



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 AUB 40x40x20mm series as the right table

Representative Test P/N: AUB0412VD-00

Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D

Life Expectancy: L10 60,000 hours minimum @ fan rated voltage and the temperature of 40°C

According to the equation for **Weibull distribution**, **MTTF 7×L10 = 420,000 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,

$$t = 1.036 \times \text{MTTF} \times [(B_{r;c})/n]^{0.91} / \text{AF}, \text{ and } \text{AF} = 2^{(T_s - T_u)/10}$$

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%).

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 L10 40°C (hours)
90	40	32.00	25	2.303	1,552	8,927	2,415,092	345,013

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
13-Mar-18	18-Jul-18	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	8,927

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).

Temperature for MTTF Estimation (°C)	Acceleration Factor A_F	Estimated MTTF (hours)	Estimated L10 (hours)
25	90.51	6,830,912	975,845
30	64.00	4,830,184	690,026
40	32.00	2,415,092	345,013
50	16.00	1,207,546	172,507
60	8.00	603,773	86,253
70	4.00	301,887	43,127
90	1.00	75,472	10,782

Fan acceptance criteria for the measurements after test:

- Speed can not decrease $\geq 15\%$ below the original measured RPM.
- Current cannot increase $> 15\%$ over original measure current.
- Noise cannot increase $> 3\text{dB}$ over the original measured noise.

Test Result

Accept
 Reject

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH18FNL007	2,161	18-Jun-19	Natthichakorn	Niranam



DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED 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)
1,552	13-Mar-18	18-Jul-18	25	0	8,927

Representative Test P/N: AUB0412VD-00	Current Test Status	<input type="checkbox"/> In F	<input checked="" type="checkbox"/> (exceed process tested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation Max (%)	Initial Test	Final Test	Deviation Max (%)	Initial Test	Final Test	Deviation Max (dB)
	Current Spec. Max (mA)	Current Spec. Max (mA)		Speed Spec. REF (RPM)	Speed Spec. REF (RPM)		Noise at 1 m Max (dB A)	Noise at 1 m Max (dB A)	
	170	170	15	7500	7500	-15	31.5	31.5	3
1	61	60	-1.6	7949	8037	1.1	29.5	29.6	0.1
2	60	57	-5.0	8156	8159	0.0	29.8	29.5	-0.3
3	60	58	-3.3	7959	7800	-2.0	30.1	29.3	-0.8
4	61	60	-1.6	7928	7899	-0.4	29.8	29.4	-0.4
5	61	64	4.9	7912	7397	-6.5	29.6	29.2	-0.4
6	64	57	-10.9	7705	8256	7.2	30.0	28.9	-1.1
7	60	58	-3.3	8008	8012	0.0	28.5	28.8	0.3
8	60	63	5.0	8238	7753	-5.9	29.7	29.1	-0.6
9	59	59	0.0	8091	7918	-2.1	28.7	29.3	0.6
10	68	62	-8.8	7942	7812	-1.6	29.6	28.7	-0.9
11	61	58	-4.9	8026	8101	0.9	28.7	28.9	0.2
12	60	58	-3.3	8043	8093	0.6	30.2	29.3	-0.9
13	64	63	-1.6	7914	7583	-4.2	28.6	29.2	0.6
14	59	62	5.1	8163	7733	-5.3	28.9	29.1	0.2
15	61	57	-6.6	7974	8335	4.5	29.3	29.3	0.0
16	60	61	1.7	8017	7710	-3.8	28.6	29.4	0.8
17	60	62	3.3	8112	7865	-3.0	28.7	29.6	0.9
18	69	60	-13.0	7045	7800	10.7	29.5	28.9	-0.6
19	68	58	-14.7	7224	8188	13.3	29.6	28.7	-0.9
20	59	61	3.4	8305	7891	-5.0	29.1	29.2	0.1
21	64	59	-7.8	7726	8078	4.6	28.5	29.3	0.8
22	60	60	0.0	7932	7661	-3.4	28.4	29.4	1.0
23	66	61	-7.6	7352	7684	4.5	28.7	29.5	0.8
24	69	59	-14.5	7099	8006	12.8	29.6	29.4	-0.2
25	67	58	-13.4	7247	7960	9.8	29.4	29.2	-0.2
X-bar	62.44	59.80	-	7843	7909	-	29.2	29.2	-
σ	3.43	2.06	-	360	223	-	0.6	0.3	-

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH18FNL007	2,161	18-Jun-19	Natthichakorn	Niranam