



# 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 AFB 80x80x15 mm series as the right table	AFB0824SHB	AFB0824VHB	AFB0824HHB	AFB0824HB	AFB0824MB
	AFB0824LB				
	AFB0812SHB	AFB0812VHB	AFB0812HHB	AFB0812HB	AFB0812MB
	AFB0812LB				

**Representative Test P/N : AFB0824SHB**

**Instruments used:** 1.Oven: F00-5, E24-T057 2. DC Source: GW GPC-3060D On/Off Cycles: Every 500 hours

© **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  $\doteq$  7×L<sub>10</sub> = 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<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%), and

Stress/Elevated Temperature T <sub>s</sub> (°C)	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 (hours)	Verified L <sub>10</sub> (hours)
70	40	8.00	20	2.303	8,876	10,471	578,054	82,579

## Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
1999/11/16 10:00 AM	2000/11/20 5:58 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	10471.0

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

Temperature for MTTF Estimation (°C)	Acceleration Factor A <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	22.63	1,634,983	233,569
30	16.00	1,156,107	165,158
40	8.00	578,054	82,579
50	4.00	289,027	41,290
60	2.00	144,513	20,645
70	1.00	72,257	10,322

## Fan Failure Criteria:

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

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
A161L	3472.00	2001/6/19 9:00 AM	Bonnie Chang	Robert Sun



# DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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	AFB0824LB				
	AFB0812SHB	AFB0812VHB	AFB0812HHB	AFB0812HB	AFB0812MB
	AFB0812LB				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
8,876	1999/11/16 10:00 AM	2000/11/20 5:58 AM	20	0	10471.0

representative Test P/N : AFB0824SHB	Current Test Status	<input type="checkbox"/>	<input type="checkbox"/> In process <span style="color: red;">(exceed requested)</span>	<input checked="" type="checkbox"/> Termination
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Instruments used: 1.Oven: F00-5, E24-T057 2. DC Source: GW GPC-3060D On/Off Cycles: Every 500 hours

### Test Data Between Initial Test and Final Test

Sample P/N: AFB0824SHB

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)
	Current Spec. ( A ) <b>0.26 Max.</b>	Current Spec. ( A ) <b>0.26 Max.</b>		Speed Spec. ( RPM ) <b>4000 Ref.</b>	Speed Spec. ( RPM ) <b>4000-15%</b>		Noise Spec. ( dB A ) <b>45.0 Max.</b>	Noise Spec. ( dB A ) <b>48.0 Max.</b>	
1	0.15	0.15	0.0	4028	4225	4.9	42.0	42.4	1.0
2	0.15	0.14	-6.7	4094	4255	3.9	41.9	42.4	1.2
3	0.16	0.15	-6.3	4111	4286	4.3	42.0	43.2	2.9
4	0.15	0.14	-6.7	4119	4255	3.3	41.9	42.9	2.4
5	0.16	0.14	-12.5	4049	4255	5.1	41.7	43.2	3.6
6	0.16	0.14	-12.5	4151	4255	2.5	41.8	41.6	-0.5
7	0.16	0.14	-12.5	4155	4225	1.7	42.1	42.0	-0.2
8	0.15	0.14	-6.7	4162	4286	3.0	41.8	42.6	1.9
9	0.16	0.15	-6.3	4145	4286	3.4	42.1	43.6	3.6
10	0.16	0.14	-12.5	4140	4286	3.5	41.8	42.8	2.4
11	0.16	0.14	-12.5	4178	4316	3.3	41.8	45.3	8.4
12	0.16	0.14	-12.5	4106	4225	2.9	41.8	41.7	-0.2
13	0.16	0.14	-12.5	4150	4286	3.3	41.8	41.7	-0.2
14	0.16	0.14	-12.5	4093	4255	4.0	41.5	43.7	5.3
15	0.16	0.15	-6.3	4189	4316	3.0	42.0	42.0	0.0
16	0.16	0.15	-6.3	4110	4138	0.7	41.8	41.4	-1.0
17	0.16	0.15	-6.3	4171	4225	1.3	42.2	42.0	-0.5
18	0.16	0.14	-12.5	4071	4316	6.0	41.8	43.7	4.5
19	0.16	0.14	-12.5	4157	4286	3.1	42.0	45.0	7.1
20	0.16	0.14	-12.5	4114	4255	3.4	41.8	44.6	6.7
X-Bar	0.158	0.143	-	4125	4262	-	41.880	42.890	-
σ	0.004	0.005	-	43.080	41.894	-	0.161	1.144	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
A161L	3472.00	2001/6/19 9:00 AM	<i>Bonnie Cheng</i>	<i>Robert Sun</i>