



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 AFC70x70x20mm series as the right table	AFC0712DD-TP10			
Representative Test P/N : AFC0712DD-7A28(SP08)				
Equipment: 1.Oven: E24-W520				

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

According to the equation for **Weibull distribution**, **MTTF ≅ 7×L₁₀ = 280,000** 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%), and

Stress/Elevated Temperature T _s (°C) (Actual Test Temperature)	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 L ₁₀ 40 °C (hours)
60	40	4.00	56	2.303	3,975	3,975.0	280,028	40,004

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2007/3/1 10:00 AM	2007/8/28 7:36 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	3975.0

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. Basically , MTBF is equal to MTTF , they use same formula to work out a life data.)

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	11.31	792,038	113,148
30	8.00	560,055	80,008
40	4.00	280,028	40,004
50	2.00	140,014	20,002
60	1.00	70,007	10,001

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	<input checked="" type="checkbox"/> Accept
		<input type="checkbox"/> Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQFML-2007022	343.00	2007/8/28 8:00 AM	XINHONG.YANG	fly.shi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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applies to AFC70x70x20mm series as the right table

AFC0712DD-TP10				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,975	2007/3/1 10:00 AM	2007/8/28 7:36 AM	56	0	3975.0
Representative Test P/N : AFC0712DD-7A28(SP08)			Current Test Status		<input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination
Equipment: 1.Oven: E24-W520					

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (mA)	Final Test Current Spec. (mA)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Check. (dB A)	Deviation (%)
	450max.	450max.		5000±8%	5000-15%		48.3max.	48.3+3max.	
1	336	325	3.3	4906	5066	3.3	44.2	45.0	1.8
2	335	327	2.4	4940	5085	2.9	44.8	44.9	0.2
3	385	386	0.3	5027	5048	0.4	45.1	45.2	0.2
4	378	374	1.1	4986	5073	1.7	45.1	45.4	0.7
5	376	371	1.3	4988	5083	1.9	45.6	44.8	1.8
6	367	364	0.8	5018	5095	1.5	44.8	44.9	0.2
7	397	389	2.0	5023	5146	2.4	44.8	43.9	2.0
8	354	351	0.8	4963	5054	1.8	44.3	45.1	1.8
9	384	381	0.8	4983	5065	1.6	44.7	44.8	0.2
10	363	350	3.6	4917	5092	3.6	45.4	44.7	1.5
11	340	338	0.6	4868	4909	0.8	43.3	44.5	2.8
12	350	342	2.3	4932	5043	2.3	44.7	44.3	0.9
13	339	337	0.6	4915	4992	1.6	44.5	44.7	0.4
14	350	345	1.4	4965	5069	2.1	44.8	45.4	1.3
15	366	362	1.1	5017	5084	1.3	45.6	44.4	2.6
16	360	354	1.7	4985	5066	1.6	44.1	45.3	2.7
17	398	396	0.5	5152	5240	1.7	45.7	46.2	1.1
18	370	368	0.5	5030	5055	0.5	45.1	45.7	1.3
19	385	370	3.9	5061	5016	0.9	45.5	44.7	1.8
20	356	380	6.7	4956	5144	3.8	44.4	44.8	0.9
21	356	343	3.7	4940	5126	3.8	44.3	44.9	1.4
22	373	351	5.9	4921	5010	1.8	44.2	45.1	2.0
23	369	363	1.6	4978	5088	2.2	45.1	45.0	0.2
24	356	348	2.2	4927	5060	2.7	44.1	45.3	2.7
25	372	360	3.2	4995	5121	2.5	44.1	45.4	2.9
26	364	351	3.6	5002	5139	2.7	45.7	44.8	2.0
27	364	359	1.4	4959	5085	2.5	44.7	45.6	2.0
28	352	344	2.3	4947	5026	1.6	44.4	44.7	0.7
29	350	340	2.9	4945	5079	2.7	44.4	45.0	1.4
30	370	372	0.5	4988	5012	0.5	44.8	45.1	0.7
31	348	339	2.6	4900	5026	2.6	45.1	44.8	0.7
32	362	366	1.1	4987	4953	0.7	45.6	44.5	2.4
33	335	334	0.3	4895	4941	0.9	44.1	45.7	3.6
34	352	346	1.7	4954	5043	1.8	45.2	44.8	0.9
35	348	350	0.6	4969	5012	0.9	44.7	45.6	2.0

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQFML-2007022	343.00	2007/8/28 8:00 AM	XINHONG.YANG	fly.shi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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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)
3,975	2007/3/1 10:00 AM	2007/8/28 7:36 AM	56	0	3975.0

Representative Test P/N : AFC0712DD-7A28(SP08)	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-W520

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. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Check. (dB A)	
	450max.	450max.		5000±8%	5000-15%		48.3max.	48.3+3max.	
36	362	352	2.8	4935	5067	2.7	44.2	44.9	1.6
37	346	340	1.7	4909	5029	2.4	44.1	45.6	3.4
38	331	328	0.9	4878	4976	2.0	44.0	44.7	1.6
39	366	366	0.0	4965	4993	0.6	44.5	46.2	3.8
40	350	378	8.0	4930	5085	3.1	44.3	44.7	0.9
41	350	346	1.1	4893	4984	1.9	45.3	45.0	0.7
42	353	344	2.5	4966	5098	2.7	44.8	45.3	1.1
43	332	321	3.3	4862	5003	2.9	43.7	44.8	2.5
44	383	370	3.4	4929	5080	3.1	44.3	46.6	5.2
45	362	360	0.6	4978	5055	1.5	44.8	44.7	0.2
46	358	351	2.0	4954	5062	2.2	45.4	44.5	2.0
47	347	349	0.6	4981	5000	0.4	45.4	44.8	1.3
48	389	388	0.3	5037	5093	1.1	45.2	46.8	3.5
49	374	360	3.7	4920	5129	4.2	45.1	44.9	0.4
50	345	332	3.8	4908	5065	3.2	44.1	44.0	0.2
51	376	365	2.9	4985	5150	3.3	43.2	44.8	3.7
52	366	363	0.8	4926	4994	1.4	45.3	45.0	0.7
53	375	372	0.8	5008	5076	1.4	44.6	46.5	4.3
54	333	331	0.6	4865	4930	1.3	43.9	44.7	1.8
55	341	336	1.5	4949	5079	2.6	44.4	44.9	1.1
56	345	340	1.4	4886	5034	3.0	44.1	45.0	2.0
Mean (X-Bar)	359.7	354.8	-	4957.2	5055.9	-	44.7	45.1	-
Standard Deviation	16.687	17.718	-	53.526	59.648	-	0.595	0.581	-

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