



# DC FAN CUSTOMIZED 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 AFC 60x60x25.4mm series as the right table	AFC0612D-SP07			
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<b>Representative Test P/N : AFC0612D-6M84R</b>	
<b>Equipment: 1.Oven: E24-F0059</b>	<b>On/Off Cycles: Every 500 hours</b>

◎ **L<sub>10</sub> Expectancy: 70,000 hours minimum @ fan rated voltage and the temperature of 40°C**  
 According to the equation for **Weibull distribution**, **MTTF ≐ 1.89×L10 = 132,300 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,

$$t = 1.119 \times \text{MTTF} \times [(B_{r,c}) \div n]^{0.33} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

where, (B<sub>r,c</sub>) 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 <sub>s</sub> (°C) (Actual Test Temperature)	Unstress Temperature T <sub>u</sub> (°C)	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r,c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 °C (hours)	Verified L <sub>10</sub> 40 °C (hours)
<b>70</b>	<b>40</b>	<b>3.38</b>	<b>56</b>	<b>2.303</b>	<b>15,303</b>	<b>20,478.0</b>	<b>177,042</b>	<b>93,673</b>

**Test Progress:**

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2007/12/5 8:30 PM	2010/7/20 12:18 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	<b>20478.0</b>

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' L<sub>10</sub> 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. )

Fan permission criteria for the measurement after test :

1. Speed can not drop of ≥ 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Test Method according to IPC-9591.

Temperature for MTTF Estimation (°C)	Acceleration Factor A <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	6.20	325,247	172,088
30	5.06	265,563	140,510
40	3.38	177,042	93,673
50	2.25	118,028	62,449
60	1.50	78,685	41,632
70	1.00	52,457	27,755

<b>Test Result</b>	<input checked="" type="checkbox"/> <b>Accept</b> <input type="checkbox"/> <b>Reject</b>
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG07FNL234	7681.00	2011/2/25	Nan Yang	Long Zhao



# DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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applies to AFC 60x60x25.4mm series as the right table

AFC0612D-SP07				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
15,303	2007/12/5 8:30 PM	2010/7/20 12:18 PM	56	0	<b>20478.0</b>

Representative Test P/N : AFC0612D-6M84R	<b>Current Test Status</b>	<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-F0059 On/Off Cycles: Every 500 hours

### Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. ( mA ) 280 TYP	Final Test Current Spec. ( mA ) 280 TYP	Deviation (%)	Initial Test Speed Spec. ( RPM ) 5850REF	Final Test Speed Spec. ( RPM ) 5850REF	Deviation (%)	Initial Test Noise Spec. ( dB A ) 48.0 Max	Final Test Noise Check. ( dB A ) 48.0 Max	Deviation (%) 3 dB Max
1	260	278	6.9	5921	6038	2.0	44.5	45.2	0.7
2	265	258	-2.6	6024	5799	-3.7	44.7	45.0	0.3
3	275	278	1.1	5929	5888	-0.7	45.1	45.3	0.2
4	269	273	1.5	6011	5942	-1.1	44.8	45.1	0.3
5	277	276	-0.4	5993	5953	-0.7	45.2	45.2	0.0
6	263	274	4.2	6006	5941	-1.1	44.9	45.4	0.5
7	260	278	6.9	5989	5904	-1.4	45.0	45.3	0.3
8	261	257	-1.5	6028	5742	-4.7	45.1	45.0	-0.1
9	259	268	3.5	5902	5969	1.1	44.9	45.1	0.2
10	269	262	-2.6	5928	5877	-0.9	44.7	45.0	0.3
11	274	262	-4.4	5869	5934	1.1	45.2	45.2	0.0
12	266	277	4.1	5920	5938	0.3	45.0	45.5	0.5
13	260	252	-3.1	5894	5751	-2.4	44.9	45.4	0.5
14	263	262	-0.4	5923	5799	-2.1	44.6	45.3	0.7
15	265	271	2.3	5946	5909	-0.6	44.7	45.2	0.5
16	271	274	1.1	5840	5938	1.7	45.0	45.4	0.4
17	282	264	-6.4	5891	5786	-1.8	44.6	45.5	0.9
18	258	279	8.1	6021	5961	-1.0	44.9	45.4	0.5
19	260	258	-0.8	5970	5850	-2.0	45.0	45.3	0.3
20	259	257	-0.8	5968	5805	-2.7	44.8	45.4	0.6
21	266	272	2.3	5913	5927	0.2	44.5	45.3	0.8
22	259	259	0.0	5835	5866	0.5	44.9	45.5	0.6
23	283	274	-3.2	5930	5933	0.1	44.7	45.0	0.3
24	277	266	-4.0	5895	5858	-0.6	45.2	45.5	0.3
25	260	267	2.7	5878	5893	0.3	44.7	45.3	0.6
26	253	271	7.1	5945	5915	-0.5	44.9	45.3	0.4
27	263	280	6.5	5941	5948	0.1	45.0	45.5	0.5
28	257	267	3.9	6015	5888	-2.1	44.5	45.2	0.7
29	265	281	6.0	5872	5988	2.0	45.0	45.0	0.0
30	271	293	8.1	5939	5851	-1.5	44.8	45.7	0.9
31	263	260	-1.1	5951	6044	1.6	44.6	45.5	0.9
32	269	264	-1.9	5987	5858	-2.2	44.9	45.3	0.4
33	265	275	3.8	6073	5931	-2.3	45.1	45.5	0.4
34	263	275	4.6	5948	5886	-1.0	44.7	45.7	1.0
35	268	271	1.1	5901	5875	-0.4	44.9	45.5	0.6

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG07FNL234	7681.00	2011/2/25	Nan Yang	Long Zhao



# DC FAN FUNCTION TEST RECORD

## FOR CUSTOMIZED LIFE EXPERIMENT

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AFC0612D-SP07					

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36	259	266	2.7	6004	5787	-3.6	45.0	45.7	0.7
37	261	248	-5.0	6013	5663	-5.8	44.7	45.5	0.8
38	258	265	2.7	6013	5849	-2.7	44.6	45.8	1.2
39	277	296	6.9	5915	6043	2.2	44.9	45.7	0.8
40	263	260	-1.1	5843	5808	-0.6	45.1	45.8	0.7
41	254	263	3.5	6005	5863	-2.4	44.7	45.7	1.0
42	270	254	-5.9	5997	5789	-3.5	45.1	45.8	0.7
43	274	272	-0.7	5898	5863	-0.6	44.9	45.7	0.8
44	269	256	-4.8	6043	5805	-3.9	44.8	45.8	1.0
45	263	260	-1.1	5922	5852	-1.2	44.7	45.7	1.0
46	260	275	5.8	6008	5949	-1.0	45.2	45.8	0.6
47	274	275	0.4	5979	5934	-0.8	44.9	45.5	0.6
48	271	270	-0.4	6005	5865	-2.3	44.6	45.0	0.4
49	276	264	-4.3	6073	5796	-4.6	44.6	45.7	1.1
50	270	272	0.7	5966	5924	-0.7	44.9	45.8	0.9
51	275	253	-8.0	5869	5762	-1.8	45.0	45.6	0.6
52	263	256	-2.7	5911	5813	-1.7	44.8	45.7	0.9
53	261	279	6.9	5924	5954	0.5	45.0	45.7	0.7
54	260	273	5.0	5996	5892	-1.7	45.1	45.8	0.7
55	262	264	0.8	5914	5825	-1.5	44.9	45.7	0.8
56	265	257	-3.0	5941	5818	-2.1	45.2	45.8	0.6
X-Bar	265.8	268.1	-	5950.6	5879.3	-	44.87	45.45	-
$\sigma$	6.933	9.778	-	58.299	77.864	-	0.198	0.259	-

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