

DC FAN LIFE EXPERIMENT 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 PFB80x80x38.0 mm series as the right table	PFB0824DHE	PFB0812SHE	PFB0812DHE-8J90	PFB0812DHE-9K44	PFB0812DHE-AJ1L
	PFB0812DHE	PFB0824GHE	PFB0812GHE-SP42	PFB0812DHE-AN65	PFB0848UHE
	PFB0812UHE	PFB0812EHE	PFB0824DHE-9H68	PFB0812UHE-AK96	PFB0812DHE-SP22
	PFB0824UHE	PFB0824EHE	PFB0848UHE-9M06	PFB0848UHE-9M05	PFB0812DHE-SE19
	PFB0812GHE	PFB0812VHE	PFB0812DHE-SP44	PFB0812DE-BC55R	PFB0824DHE-T50F
Representative Test P/N :PFB0812DHE-F00	PFB0812DHE-TYNT				
Equipment: 1.Oven: E24-T0164			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**, $MTTF \cong 7 \times L_{10} = 350,000$ 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,

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

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	25,956.0	1,828,528	261,218

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/4/11 11:30 PM	2007/10/1 3:15 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	25956.0

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	5,171,858	738,837
30	8.00	3,657,056	522,437
40	4.00	1,828,528	261,218
50	2.00	914,264	130,609
60	1.00	457,132	65,305

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
DG05FNL072	16695.50	2010/2/22 3:00 AM	Nan Yang	Zenny Lei



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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	PFB0812UHE	PFB0812EHE	PFB0824DHE-9H68	PFB0812UHE-AK96	PFB0812DHE-SP22
	PFB0824UHE	PFB0824EHE	PFB0848UHE-9M06	PFB0848UHE-9M05	PFB0812DHE-SE19
	PFB0812GHE	PFB0812VHE	PFB0812DHE-SP44	PFC0812DE-BC55R	PFB0824DHE-T50F
	PFB0812DHE-TYNT				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2005/4/11 11:30 PM	2007/10/1 3:15 PM	56	0	25956.0

Representative Test P/N :PFB0812DHE-F00	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-T0164 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 4.13Max.	Final Test Current Spec. (A) 4.13Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 8100-9900	Final Test Speed Spec. (RPM) 8100-9900	Deviation (%)	Initial Test Noise Spec. (dB A) 70.0Max	Final Test Noise Spec. (dB A) 70.0Max	Deviation (%)
1	2.55	2.53	-0.6	8714	8860	1.7	64.3	65.8	2.3
2	2.52	2.58	2.2	8960	8958	0.0	65.0	65.9	1.4
3	2.51	2.51	0.1	8936	8862	-0.8	64.5	66.3	2.8
4	2.52	2.55	1.0	8811	8908	1.1	64.6	66.5	2.9
5	2.48	2.59	4.8	8985	8898	-1.0	64.7	66.1	2.2
6	2.55	2.54	-0.4	9003	8877	-1.4	64.4	65.8	2.2
7	2.60	2.58	-0.7	8875	8958	0.9	64.6	66.4	2.8
8	2.41	2.62	8.6	8919	8998	0.9	64.3	66.0	2.6
9	2.43	2.63	8.2	8754	8977	2.5	64.8	66.2	2.2
10	2.43	2.49	2.1	8661	8837	2.0	64.5	66.3	2.8
11	2.51	2.51	-0.2	8929	8811	-1.3	64.6	65.9	2.0
12	2.47	2.47	0.0	9045	8820	-2.5	64.4	65.8	2.2
13	2.44	2.52	3.5	8941	8841	-1.1	63.2	66.3	4.9
14	2.43	2.52	3.5	8931	8896	-0.4	67.6	66.1	-2.2
15	2.46	2.54	3.3	8728	8896	1.9	64.7	66.7	3.1
16	2.49	2.46	-1.2	8836	8759	-0.9	64.5	66.0	2.3
17	2.38	2.52	5.9	8958	8831	-1.4	64.8	65.9	1.7
18	2.51	2.48	-1.1	8809	8853	0.5	64.3	66.4	3.3
19	2.57	2.51	-2.5	8846	8795	-0.6	64.5	66.2	2.6
20	2.41	2.55	5.7	8637	8865	2.6	64.9	66.8	2.9
21	2.43	2.54	4.4	8712	8803	1.0	64.4	65.8	2.2
22	2.55	2.49	-2.4	9066	8831	-2.6	64.6	66.3	2.6
23	2.48	2.50	0.5	8990	8901	-1.0	66.1	67.6	2.3
24	2.45	2.38	-2.6	8953	8347	-6.8	64.8	66.5	2.6
25	2.54	2.46	-3.3	9059	8784	-3.0	64.5	65.8	2.0
26	2.50	2.65	6.3	8785	8927	1.6	64.3	66.3	3.1
27	2.41	2.50	3.8	8677	8893	2.5	64.5	66.5	3.1
28	2.58	2.45	-4.9	8826	8931	1.2	64.6	66.0	2.2
29	2.50	2.45	-2.0	8921	8927	0.1	63.5	66.2	4.3
30	2.51	2.61	3.7	8736	8951	2.5	64.6	65.8	1.9
31	2.48	2.53	2.2	9108	8853	-2.8	64.3	66.4	3.3
32	2.69	2.48	-7.7	9015	8840	-1.9	64.8	65.9	1.7
33	2.56	2.65	3.6	8956	8924	-0.4	64.2	66.2	3.1
34	2.36	2.41	2.1	8759	8956	2.2	63.9	65.8	3.0
35	2.45	2.61	6.5	8925	8650	-3.1	64.2	66.4	3.4

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL072	16695.50	2010/2/22 3:00 AM	Nan Yang	Zenny Lei



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	PFB0824UHE	PFB0824EHE	PFB0848UHE-9M06	PFB0848UHE-9M05	PFB0812DHE-SE19
	PFB0812GHE	PFB0812VHE	PFB0812DHE-SP44	PFB0812DHE-BC55R	PFB0824DHE-T50F
	PFB0812DHE-TYNT				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
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Representative Test P/N :PFB0812DHE-F00	Current Test Status	<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 Current Spec. (A) 4.13Max.	Final Test Current Spec. (A) 4.13Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 8100-9900	Final Test Speed Spec. (RPM) 8100-9900	Deviation (%)	Initial Test Noise Spec. (dB A) 70.0Max	Final Test Noise Spec. (dB A) 70.0Max	Deviation (%)
36	2.52	2.51	-0.5	8956	8745	-2.4	64.2	66.1	3.0
37	2.53	2.61	3.0	8963	8943	-0.2	64.3	65.7	2.2
38	2.50	2.42	-3.2	9102	9172	0.8	64.2	65.9	2.6
39	2.52	2.59	2.9	8925	8856	-0.8	64.2	66.2	3.1
40	2.50	2.63	5.1	8936	8875	-0.7	64.3	66.8	3.9
41	2.52	2.47	-1.8	8912	8856	-0.6	63.8	66.0	3.4
42	2.53	2.46	-2.7	8945	8625	-3.6	63.9	66.4	3.9
43	2.52	2.48	-1.7	8936	8759	-2.0	64.2	65.9	2.6
44	2.50	2.50	-0.1	8975	8826	-1.7	64.3	66.1	2.8
45	2.46	2.61	5.9	8925	8925	0.0	64.2	66.5	3.6
46	2.52	2.65	5.3	8925	8726	-2.2	64.0	65.9	3.0
47	2.50	2.53	1.2	8936	8823	-1.3	67.6	66.2	-2.1
48	2.47	2.50	1.2	9012	8813	-2.2	64.3	66.5	3.4
49	2.50	2.47	-1.2	9123	8726	-4.4	64.8	66.0	1.9
50	2.49	2.49	0.0	9123	8956	-1.8	65.0	66.8	2.8
51	2.48	2.47	-0.2	9025	8836	-2.1	64.2	66.3	3.3
52	2.46	2.48	0.7	8936	8925	-0.1	64.3	66.1	2.8
53	2.58	2.65	2.8	9102	8945	-1.7	64.2	65.4	1.9
54	2.46	2.36	-4.1	9202	9025	-1.9	64.3	65.8	2.3
55	2.63	2.55	-3.0	9123	8896	-2.5	64.9	65.9	1.5
56	2.58	2.59	0.4	8956	8942	-0.2	64.6	66.3	2.6
X-Bar	2.498	2.525	-	8925.1	8860.9	-	64.54	66.17	-
σ	0.060	0.070	-	128.037	114.354	-	0.720	0.360	-

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