



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 PFB120x120x38mm series as the right table	PFB1248XHE-CA20			
	PFB1248XHE-TP17			

Representative Test P/N : PFB1248XHE-SP09

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

☉ **L₁₀ 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_{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	4,968	9,360.0	659,386	94,198

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2007/2/12 11:30 PM	2008/9/27 1:45 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	9360.0

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	1,865,025	266,432
30	8.00	1,318,772	188,396
40	4.00	659,386	94,198
50	2.00	329,693	47,099
60	1.00	164,846	23,549

- 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 $> 3\text{dB}$ over the original measure noise.

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
DG07FNL022	9242.00	2009/4/28	Nan.Yang	Zenny Lei



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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PFB1248XHE-CA20				
PFB1248XHE-TP17				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2007/2/12 11:30 PM	2008/9/27 1:45 AM	56	0	9360.0

Representative Test P/N : PFB1248XHE-SP09	Current Test Status	<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 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 Spec. (dB A)	
	1.92 Max.	1.92 Max.		6300-7700	6300-7700		76.5Max	76.5Max	3 dBMax.
1	1.69	1.56	-7.5	7001	6797	-2.9	73.8	74.2	0.4
2	1.54	1.56	1.5	6838	6805	-0.5	74.0	74.6	0.6
3	1.57	1.56	-0.9	6934	6797	-2.0	73.0	74.1	1.1
4	1.53	1.58	3.1	6891	7033	2.1	73.7	74.0	0.3
5	1.57	1.56	-0.1	6929	6805	-1.8	73.2	74.2	1.0
6	1.61	1.60	-0.1	7002	6926	-1.1	73.8	73.9	0.1
7	1.55	1.60	3.1	6830	7003	2.5	73.4	74.6	1.2
8	1.58	1.55	-2.3	6922	6821	-1.5	74.0	74.2	0.2
9	1.60	1.61	1.0	6945	7100	2.2	73.6	74.1	0.5
10	1.71	1.61	-6.0	7137	6900	-3.3	73.9	73.9	0.0
11	1.63	1.59	-2.2	7118	6993	-1.8	73.9	74.5	0.6
12	1.61	1.58	-1.6	7013	7033	0.3	73.8	73.9	0.1
13	1.59	1.55	-2.5	6951	6830	-1.7	73.2	74.0	0.8
14	1.61	1.59	-1.2	7030	7014	-0.2	74.0	74.3	0.3
15	1.51	1.61	6.6	6791	6926	2.0	73.5	74.2	0.7
16	1.56	1.59	1.9	6907	7012	1.5	73.9	74.1	0.2
17	1.56	1.59	2.3	6923	7028	1.5	74.0	75.9	1.9
18	1.58	1.59	0.4	6969	6730	-3.4	73.6	74.5	0.9
19	1.55	1.59	2.4	6907	7014	1.5	73.7	74.0	0.3
20	1.56	1.58	1.2	6930	6749	-2.6	74.2	74.2	0.0
21	1.66	1.61	-3.0	7160	6905	-3.6	73.4	74.6	1.2
22	1.62	1.56	-3.6	6992	6808	-2.6	73.8	74.2	0.4
23	1.55	1.59	2.6	6800	7028	3.4	73.4	74.2	0.8
24	1.59	1.58	-0.8	6852	6749	-1.5	73.5	74.5	1.0
25	1.58	1.56	-1.5	6867	6815	-0.8	73.7	74.7	1.0
26	1.70	1.55	-9.2	7103	6831	-3.8	73.3	74.1	0.8
27	1.75	1.56	-10.9	7119	6808	-4.4	73.7	74.3	0.6
28	1.64	1.63	-0.8	6988	7054	0.9	74.0	74.0	0.0
29	1.51	1.60	6.0	6889	6979	1.3	73.5	74.0	0.5
30	1.57	1.56	-0.8	6872	6815	-0.8	73.8	74.5	0.7
31	1.64	1.60	-2.5	6941	6961	0.3	73.3	74.4	1.1
32	1.64	1.60	-2.3	6838	7141	4.4	73.9	74.6	0.7
33	1.74	1.59	-8.7	7065	6722	-4.9	74.0	74.2	0.2
34	1.60	1.56	-2.7	6876	6801	-1.1	73.9	73.9	0.0
35	1.63	1.66	1.7	6930	6948	0.3	73.4	74.2	0.8

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG07FNL022	9242.00	2009/4/28	Nan.Yang	Zenny Lei



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	Current Spec. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	1.92 Max.	1.92 Max.		6300-7700	6300-7700		76.5Max	76.5Max	3 dBMax.
36	1.56	1.56	-0.1	6862	6807	-0.8	73.2	74.5	1.3
37	1.58	1.58	0.1	6888	6764	-1.8	73.7	74.3	0.6
38	1.60	1.58	-0.8	6937	7054	1.7	73.0	74.0	1.0
39	1.59	1.56	-2.0	6948	6811	-2.0	74.0	74.3	0.3
40	1.67	1.55	-7.2	7037	6819	-3.1	73.5	74.6	1.1
41	1.60	1.55	-3.4	6996	6835	-2.3	74.0	74.1	0.1
42	1.53	1.56	1.9	6835	6863	0.4	73.6	74.4	0.8
43	1.55	1.56	0.7	6961	6807	-2.2	73.2	74.7	1.5
44	1.53	1.55	1.4	6851	6825	-0.4	73.3	74.5	1.2
45	1.55	1.61	3.7	6928	7119	2.8	73.4	73.9	0.5
46	1.63	1.61	-1.6	7080	7119	0.6	73.5	74.2	0.7
47	1.49	1.61	7.6	6817	7131	4.6	73.5	74.7	1.2
48	1.55	1.60	3.2	6930	6969	0.6	73.8	74.6	0.8
49	1.57	1.61	2.3	6936	7131	2.8	74.0	74.2	0.2
50	1.51	1.58	4.6	6886	7045	2.3	74.1	74.7	0.6
51	1.59	1.58	-0.3	7052	7045	-0.1	73.3	74.5	1.2
52	1.61	1.55	-3.8	7049	6838	-3.0	73.9	74.4	0.5
53	1.54	1.56	1.2	6854	6804	-0.7	73.8	74.6	0.8
54	1.56	1.59	2.1	7050	6733	-4.5	73.5	74.2	0.7
55	1.53	1.56	2.0	6867	6809	-0.8	73.0	74.0	1.0
56	1.63	1.60	-1.6	7001	6938	-0.9	73.2	74.5	1.3
X-Bar	1.590	1.580	-	6946.9	6909.8	-	73.63	74.32	-
σ	0.057	0.024	-	90.834	123.870	-	0.313	0.328	-

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DG07FNL022	9242.00	2009/4/28	Nan.Yang	Zenny Lei