DELTA ELECTRONICS, INC.

DC FAN CUSTOMIZED
LIFE EXPERIMENT TEST 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 60x60x25.4 mm** series as the right table	AFB0612SH-A	AFB0612M-A	AFB0624HH-A	AFB0648SH-A	AFB0648M-A
	AFB0612VH-A	AFB0612L-A	AFB0624H-A	AFB0648VH-A	AFB0648L-A
	AFB0612HH-A	AFB0624SH-A	AFB0624M-A	AFB0648HH-A	AFB0612H-7J1D
	AFB0612H-A	AFB0624VH-A	AFB0624L-A	AFB0612H-TZLG	AFB0648H-A

Representative Test P/N : AFB0612EH-ABF00

Instruments used: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D On/Off Cycles: Every 500 hours

◎ L_{10} Expectancy 70,000 hours minimum @ fan rated voltage and the temperature of 40℃

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,

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

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 (℃)	Unstress Temperature Tu (℃)	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 (hours)	Verified L_{10} (hours)
70	40	8.00	56	2.303	3,478	**9,360.0**	1,318,772	188,396

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/3/17 8:30 AM	2005/10/28 4:46 AM	☐ In process	☐ In process (exceed requested)	☑ Termination	**9360.0**

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_{10} 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.**)

Fan permission criteria for the measurement after test :

1. For current, the limit is less than spec.(max.).
2. For speed, the allowable descrease is less than 15%.
3. For noise, the limit is less than spec.(max.). + 3 dB

Temperature for MTTF Estimation (℃)	Acceleration Factor A_F	Estimated MTTF (hours)	Estimated L_{10} (hours)
25	22.63	3,730,050	532,864
30	16.00	2,637,544	376,792
40	8.00	1,318,772	188,396
45	5.66	932,513	133,216
50	4.00	659,386	94,198
60	2.00	329,693	47,099
70	1.00	164,846	23,549

QE File No.	Time-out for function test or	Issued Date	Reported By	Approved By
TH05FNL076	1918.50	2006/6/30 7:00 AM	Ch.Sirirote	Luc

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AFB0612VH-A	AFB0612L-A	AFB0624H-A	AFB0648VH-A	AFB0648L-A
AFB0612HH-A	AFB0624SH-A	AFB0624M-A	AFB0648HH-A	AFB0612H-7J1D
AFB0612H-A	AFB0624VH-A	AFB0624L-A	AFB0648H-A	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2005/3/17 8:30 AM	2005/10/28 4:46 AM	56	0	**9360.0**

epresentative Test P/N : **AFB0612EH-ABF00**

Current Test Status ☐ In process ☐ In process (exceed requested) ☑ Termination

Instruments used: 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 : AFB0612EH-ABF00

Sample No.	Initial Test Current Spec. (A) **0.48 Max.**	Final Test Current Spec. (A) **0.48 Max.**	Deviation (%)	Initial Test Speed Spec. (RPM) **6800 Ref.**	Final Test Speed Spec. (RPM) **6800-15%**	Deviation (%)	Initial Test Noise Spec. (dB A) **50.5 Max.**	Final Test Noise Spec. (dB A) **53.5 Max.**	Deviation (%)
1	0.40	0.40	0.0	6836	6836	0.0	48.7	47.9	-1.6
2	0.42	0.41	-2.4	6910	6880	-0.4	48.2	48.0	-0.4
3	0.40	0.40	0.0	6859	6836	-0.3	48.4	48.2	-0.4
4	0.39	0.39	0.0	6824	6800	-0.4	48.8	48.1	-1.4
5	0.40	0.39	-2.5	6795	6835	0.6	49.0	47.9	-2.2
6	0.42	0.41	-2.4	6973	6975	0.0	47.7	49.4	3.6
7	0.40	0.40	0.0	6852	6884	0.5	48.2	48.6	0.8
8	0.37	0.37	0.0	6680	6709	0.4	48.4	48.1	-0.6
9	0.41	0.40	-2.4	6919	6938	0.3	48.6	48.2	-0.8
10	0.42	0.42	0.0	6935	6941	0.1	48.5	48.8	0.6
11	0.38	0.37	-2.6	6734	6748	0.2	48.9	48.7	-0.4
12	0.42	0.42	0.0	7031	6952	-1.1	47.4	49.3	4.0
13	0.43	0.43	0.0	6973	6970	0.0	48.5	48.9	0.8
14	0.38	0.38	0.0	6737	6740	0.0	48.7	48.3	-0.8
15	0.43	0.43	0.0	7028	6989	-0.6	49.4	49.3	-0.2
16	0.43	0.43	0.0	6987	6967	-0.3	48.9	49.3	0.8
17	0.39	0.38	-2.6	6757	6720	-0.5	47.3	47.8	1.1
18	0.42	0.42	0.0	6894	6885	-0.1	48.6	50.9	4.7
19	0.42	0.42	0.0	6966	6986	0.3	48.8	51.9	6.4
20	0.42	0.41	-2.4	6924	6933	0.1	48.4	48.4	0.0
21	0.40	0.39	-2.5	6817	6828	0.2	48.2	48.2	0.0
22	0.38	0.38	0.0	6676	6689	0.2	47.5	47.9	0.8
23	0.38	0.40	5.3	6756	6839	1.2	48.4	48.6	0.4
24	0.39	0.40	2.6	6642	6795	2.3	48.1	48.6	1.0
25	0.41	0.41	0.0	6937	6887	-0.7	49.6	51.1	3.0
26	0.42	0.43	2.4	6916	6930	0.2	48.7	48.6	-0.2
27	0.41	0.40	-2.4	6906	6896	-0.1	48.5	48.9	0.8
28	0.42	0.42	0.0	6964	6920	-0.6	48.2	49.0	1.7
29	0.42	0.40	-4.8	6941	6816	-1.8	48.5	48.8	0.6
30	0.40	0.39	-2.5	6853	6689	-2.4	48.2	48.7	1.0
31	0.40	0.38	-5.0	6802	6610	-2.8	48.3	48.3	0.0
32	0.38	0.36	-5.3	6698	6504	-2.9	48.5	47.9	-1.2
33	0.42	0.40	-4.8	6918	6766	-2.2	47.9	48.7	1.7
34	0.40	0.38	-5.0	6826	6668	-2.3	48.6	48.1	-1.0
35	0.40	0.38	-5.0	6821	6687	-2.0	48.8	48.2	-1.2

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AFB0612HH-A	AFB0624SH-A	AFB0624M-A	AFB0648HH-A	AFB0612H-7J1D
AFB0612H-A	AFB0624VH-A	AFB0624L-A	AFB0648H-A	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2005/3/17 8:30 AM	2005/10/28 4:46 AM	56	0	**9360.0**

epresentative Test P/N : **AFB0612EH-ABF00**

Current Test Status ☐ In process ☐ In process (exceed requested) ☑ Termination

Instruments used: 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 : AFB0612EH-ABF00

Sample No.	Initial Test Current Spec. (A) **0.48 Max.**	Final Test Current Spec. (A) **0.48 Max.**	Deviation (%)	Initial Test Speed Spec. (RPM) **6800 Ref.**	Final Test Speed Spec. (RPM) **6800-15%**	Deviation (%)	Initial Test Noise Spec. (dB A) **50.5 Max.**	Final Test Noise Spec. (dB A) **53.5 Max.**	Deviation (%)
36	0.40	0.38	-5.0	6829	6710	-1.7	47.2	48.4	2.5
37	0.40	0.38	-5.0	6781	6602	-2.6	48.3	49.6	2.7
38	0.41	0.40	-2.4	6912	6680	-3.4	48.7	48.5	-0.4
39	0.38	0.36	-5.3	6737	6538	-3.0	47.9	48.3	0.8
40	0.41	0.40	-2.4	6948	6685	-3.8	48.5	48.4	-0.2
41	0.39	0.37	-5.1	6818	6604	-3.1	48.7	48.4	-0.6
42	0.42	0.40	-4.8	6931	6725	-3.0	48.8	49.0	0.4
43	0.41	0.39	-4.9	6916	6717	-2.9	48.6	48.4	-0.4
44	0.38	0.37	-2.6	6758	6573	-2.7	48.1	48.5	0.8
45	0.38	0.36	-5.3	6725	6533	-2.9	47.8	48.1	0.6
46	0.40	0.41	2.5	6864	6809	-0.8	48.5	48.2	-0.6
47	0.39	0.40	2.6	6785	6709	-1.1	48.0	48.0	0.0
48	0.38	0.38	0.0	6720	6705	-0.2	47.6	48.3	1.5
49	0.39	0.39	0.0	6835	6805	-0.4	48.3	48.7	0.8
50	0.44	0.43	-2.3	6982	6997	0.2	49.3	49.2	-0.2
51	0.41	0.43	4.9	6829	6866	0.5	48.7	48.6	-0.2
52	0.40	0.40	0.0	6823	6811	-0.2	47.8	48.6	1.7
53	0.40	0.40	0.0	6795	6801	0.1	48.0	48.2	0.4
54	0.40	0.40	0.0	6805	6797	-0.1	48.5	48.8	0.6
55	0.40	0.39	-2.5	6832	6816	-0.2	48.4	48.6	0.4
56	0.43	0.43	0.0	7016	6984	-0.5	48.7	48.4	-0.6
X-Bar	0.40	0.40	-	6852.29	6794.91	-	48.39	48.66	-
σ	0.03	0.04	-	186.91	247.03	-	0.98	1.30	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
TH05FNL076	**1918.50**	**2006/6/30 7:00 AM**	**Ch.Sirirote**	**Luc**