



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 AFB150x172x25.4mm series as the right table	AFB1512HH-A	AFB1524HH-A	AFB1548HH-A	AFB1724HH-A	AFB1712HH-A
	AFB1512H-A	AFB1524H-A	AFB1548H-A	AFB1724H-A	AFB1712H-A
	AFB1512M-A	AFB1524M-A	AFB1548M-A	AFB1724M-A	AFB1712M-A
	AFB1512L-A	AFB1524L-A	AFB1548L-A	AFB1724L-A	AFB1712L-A

Representative Test P/N: AFB1524HH-AF00

Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D

Life Expectancy: L10 80,000 hours minimum @ fan rated voltage and the temperature of 40°C

According to the equation for **Weibull distribution**, **MTTF $\cong 7 \times L10 = 560,000$ 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,

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

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 T_s (°C) <small>(Actual Test Temperature)</small>	Unstress Temperature T_u (°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 L10 40°C (hours)
70	40	8.00	56	2.303	3,975	19,364	2,728,280	389,754

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
08-Feb-05	7-Sep-07	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	19,364

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 L10 (hours)
25	22.63	7,716,741	1,102,392
30	16.00	5,456,560	779,509
40	8.00	2,728,280	389,754
50	4.00	1,364,140	194,877
60	2.00	682,070	97,439
70	1.00	341,035	48,719
Test Result		<input checked="" type="checkbox"/> Accept	<input type="checkbox"/> Reject

Fan acceptance criteria for the measurements after test :

1. Speed can not decrease $\geq 15\%$ below the original measured RPM.
2. Current cannot increase $> 15\%$ over original measure current.
3. Noise cannot increase $> 3\text{dB}$ over the original measured noise.

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH05FNL070	3,220	07-Sep-07	Adoon	Luc



DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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AFB1512H-A	AFB1524H-A	AFB1548H-A	AFB1724H-A	AFB1712H-A
AFB1512M-A	AFB1524M-A	AFB1548M-A	AFB1724M-A	AFB1712M-A
AFB1512L-A	AFB1524L-A	AFB1548L-A	AFB1724L-A	AFB1712L-A

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,975	8-Feb-05	7-Sep-07	56	0	19,364

Representative Test P/N: AFB1524HH-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: F00-5, E24-T060 2. DC Source: GW GPC-3060D

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%) +15% Max	Initial Test	Final Test	Deviation (%) -15% Max	Initial Test	Final Test	Deviation dB +3 dB Max
	Current Spec. TYP (A) 0.6	Current Spec. TYP (A) 0.6		Speed Spec. REF (RPM) 3200	Speed Spec. REF (RPM) 3200		Noise Spec. Max (dB A) 58.5	Noise Check. Max (dB A) 58.5	
1	0.65	0.59	-9.0	3360	3212	-4.4	56.0	57.7	1.7
2	0.62	0.56	-9.3	3312	3128	-5.6	55.4	55.2	-0.2
3	0.62	0.57	-8.0	3298	3193	-3.2	56.1	56.8	0.7
4	0.61	0.57	-6.8	3288	3210	-2.4	55.9	56.2	0.3
5	0.63	0.56	-11.0	3326	3150	-5.3	56.3	56.1	-0.2
6	0.62	0.58	-7.0	3310	3194	-3.5	56.2	56.8	0.6
7	0.63	0.58	-8.0	3336	3177	-4.8	56.4	55.8	-0.6
8	0.64	0.59	-8.5	3343	3182	-4.8	56.5	55.9	-0.6
9	0.60	0.55	-8.3	3290	3166	-3.8	56.2	55.6	-0.6
10	0.62	0.57	-8.7	3314	3193	-3.7	56.4	56.7	0.3
11	0.62	0.58	-6.0	3280	3186	-2.9	55.8	56.3	0.5
12	0.64	0.59	-8.5	3292	3155	-4.2	56.0	56.0	0.0
13	0.60	0.54	-10.0	3263	3147	-3.6	56.3	56.0	-0.3
14	0.62	0.58	-7.0	3286	3190	-2.9	56.2	56.5	0.3
15	0.61	0.59	-3.1	3330	3202	-3.8	56.3	55.9	-0.4
16	0.63	0.58	-8.0	3341	3171	-5.1	56.5	55.4	-1.1
17	0.64	0.58	-10.0	3324	3170	-4.6	56.3	55.8	-0.5
18	0.62	0.59	-4.7	3290	3203	-2.6	56.0	55.9	-0.1
19	0.61	0.55	-9.2	3293	3144	-4.5	55.6	57.2	1.6
20	0.63	0.58	-8.5	3318	3171	-4.4	55.7	56.4	0.7
21	0.63	0.59	-7.1	3332	3179	-4.6	56.2	55.4	-0.8
22	0.63	0.58	-7.5	3330	3179	-4.5	55.9	55.2	-0.7
23	0.63	0.57	-9.2	3342	3165	-5.3	56.2	55.7	-0.5
24	0.60	0.57	-5.3	3263	3178	-2.6	56.4	57.8	1.4
25	0.62	0.57	-8.5	3325	3200	-3.8	56.3	56.4	0.1
26	0.60	0.55	-8.0	3298	3171	-3.9	55.8	55.5	-0.3
27	0.63	0.57	-10.3	3324	3170	-4.6	56.0	55.9	-0.1
28	0.61	0.57	-6.9	3310	3189	-3.7	56.5	57.5	1.0
29	0.64	0.59	-8.2	3330	3220	-3.3	56.2	56.6	0.4
30	0.63	0.58	-8.1	3345	3225	-3.6	56.4	56.3	-0.1
31	0.62	0.58	-6.9	3294	3208	-2.6	56.6	56.4	-0.2
32	0.63	0.57	-8.8	3320	3199	-3.6	56.0	56.0	0.0
33	0.62	0.56	-9.4	3302	3074	-6.9	56.2	56.1	-0.1
34	0.65	0.59	-9.3	3324	3198	-3.8	56.3	56.4	0.1
35	0.62	0.58	-6.7	3277	3185	-2.8	56.0	57.2	1.2

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH05FNL070	3,220	7-Sep-07	Adoon	Luc



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AFB1512H-A	AFB1524H-A	AFB1548H-A	AFB1724H-A	AFB1712H-A
AFB1512M-A	AFB1524M-A	AFB1548M-A	AFB1724M-A	AFB1712M-A
AFB1512L-A	AFB1524L-A	AFB1548L-A	AFB1724L-A	AFB1712L-A

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,975	8-Feb-05	7-Sep-07	56	0	19,364
Representative Test P/N: AFB1524HH-AF00			Current Test Status	<input type="checkbox"/> In process <input type="checkbox"/> In process exceed requested)	<input checked="" type="checkbox"/> Termination
Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D					

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 dB
	Current Spec. TYP (A)	Current Spec. TYP (A)		Speed Spec. REF (RPM)	Speed Spec. REF (RPM)		Noise Spec. Max (dB A)	Noise Check. Max (dB A)	
	0.6	0.6	+15% Max	3200	3200	-15% Max	58.5	58.5	+3 dB Max
36	0.63	0.56	-10.8	3303	3167	-4.1	56.2	55.3	-0.9
37	0.61	0.57	-7.0	3326	3189	-4.1	56.6	56.9	0.3
38	0.61	0.56	-8.2	3313	3165	-4.5	56.1	55.7	-0.4
39	0.63	0.57	-9.3	3263	3189	-2.3	56.3	55.8	-0.5
40	0.64	0.58	-8.9	3286	3193	-2.8	56.0	55.9	-0.1
41	0.64	0.59	-8.5	3334	3197	-4.1	56.3	56.2	-0.1
42	0.64	0.57	-10.2	3336	3173	-4.9	56.2	55.8	-0.4
43	0.63	0.57	-9.6	3323	3207	-3.5	55.8	56.0	0.2
44	0.60	0.59	-2.0	3325	3185	-4.2	55.9	56.3	0.4
45	0.62	0.57	-7.5	3293	3200	-2.8	55.6	56.2	0.6
46	0.64	0.58	-9.3	3328	3190	-4.1	56.2	56.1	-0.1
47	0.61	0.57	-6.7	3325	3200	-3.8	56.1	55.9	-0.2
48	0.64	0.59	-7.2	3332	3200	-4.0	55.7	56.5	0.8
49	0.62	0.57	-8.1	3260	3121	-4.3	55.4	55.4	0.0
50	0.60	0.56	-6.4	3272	3138	-4.1	56.4	55.7	-0.7
51	0.62	0.57	-7.4	3324	3095	-6.9	55.8	55.3	-0.5
52	0.61	0.56	-7.9	3305	3187	-3.6	56.2	55.8	-0.4
53	0.64	0.58	-9.1	3324	3206	-3.5	55.8	55.7	-0.1
54	0.62	0.56	-10.1	3326	3180	-4.4	55.8	55.8	0.0
55	0.61	0.57	-6.7	3294	3206	-2.7	55.7	56.2	0.5
56	0.64	0.59	-7.3	3314	3206	-3.3	55.7	56.5	0.8
X-bar	0.62	0.57	-	3311	3180	-	56.1	56.1	-
σ	0.01	0.01	-	24	29	-	0.3	0.6	-

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH05FNL070	3,220	7-Sep-07	Adoon	Luc