



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 FFB40x40x28 mm series as the right table	FFB0412SHN-BR00	FFB0412VHN-BV29			
	FFB0412SHN-SZ71	FFB0412VHN-PE05			
	FFB0412SHN-PM04	FFB0412VHN-B			
	FFB0412VHN-BR00	FFB0412SHN-AL1T			

Representative Test P/N :FFB0412SHN-F00(2)

Equipment: 1.Oven: E24-F0053 On/Off Cycles: Every 500 hours

◎ **L₁₀ Expectancy: 30,000 hours minimum @ fan rated voltage and the temperature of 55°C**
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L₁₀ = 210,000 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 55 °C (hours)	Verified L ₁₀ 55 °C (hours)
70	55	2.83	56	2.303	4,216	4,216.0	210,015	30,002

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2003/7/1 10:00 PM	2004/1/18 6:12 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	4216.0

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	22.63	1,680,117	240,017
30	16.00	1,188,022	169,717
40	8.00	594,011	84,859
50	4.00	297,005	42,429
55	2.83	210,015	30,002
60	2.00	148,503	21,215
70	1.00	74,251	10,607

- 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
DG03FNL083	604.50	2004/1/18 6:30 PM	Huiling.Fu	Even.Liu

Note: The test sample equivalent to STD, Part number: FFB0412SHN-F00.



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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FFB0412SHN-SZ71	FFB0412VHN-PE05		
FFB0412SHN-PM04	FFB0412VHN-B		
FFB0412VHN-BR00	FFB0412SHN-AL1T		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,216	2003/7/1 10:00 PM	2004/1/18 6:12 PM	56	0	4216.0
Representative Test P/N :FFB0412SHN-F00(2)			Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination
Equipment: 1.Oven: E24-F0053				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) 0.60Max.	Current Spec. (A) 0.60Max.		Speed Spec. (RPM) 11960-14040	Speed Spec. (RPM) 11960-14040		Noise Spec. (dB A) 57.0Max	Noise Spec. (dB A) 57.0Max	
1	0.39	0.39	0.0	13927	13364	-4.0	54.6	55.4	1.5
2	0.42	0.40	-4.8	13918	13341	-4.1	55.1	55.1	0.0
3	0.40	0.39	-2.5	13874	13224	-4.7	54.8	55.2	0.7
4	0.40	0.40	0.0	13527	13257	-2.0	54.7	45.9	-16.1
5	0.41	0.41	0.0	13629	13377	-1.8	54.9	55.6	1.3
6	0.40	0.40	0.0	13667	13348	-2.3	54.8	55.1	0.5
7	0.40	0.39	-2.5	13657	13360	-2.2	54.7	55.3	1.1
8	0.40	0.40	0.0	13695	12659	-7.6	54.6	46.9	-14.1
9	0.40	0.41	2.5	13657	13386	-2.0	55.2	55.4	0.4
10	0.41	0.41	0.0	13707	13430	-2.0	55.3	55.6	0.5
11	0.40	0.40	0.0	13659	13304	-2.6	55.1	55.7	1.1
12	0.39	0.39	0.0	13556	13407	-1.1	54.6	53.9	-1.3
13	0.42	0.42	0.0	13727	13450	-2.0	54.6	55.1	0.9
14	0.42	0.43	2.4	13849	13422	-3.1	55.2	55.1	-0.2
15	0.40	0.40	0.0	13447	13467	0.1	55.1	55.4	0.5
16	0.42	0.40	-4.8	13759	13541	-1.6	55.2	55.6	0.7
17	0.40	0.41	2.5	13394	13423	0.2	55.6	55.4	-0.4
18	0.41	0.41	0.0	13459	13364	-0.7	54.7	55.3	1.1
19	0.40	0.39	-2.5	13492	13354	-1.0	54.8	55.1	0.5
20	0.40	0.40	0.0	13779	13326	-3.3	54.9	55.6	1.3
21	0.40	0.41	2.5	13892	13442	-3.2	54.6	55.0	0.7
22	0.41	0.42	2.4	13886	13518	-2.7	55.1	55.1	0.0
23	0.41	0.40	-2.4	13729	13379	-2.5	55.0	55.0	0.0
24	0.41	0.40	-2.4	13859	13724	-1.0	55.2	55.2	0.0
25	0.41	0.40	-2.4	13807	13338	-3.4	54.9	55.3	0.7
26	0.42	0.40	-4.8	13827	13479	-2.5	54.8	55.4	1.1
27	0.41	0.40	-2.4	13525	13364	-1.2	54.7	55.1	0.7
28	0.39	0.38	-2.6	13574	13289	-2.1	54.6	55.0	0.7
29	0.40	0.42	5.0	13921	13380	-3.9	55.3	55.1	-0.4
30	0.41	0.41	0.0	13747	13230	-3.8	55.1	55.4	0.5
31	0.41	0.41	0.0	13794	13412	-2.8	54.6	55.6	1.8
32	0.41	0.40	-2.4	13729	13357	-2.7	55.3	55.6	0.5
33	0.43	0.42	-2.3	13749	13475	-2.0	55.1	55.3	0.4
34	0.42	0.41	-2.4	13827	13510	-2.3	54.6	55.3	1.3
35	0.42	0.40	-4.8	13987	13441	-3.9	54.7	55.2	0.9

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL083	604.50	2004/1/18 6:30 PM	Huiling.Fu	Even.Liu



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4,216	2003/7/1 10:00 PM	2004/1/18 6:12 PM	56	0	4216.0				
Representative Test P/N :FFB0412SHN-F00(2)				Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination		
Equipment: 1.Oven: E24-F0053					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)	
	0.60Max.	0.60Max.		11960-14040	11960-14040		57.0Max	57.0Max	
36	0.42	0.40	-4.8	13759	13254	-3.7	54.6	55.2	1.1
37	0.43	0.43	0.0	13745	13347	-2.9	54.5	55.7	2.2
38	0.41	0.40	-2.4	13794	13357	-3.2	54.0	55.6	3.0
39	0.40	0.40	0.0	13762	13256	-3.7	55.0	55.5	0.9
40	0.40	0.40	0.0	13849	13370	-3.5	54.8	55.4	1.1
41	0.42	0.42	0.0	13847	13424	-3.1	54.7	55.7	1.8
42	0.41	0.41	0.0	13719	13433	-2.1	55.2	55.6	0.7
43	0.42	0.42	0.0	13692	13376	-2.3	55.1	55.2	0.2
44	0.40	0.44	10.0	13794	13306	-3.5	54.8	55.8	1.8
45	0.42	0.42	0.0	13827	13379	-3.2	54.7	55.7	1.8
46	0.41	0.41	0.0	13639	13424	-1.6	54.6	55.6	1.8
47	0.41	0.40	-2.4	13827	13401	-3.1	55.4	55.7	0.5
48	0.40	0.41	2.5	13946	13307	-4.6	55.3	55.2	-0.2
49	0.40	0.41	2.5	13735	13401	-2.4	54.7	55.1	0.7
50	0.42	0.43	2.4	13579	13479	-0.7	54.5	55.0	0.9
51	0.41	0.41	0.0	13394	13311	-0.6	54.4	55.7	2.4
52	0.40	0.41	2.5	13690	13370	-2.3	54.6	55.1	0.9
53	0.41	0.40	-2.4	13857	13581	-2.0	54.6	55.2	1.1
54	0.40	0.41	2.5	13827	13458	-2.7	55.3	55.6	0.5
55	0.42	0.42	0.0	13874	13350	-3.8	55.6	55.1	-0.9
56	0.40	0.40	0.0	13449	13245	-1.5	54.6	55.7	2.0
X-Bar	0.408	0.407	-	13727.5	13374.7	-	54.88	55.01	-
σ	0.010	0.012	-	147.217	133.489	-	0.321	1.703	-
QE File No.	Time-out for function test or others (hrs)			Issued Date		Reported By		Approved By	
DG03FNL083	604.50			2004/1/18 6:30 PM		Huiling.Fu		Even.Liu	