

## DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical	AFB1212SH	AFB1212VH	AFB1212HH	AFB1212H	AFB1212M		
structure. All model may be followed by Rxx or Fxx series	AFB1212L	AFB1224SH	AFB1224VH	AFB1224HH	AFB1224H		
suffixes. This test report applies to AFB 120x120x25.4 mm	AFB1224M	AFB1224L	AFB1212HH-SM00	AFB1212HH-SE16	AFB1212HH-SE17		
series as the right table							
Representative Test P/N : AFB1224SH							
<b>Equipment:</b> 1.Oven: F00-5. E24-T060 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℃

According to the equation for **Weibull distribution**,

 $MTTF = 7 \times L10 = 490,000 \text{ hours}$ 

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,

$$t=1.036\times MTTF\times \left[(B_{r;c})\div n\right]^{0.91}\div A_{F}$$
 , and  $A_{F}=2^{(Ts-Tu)/10}$ 

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 Ts (°C)	Unstress Temperature Tu (℃)	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 ℃ (hours)	Verified L <sub>10</sub> 40 ℃ (hours)
70	40	8.00	18	2.303	9,769	12,175.0	610,674	87,239

## **Test Progress:**

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status		Current Total Test Time (hours)	
2001/1/3 8:00 AM	2002/4/9 11:07 AM	In process	In process (exceed requested)	Termination	12175.0

Herewith, we could assume as right on the basis of above test result. Temperature for Acceleration **Estimated MTTF** Estimated L<sub>10</sub> Besides, if the actual test time exceed the required, it comes out that those MTTF Estimation Factor (hours) (hours) (°C)  $A_F$ fans'  $L_{10}$  expectancy and MTTF are greater than the warrant. (MTTF: means Mean Time To Failures, it should be used in a non-repairable system 25 22.63 1,727,248 246,750 setting. Now we show the MTTF in our life report, that's because we will no repair the failed fans during life experiment.MTBF: means Mean Time 30 16.00 1,221,349 174,478 Between failures, it should be used in a repairable system setting.) 610,674 87,239 40 8.00 50 4.00 305,337 43,620 Fan permission criteria for the measurement after test: 21,810 60 2.00 152,669 1. For current, the limit is less than spec.(max.). 70 76,334 10,905 1.00 2. For speed, the allowable descrease 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
A250	1298.00	2002/7/18 5:00 PM	Jung Chung Ja	Jelman

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## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

AFB1212SH AFB1212VH AFB1212HH AFB1212H AFB1212M Available for these models with lower speed and same physical structure. AFB1212L AFB1224SH AFB1224VH AFB1224HH AFB1224H All model may be followed by Rxx or Fxx series suffixes. This test report AFB1224M AFB1224L AFB1212HH-SM00AFB1212HH-SE16AFB1212-SE17 applies to AFB 120x120x25.4 mm series as the right table **Required Test Time Date for Test Date for Test Current Total Test Time** Sample Size **Failure Beginning Termination** (hrs) (pcs): (pcs): (hrs) 2001/1/3 8:00 AM 2002/4/9 11:07 AM 9,769 12175.0 () 18 П ☐ In process ᄀ Representative Test P/N :AFB1224SH **Current Test Status** (exceed requested) In process Termination Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D On/Off Cycles: Every 500 hours **Test Data Between Initial Test and Final Test** Sample P/N : AFB1224SH Initial Test Initial Test Final Test Final Test Initial Test Final Test Sample Deviation Deviation Deviation Current Spec. Current Spec. Speed Spec. Speed Spec. Noise Spec. Noise Spec. (RPM) (RPM) (dBA) (dBA) No. (A) (A) (%) (%)(%) 49.5 Max. 52.5 Max. 0.42 Max. 0.42 Max. 3400 Ref. 2890 Min. 44.6 0.26 7.7 3419 0.28 3376 -1.3 47.6 6.7 2 0.26 0.28 7.7 3371 3337 -1.0 44.2 47.7 7.9 3 0.26 0.27 3.8 3400 3334 -1.9 44.4 47.5 7.0 4 0.25 0.28 12.0 3306 3320 0.4 44.0 49.1 11.6 0.26 3419 44.5 5 3.8 -2.0 0.27 3350 47.5 6.7 0.25 3315 44.3 6 0.27 8.0 3341 0.8 52.0 17.4 0.26 3428 44.3 3.8 6.3 7 0.27 3376 -1.547.1 0.26 7.7 3419 -1.5 44.8 8 0.28 3369 47.8 6.7 9 0.26 7.7 3371 -0.1 44.5 9.7 0.28 3366 48.8 10 0.26 0.28 7.7 3380 3346 -1.0 44.7 51.5 15.2 11 0.26 0.28 7.7 3371 0.3 44.4 7.0 3382 47.5 44.4 12 0.26 0.27 3.8 3371 3380 0.3 47.6 7.2 13 0.27 0.0 3400 44.5 6.7 0.27 3363 -1.1 47.5 3419 44.7 0.26 14 0.27 3.8 3376 -1.3 47.3 5.8 0.27 3390 44.3 15 0.27 0.0 3368 -0.6 48.7 9.9 0.27 3371 44.5 16 0.27 0.0 3353 -0.5 48.9 9.9 17 0.27 0.27 0.0 3324 3363 1.2 44.7 47.8 6.9 18 0.27 0.28 3.7 3352 3363 0.3 44.7 47.7 6.7 X-Bar 0.262 0.274 3379 3359 44.5 48.3 0.006 0.005 37.024 17.748 0.208 1.383 Time-out for function test QE File No. **Issued Date** Reported By Approved By or others (hrs) Hung Chung of 2002/7/18 5:00 PM **A250** 1298.00