



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 AFC120x120x25.4mm series as the right table	AFC1212D-F00			

Representative Test P/N : AFC1212D-5G2K

Equipment: 70°C Burn-in Room On/Off Cycles: Every 500 hours

© **L₁₀ Expectancy: 70,000 hours minimum @ fan rated voltage and the temperature of 40°C**

According to the equation for **Weibull distribution**, **MTTF ≅ 7×L10 = 490,000 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)
70	40	8.00	56	2.303	3,478	3,478.0	490,031	70,004

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/11/2 5:00 PM	2006/12/18 6:16 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	3478.0

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	1,386,017	198,002
30	16.00	980,062	140,009
40	8.00	490,031	70,004
50	4.00	245,015	35,002
60	2.00	122,508	17,501
70	1.00	61,254	8,751

- 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
DG05FNL258	6375.50	2006/12/18	Nan.Yang	gx.xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

Available for these models with lower speed and same physical structure.
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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)
3,478	2005/11/2 5:00 PM	2006/12/18 6:16 AM	56	0	3478.0

Representative Test P/N : AFC1212D-5G2K	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: 70°C Burn-in Room 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)	
	0.54Max.	0.54Max.		3060-3740	3060-3740		50.8Max	50.8Max	
1	0.41	0.42	1.5	3475	3228	-7.1	47.9	48.0	0.2
2	0.46	0.46	-0.6	3442	3065	-11.0	47.5	47.8	0.6
3	0.46	0.44	-5.0	3411	3214	-5.8	47.7	47.3	-0.8
4	0.42	0.44	2.8	3535	3112	-12.0	47.7	47.7	0.0
5	0.45	0.42	-6.9	3379	3198	-5.4	47.3	47.3	-0.1
6	0.43	0.41	-5.4	3541	3194	-9.8	47.5	48.1	1.3
7	0.46	0.40	-13.2	3399	3159	-7.1	47.5	47.8	0.6
8	0.41	0.41	0.7	3374	3147	-6.7	47.3	47.5	0.4
9	0.45	0.43	-4.7	3435	3256	-5.2	47.9	47.7	-0.4
10	0.46	0.42	-8.6	3438	3211	-6.6	47.6	47.7	0.2
11	0.40	0.43	7.5	3444	3194	-7.3	47.6	47.5	-0.2
12	0.44	0.43	-3.4	3364	3154	-6.2	47.0	47.9	1.9
13	0.41	0.43	4.8	3451	3205	-7.1	47.2	47.6	0.8
14	0.44	0.45	1.8	3409	3119	-8.5	47.5	47.8	0.6
15	0.42	0.43	3.1	3494	3111	-11.0	47.9	48.0	0.2
16	0.42	0.41	-3.3	3506	3284	-6.3	47.4	47.3	-0.2
17	0.41	0.41	0.5	3471	3250	-6.4	47.5	47.6	0.2
18	0.41	0.43	4.9	3494	3241	-7.2	47.7	47.7	0.0
19	0.44	0.43	-4.1	3392	3125	-7.9	47.4	47.3	-0.2
20	0.42	0.44	6.0	3504	3113	-11.2	47.9	47.8	-0.2
21	0.41	0.41	-1.4	3508	3208	-8.6	47.5	47.6	0.2
22	0.44	0.42	-5.5	3367	3218	-4.4	47.8	47.9	0.2
23	0.45	0.40	-9.6	3391	3211	-5.3	47.6	47.4	-0.4
24	0.42	0.41	-4.0	3516	3182	-9.5	47.4	47.8	0.8
25	0.44	0.43	-3.2	3366	3143	-6.6	47.6	47.5	-0.2
26	0.41	0.41	-1.2	3494	3222	-7.8	47.9	47.7	-0.4
27	0.43	0.41	-5.1	3527	3200	-9.3	47.8	47.6	-0.4
28	0.42	0.41	-3.3	3510	3163	-9.9	47.5	47.6	0.2
29	0.44	0.43	-3.8	3397	3164	-6.9	47.8	47.6	-0.4
30	0.44	0.41	-6.0	3513	3183	-9.4	47.7	47.3	-0.8
31	0.43	0.40	-7.6	3521	3244	-7.9	47.5	47.8	0.6
32	0.46	0.41	-9.4	3445	3232	-6.2	47.4	48.1	1.5
33	0.44	0.40	-8.8	3399	3227	-5.1	47.9	47.5	-0.8
34	0.44	0.46	3.9	3414	3115	-8.8	47.5	48.3	1.7
35	0.42	0.43	1.7	3389	3233	-4.6	47.3	47.5	0.4

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL258	6375.50	2006/12/18	Nan.Yang	Gx.Xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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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.	Current Spec.		Speed Spec.	Speed Spec.		Noise Spec.	Noise Spec.	
	(A) 0.54Max.	(A) 0.54Max.		(RPM) 3060-3740	(RPM) 3060-3740		(dB A) 50.8Max	(dB A) 50.8Max	
36	0.43	0.42	-3.0	3369	3266	-3.1	47.9	47.9	0.0
37	0.40	0.42	4.8	3362	3180	-5.4	47.9	47.7	-0.4
38	0.41	0.45	10.0	3462	3088	-10.8	47.4	47.8	0.8
39	0.44	0.42	-4.8	3384	3120	-7.8	47.5	47.4	-0.2
40	0.43	0.39	-10.9	3357	3125	-6.9	47.4	47.6	0.4
41	0.45	0.42	-7.1	3396	3149	-7.3	47.6	47.9	0.6
42	0.40	0.41	2.7	3436	3169	-7.8	47.5	47.7	0.4
43	0.41	0.41	0.2	3486	3117	-10.6	47.9	47.5	-0.8
44	0.44	0.42	-2.8	3375	3133	-7.2	47.4	47.6	0.4
45	0.40	0.40	-1.0	3463	3188	-7.9	47.9	47.5	-0.8
46	0.45	0.41	-7.6	3426	3146	-8.2	47.8	47.9	0.2
47	0.41	0.43	3.6	3487	3187	-8.6	47.8	47.3	-1.0
48	0.43	0.45	6.1	3525	3132	-11.1	47.8	48.3	1.0
49	0.44	0.42	-3.4	3396	3096	-8.8	47.9	47.3	-1.1
50	0.46	0.41	-9.8	3419	3237	-5.3	47.5	47.7	0.4
51	0.44	0.41	-5.3	3342	3216	-3.8	48.0	47.4	-1.3
52	0.45	0.42	-7.6	3406	3158	-7.3	47.7	48.0	0.5
53	0.44	0.40	-9.0	3383	3251	-3.9	47.9	47.5	-0.8
54	0.42	0.43	1.2	3511	3234	-7.9	47.5	47.6	0.2
55	0.43	0.42	-1.9	3540	3239	-8.5	47.9	47.5	-0.8
56	0.44	0.43	-2.5	3393	3285	-3.2	47.5	47.8	0.6
X-Bar	0.431	0.420	-	3439.9	3182.9	-	47.62	47.67	-
σ	0.017	0.016	-	58.300	53.556	-	0.225	0.248	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG05FNL258	6375.50	2006/12/18	Nan.Yang	Gx.Xu