



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 GFB40x40x55.0 mm series as the right table	GFB0412EHS	GFB0412SHS			

Representative Test P/N :GFB0412EHS-AF00

Equipment: 1.Oven: E24-F0053

On/Off Cycles: Every 500 hours

L₁₀ Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40

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 () (Actual Test Temperature)	Unstress Temperature Tu ()	Acceleration Factor A _F	Quantity of Test Devices (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 (hours)	Verified L ₁₀ 40 (hours)
70	40	8.00	56	2.303	2,484	2,484.0	349,982	49,997

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/12/26 11:30 PM	2006/4/28 11:37 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	2484.0

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 ()	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	989,898	141,414
30	16.00	699,964	99,995
40	8.00	349,982	49,997
50	4.00	174,991	24,999
60	2.00	87,495	12,499
70	1.00	43,748	6,250

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
DG05FNL305	468.00	2006/4/28 11:30 PM	Nan.Yang	gx.xu



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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	2005/12/26 11:30 PM	2006/4/28 11:37 PM	56	0	2484.0
Representative Test P/N :GFB0412EHS-AF00			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 Check. (dB A)	
	1.82Max.	1.82Max.		14580-17820	14580-17820		66.5Max	66.5Max	
				10800-13200	10800-13200				
1	1.20	1.18	-1.7	16889	16839	-0.3	62.7	62.4	-0.5
				12399	12363	-0.3			
2	1.27	1.26	-0.8	16561	16747	1.1	62.5	62.6	0.2
				12398	12357	-0.3			
3	1.26	1.24	-1.6	16736	16324	-2.5	62.8	62.3	-0.8
				12725	12170	-4.4			
4	1.25	1.25	0.0	17079	16814	-1.6	62.4	62.6	0.3
				12522	12377	-1.2			
5	1.21	1.21	0.0	16688	16522	-1.0	62.6	63.1	0.8
				12747	12649	-0.8			
6	1.21	1.21	0.0	16655	16413	-1.5	62.3	62.4	0.2
				12445	12271	-1.4			
7	1.27	1.26	-0.8	16935	16942	0.0	62.7	62.3	-0.6
				12127	12012	-0.9			
8	1.23	1.21	-1.6	16672	16899	1.4	62.3	62.7	0.6
				12539	12477	-0.5			
9	1.23	1.23	0.0	16660	16989	2.0	62.8	62.4	-0.6
				12507	12576	0.6			
10	1.17	1.15	-1.7	16660	16591	-0.4	62.5	62.6	0.2
				12507	12315	-1.5			
11	1.25	1.23	-1.6	16788	16672	-0.7	62.7	62.3	-0.6
				12398	12367	-0.3			
12	1.23	1.23	0.0	16464	16598	0.8	62.4	62.2	-0.3
				12250	12573	2.6			
13	1.25	1.24	-0.8	16915	16925	0.1	62.8	62.4	-0.6
				12555	12339	-1.7			
14	1.20	1.20	0.0	16893	16768	-0.7	62.4	62.3	-0.2
				12449	12392	-0.5			
15	1.23	1.23	0.0	16397	16829	2.6	62.7	62.5	-0.3
				12417	12536	1.0			
16	1.23	1.20	-2.4	16606	16658	0.3	62.3	62.4	0.2
				12380	12461	0.7			
17	1.25	1.24	-0.8	16632	16457	-1.1	62.8	62.2	-1.0
				12612	12615	0.0			
18	1.28	1.21	-5.5	16674	16877	1.2	62.4	62.4	0.0
				12600	12552	-0.4			

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL305	468.00	2006/4/28 11:30 PM	Nan.Yang	gx.xu



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GFB0412EHS	GFB0412SHS		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
2,484	2005/12/26 11:30 PM	2006/4/28 11:37 PM	56	0	2484.0

Representative Test P/N :GFB0412EHS-AF00	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-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)	
	1.82Max.	1.82Max.		14580-17820	14580-17820		66.5Max	66.5Max	
				10800-13200	10800-13200				
19	1.27	1.24	-2.4	16596	16565	-0.2	62.7	62.2	-0.8
				12445	12398	-0.4			
20	1.19	1.17	-1.7	16725	16882	0.9	62.4	62.3	-0.2
				12560	12205	-2.8			
21	1.25	1.26	0.8	16310	16628	1.9	62.7	62.4	-0.5
				12495	12279	-1.7			
22	1.20	1.24	3.3	16860	16926	0.4	62.5	62.3	-0.3
				12529	12583	0.4			
23	1.25	1.28	2.4	16560	16482	-0.5	62.7	62.2	-0.8
				12558	12583	0.2			
24	1.27	1.24	-2.4	16877	16051	-4.9	62.6	62.6	0.0
				12293	12218	-0.6			
25	1.29	1.27	-1.6	16779	16851	0.4	62.8	62.4	-0.6
				12482	12475	-0.1			
26	1.27	1.25	-1.6	16634	16587	-0.3	62.4	62.3	-0.2
				12490	12547	0.5			
27	1.23	1.20	-2.4	16705	16877	1.0	62.3	63.0	1.1
				12421	12441	0.2			
28	1.21	1.20	-0.8	16401	16406	0.0	62.7	62.4	-0.5
				12643	12368	-2.2			
29	1.25	1.24	-0.8	16705	16570	-0.8	62.5	62.2	-0.5
				12421	12420	0.0			
30	1.25	1.22	-2.4	16159	16823	4.1	62.8	62.3	-0.8
				12151	12158	0.1			
31	1.27	1.24	-2.4	16451	16559	0.7	62.4	62.5	0.2
				12555	+12440	-0.9			
32	1.26	1.23	-2.4	16316	16331	0.1	62.7	62.4	-0.5
				11824	12787	8.1			
33	1.26	1.25	-0.8	16126	16269	0.9	62.8	62.6	-0.3
				12052	12152	0.8			
34	1.21	1.23	1.7	16362	16319	-0.3	62.8	62.3	-0.8
				12250	12254	0.0			
35	1.25	1.25	0.0	16639	16621	-0.1	62.4	62.4	0.0
				12500	12403	-0.8			
36	1.21	1.20	-0.8	16458	16625	1.0	62.5	62.1	-0.6
				12356	12895	4.4			
37	1.27	1.27	0.0	16814	16267	-3.3	62.7	62.5	-0.3
				12428	12391	-0.3			

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
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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	2005/12/26 11:30 PM	2006/4/28 11:37 PM	56	0	2484.0
Representative Test P/N :GFB0412EHS-AF00			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)	
	1.82Max.	1.82Max.		14580-17820	14580-17820		66.5Max	66.5Max	
				10800-13200	10800-13200				
38	1.20	1.18	-1.7	16662	16571	-0.5	62.3	62.3	0.0
39	1.24	1.21	-2.4	12179	12239	0.5	62.9	62.4	-0.8
				12345	12329	-0.1			
40	1.30	1.26	-3.1	16736	16553	-1.1	62.3	62.6	0.5
				12156	12143	-0.1			
41	1.26	1.25	-0.8	16704	16650	-0.3	62.7	62.5	-0.3
				12444	12324	-1.0			
42	1.26	1.24	-1.6	16646	16739	0.6	62.4	62.2	-0.3
				12016	12573	4.6			
43	1.23	1.22	-0.8	16896	16877	-0.1	62.8	62.4	-0.6
				12805	12917	0.9			
44	1.23	1.20	-2.4	16636	16830	1.2	62.3	62.6	0.5
				12320	12689	3.0			
45	1.24	1.22	-1.6	16356	16882	3.2	62.6	62.4	-0.3
				12664	12668	0.0			
46	1.26	1.26	0.0	16914	16729	-1.1	62.4	62.3	-0.2
				12385	12479	0.8			
47	1.23	1.21	-1.6	16544	16885	2.1	62.8	62.4	-0.6
				12330	12525	1.6			
48	1.25	1.24	-0.8	16937	16340	-3.5	62.7	62.4	-0.5
				12509	12388	-1.0			
49	1.28	1.26	-1.6	16616	16641	0.2	62.3	62.6	0.5
				12332	12596	2.1			
50	1.19	1.20	0.8	16347	16400	0.3	62.5	62.2	-0.5
				12559	12636	0.6			
51	1.32	1.32	0.0	16173	16897	4.5	62.2	62.4	0.3
				12361	12443	0.7			
52	1.25	1.25	0.0	16779	16578	-1.2	62.8	63.0	0.3
				12326	12405	0.6			
53	1.22	1.22	0.0	16698	16710	0.1	62.5	62.7	0.3
				12424	12351	-0.6			
54	1.26	1.26	0.0	16812	16625	-1.1	62.2	62.3	0.2
				12363	12271	-0.7			
55	1.26	1.26	0.0	16655	16483	-1.0	62.8	62.4	-0.6
				12410	12503	0.7			
56	1.28	1.26	-1.6	16991	16949	-0.2	62.7	62.6	-0.2
				12545	12557	0.1			
X-Bar	1.285	1.247	-	13740.4	14488.1	-	61.19	62.58	-
	0.039	0.033	-	2077.422	2116.893	-	1.008	0.319	-

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