</b>		<b>70.5Max</b>	<b>70.5Max</b>			
1	3.86	4.20	8.9	5484	5561	1.4	67.1	66.6	-0.7		
2	3.80	3.86	1.7	5514	5285	-4.2	67.3	66.8	-0.7		
3	3.88	3.97	2.3	5541	5486	-1.0	67.7	67.1	-0.9		
4	3.76	3.86	2.8	5536	5561	0.5	67.4	66.8	-0.9		
5	4.03	4.01	-0.5	5386	5487	1.9	67.5	66.9	-0.9		
6	3.90	4.03	3.5	5612	5477	-2.4	67.2	67.1	-0.1		
7	3.90	3.97	1.8	5538	5524	-0.3	67.0	66.5	-0.7		
8	3.96	4.04	2.0	5513	5509	-0.1	67.6	66.4	-1.8		
9	3.88	4.03	3.9	5559	5460	-1.8	67.2	66.9	-0.4		
10	3.86	3.96	2.6	5521	5526	0.1	67.1	66.6	-0.7		
11	3.93	4.02	2.2	5434	5477	0.8	67.4	66.7	-1.0		
12	3.89	4.09	5.3	5552	5545	-0.1	67.3	67.2	-0.1		
13	3.88	4.00	3.2	5572	5448	-2.2	67.6	66.6	-1.5		
14	3.68	3.84	4.3	5578	5457	-2.2	67.5	66.5	-1.5		
15	3.73	4.06	8.9	5559	5586	0.5	67.1	67.0	-0.1		
16	3.86	4.04	4.7	5598	5541	-1.0	67.2	66.5	-1.0		
17	3.78	3.99	5.6	5484	5557	1.3	67.4	66.8	-0.9		
18	3.87	4.03	4.2	5558	5594	0.6	67.6	66.7	-1.3		
19	3.84	4.02	4.6	5513	5310	-3.7	67.7	66.5	-1.8		
20	3.85	4.03	4.5	5578	5462	-2.1	67.2	67.1	-0.1		
21	3.74	3.89	4.0	5539	5486	-1.0	67.4	66.9	-0.7		
22	3.78	4.18	10.7	5546	5498	-0.9	67.3	66.5	-1.2		
23	3.77	3.94	4.6	5536	5528	-0.1	67.5	67.1	-0.6		
24	3.90	4.15	6.3	5547	5537	-0.2	67.6	66.9	-1.0		
25	3.87	3.54	-8.6	5548	5436	-2.0	67.4	67.0	-0.6		
26	4.13	4.10	-0.6	5332	5426	1.8	67.2	67.1	-0.1		
27	3.68	4.05	10.1	5543	5561	0.3	67.7	66.8	-1.3		
28	3.89	4.18	7.5	5571	5611	0.7	67.3	66.5	-1.2		
29	3.71	3.98	7.4	5579	5573	-0.1	67.8	66.9	-1.3		
30	3.87	4.03	4.1	5593	5448	-2.6	67.3	66.5	-1.2		
31	3.78	4.20	11.1	5625	5586	-0.7	67.5	66.8	-1.0		
32	3.88	4.02	3.5	5559	5520	-0.7	67.1	66.8	-0.4		
33	4.03	4.11	2.0	5395	5526	2.4	67.6	66.6	-1.5		
34	3.81	4.05	6.2	5538	5511	-0.5	67.4	67.1	-0.4		
35	3.73	3.96	6.2	5559	5471	-1.6	67.1	67.3	0.3		

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL090	17225.50	2009/7/27 2:00 AM	Nan Yang	Zenny Lei



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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)
6,956	2005/5/24 4:30 PM	2008/2/26 5:33 AM	56	0	<b>19360.0</b>

Representative Test P/N :PFC1212DE-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-T0160	<b>On/Off Cycles: Every 500 hours</b>
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### Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Current Spec.	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)
	( A )	( A )		( RPM )	( RPM )		( dB A )	( dB A )	
	<b>4.80Max.</b>	<b>4.80Max.</b>		<b>4950-6050</b>	<b>4950-6050</b>		<b>70.5Max</b>	<b>70.5Max</b>	
36	3.79	4.01	5.7	5526	5386	-2.5	67.3	66.6	-1.0
37	3.88	4.06	4.6	5547	5486	-1.1	67.5	67.0	-0.7
38	3.95	3.46	-12.5	5427	5563	2.5	67.7	66.9	-1.2
39	3.70	4.12	11.4	5573	5551	-0.4	67.4	66.6	-1.2
40	3.63	3.85	6.1	5621	5476	-2.6	67.6	66.5	-1.6
41	3.90	3.92	0.7	5552	5373	-3.2	67.8	66.8	-1.5
42	3.78	3.86	2.1	5585	5459	-2.3	67.1	67.1	0.0
43	3.97	4.00	0.8	5402	5472	1.3	67.4	66.6	-1.2
44	3.88	4.00	3.3	5548	5398	-2.7	67.3	67.2	-0.1
45	3.74	3.95	5.5	5544	5626	1.5	67.7	66.8	-1.3
46	3.88	3.93	1.4	5573	5586	0.2	67.2	66.5	-1.0
47	3.72	3.96	6.5	5553	5457	-1.7	67.6	66.9	-1.0
48	3.74	3.89	4.1	5556	5549	-0.1	67.5	67.2	-0.4
49	3.90	4.13	5.8	5538	5536	0.0	67.2	67.1	-0.1
50	3.88	4.15	6.9	5559	5662	1.9	67.7	66.5	-1.8
51	3.69	3.88	5.1	5569	5584	0.3	67.3	66.9	-0.6
52	3.88	4.15	6.9	5581	5675	1.7	67.6	67.2	-0.6
53	3.89	4.19	7.7	5550	5586	0.6	67.0	66.8	-0.3
54	3.88	3.96	2.1	5448	5523	1.4	67.4	66.5	-1.3
55	3.88	4.02	3.5	5556	5505	-0.9	67.1	66.9	-0.3
56	3.89	3.96	1.7	5590	5458	-2.4	67.5	66.3	-1.8
X-Bar	3.841	3.998	-	5536.4	5508.6	-	67.40	66.80	-
$\sigma$	0.096	0.135	-	59.091	75.845	-	0.216	0.253	-

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