



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 ASB 40x40x10mm series as the right table	ASB0412SA-00			
	ASB0405SA-00			

Representative Test P/N: ASB0412SA-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	7,123	1,927,042	275,292

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
13-Mar-18	3-Aug-18	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	7,123

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	5,450,497	778,642
30	64.00	3,854,083	550,583
40	32.00	1,927,042	275,292
50	16.00	963,521	137,646
60	8.00	481,760	68,823
70	4.00	240,880	34,411
90	1.00	60,220	8,603

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
TH18FNL004	1,445	5-Mar-19	Natthichakorn	Niranam



DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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ASB0412SA-00

ASB0405SA-00

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	3-Aug-18	25	0	7,123

Representative Test P/N: ASB0412SA-00

Current Test Status

 In F

 (exceed process tested)

 Termination

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 (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation 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)	
	110	110	+15% Max	8000	8000	-15% Max	38.5	38.5	+3 dB Max
1	56	62	10.9	7803	7930	1.6	33.2	32.2	-1.0
2	55	61	11.3	7910	8223	4.0	33.8	31.6	-2.2
3	55	63	13.8	7922	7889	-0.4	34.2	32.3	-1.9
4	53	61	14.7	7918	8050	1.7	33.8	32.4	-1.4
5	55	62	13.5	8017	8059	0.5	34.1	31.6	-2.5
6	55	62	12.7	7788	8074	3.7	33.3	31.7	-1.6
7	55	58	5.5	7816	8253	5.6	33.6	32.3	-1.3
8	55	62	12.4	7877	8041	2.1	33.5	31.5	-2.0
9	56	63	12.9	7830	8010	2.3	33.2	31.9	-1.3
10	56	63	12.7	7725	7984	3.4	32.8	32.3	-0.5
11	54	62	14.6	7919	7983	0.8	34.1	32.4	-1.7
12	53	60	13.6	7849	8005	2.0	33.6	31.8	-1.8
13	55	60	8.4	7723	7987	3.4	33.4	31.6	-1.8
14	53	60	12.8	7936	8055	1.5	33.3	32.3	-1.0
15	52	60	15.0	7996	8057	0.8	33.9	32.4	-1.5
16	55	58	5.3	8014	8218	2.5	33.8	32.5	-1.3
17	54	60	11.9	7878	8097	2.8	33.6	32.6	-1.0
18	55	62	12.2	7866	7982	1.5	34.0	32.4	-1.6
19	55	57	3.1	7791	8017	2.9	33.5	32.5	-1.0
20	56	63	11.8	7775	8003	2.9	32.8	32.7	-0.1
21	54	61	13.0	7847	7935	1.1	33.5	31.8	-1.7
22	58	65	12.6	7724	7977	3.3	33.3	31.9	-1.4
23	55	61	10.2	7681	7906	2.9	33.2	32.3	-0.9
24	57	64	11.6	7811	8146	4.3	33.2	32.5	-0.7
25	56	63	12.3	7895	8000	1.3	33.7	32.6	-1.1
X-bar	54.92	61.25	-	7852	8035	-	33.5	32.2	-
σ	1.32	1.95	-	91	94	-	0.4	0.4	-

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH18FNL004	1,445	5-Mar-19	Natthichakorn	Niranam