MTTF TEST REPORT

(DC FAN LIFE EXPERIMENT) (Initial test)

Model NO.	SPEC		TEST CONDITION		SAMPLES SIZE	FILE NO
AB0603812A-H-P0	RPM=20000	A≤3.6A	TEMP=40℃	VOLT=12V	60*60*38MM	

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

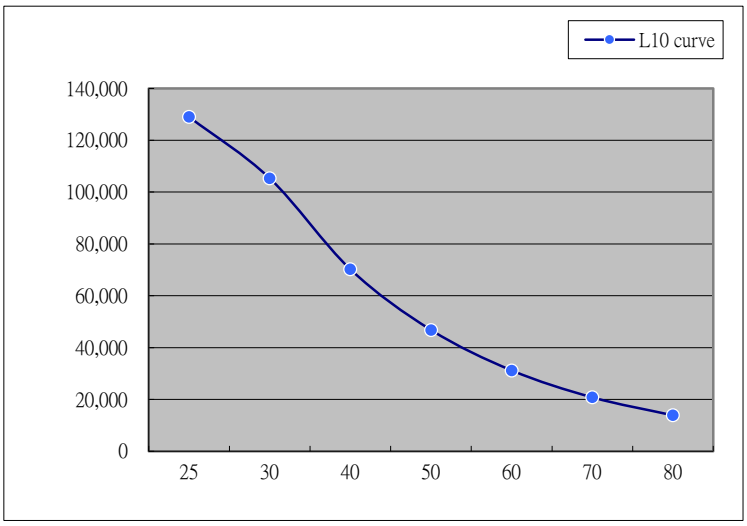
According to the equation for **Weibull distribution,** if β=1.1 **MTTF ≒ 522,410 hours**

for 90% confidence, the Chi Square value with two degrees of freedom is 4.605, Solve the following equation for the zero fails test time at the test temperature using a sample size n, the total test time(t) for verifying the above L10 estimation by the equations, **$t = 1.036 \times MTTF \times [(Br;c) \div n] 0.91 \div AF$, and $AF = 1.5^{(Ts-Tu)/10}$**

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) at40℃	Verified L_{10} (hours) at40℃
80	40	5.06	56	2.303	5,878	5,879	524,066	70,222

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2019/5/20 3:00 PM	2020/1/20 12:50 PM	☐ In process	☐ In process (exceed requested)	☑ Termination	5878.83



Temperature for MTTF Estimation (℃)	Acceleration Factor A_F	Estimated MTTF (hours)	Estimated L_{10} (hours)
25	9.30	962,935	129,028
30	7.59	786,233	105,351
40	5.06	524,155	70,234
50	3.38	349,437	46,823
60	2.25	232,958	31,215
70	1.50	155,305	20,810
80	1.00	103,537	13,873

Fan permission criteria for the measurement after test :

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

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.

Test Restult	
	☑ Accept
	☐ Reject

Time-out for function test or others (hours)	Actual test completion date	Prepared By	Approved By
0	2020/1/20 1:50 PM	Wei Shuang	Jason Zhang

MTTF TEST REPORT

(DC FAN FUNCTION TEST RECORD) (Initial test report)

Test Data Between Initial Test and Final Test

NO.	Initial Test	Final Test	Deviation 15%	Initial Test	Final Test	Deviation ±15%	Initial Test	Final Test	Deviation (+3 dB-A)	Initial Test	Final Test
	Current Spec(A)			Speed Spec (RPM)			Noise Spec (dB-A)			abnormal noise,abnormal vibration,lowest voltage restart,external inspection etc	
	3.6 Max.			**20000±10%**			**71 Max**				
1	3.112	3.036	-2.44%	20081	20016	-0.32%	64.9	64.5	-0.40	OK	OK
2	3.036	3.052	0.53%	20226	20123	-0.51%	64.2	64.3	0.10	OK	OK
3	3.027	3.036	0.30%	20053	20064	0.05%	64.5	64.2	-0.30	OK	OK
4	3.155	3.125	-0.95%	19962	20013	0.26%	63.9	63.5	-0.40	OK	OK
5	3.073	3.126	1.72%	20208	20258	0.25%	64.2	64.0	-0.20	OK	OK
6	2.926	3.026	3.42%	19966	20016	0.25%	63.8	64.5	0.70	OK	OK
7	3.018	3.126	3.58%	20066	20045	-0.10%	64.5	64.3	-0.20	OK	OK
8	3.086	3.099	0.42%	20058	20136	0.39%	63.7	64.5	0.80	OK	OK
9	3.123	3.025	-3.14%	19979	20045	0.33%	64.7	64.6	-0.10	OK	OK
10	3.103	3.096	-0.23%	20218	20136	-0.41%	63.9	64.5	0.60	OK	OK
11	3.118	3.196	2.50%	19969	20025	0.28%	64.5	64.3	-0.20	OK	OK
12	3.038	3.125	2.86%	20069	20036	-0.16%	63.8	64.2	0.40	OK	OK
13	2.959	3.026	2.26%	20169	20145	-0.12%	64.4	64.1	-0.30	OK	OK
14	3.019	3.123	3.44%	20252	20132	-0.59%	64.2	64.6	0.40	OK	OK
15	2.930	3.026	3.28%	20267	20123	-0.71%	64.9	64.5	-0.40	OK	OK
16	3.016	3.062	1.53%	20631	20254	-1.83%	63.8	64.2	0.40	OK	OK
17	3.009	3.016	0.23%	20102	20052	-0.25%	64.3	64.9	0.60	OK	OK
18	2.998	3.024	0.87%	19987	20064	0.39%	64.2	64.3	0.10	OK	OK
19	3.102	2.996	-3.42%	20136	20123	-0.06%	64.6	65.2	0.60	OK	OK
20	3.112	3.201	2.86%	20045	20365	1.60%	64.5	65.3	0.80	OK	OK
21	3.020	3.126	3.51%	20030	20254	1.12%	64.3	64.2	-0.10	OK	OK
22	3.120	3.085	-1.12%	19936	20123	0.94%	64.2	64.9	0.70	OK	OK
23	3.116	3.126	0.32%	20103	19996	-0.53%	63.9	64.2	0.30	OK	OK
24	3.095	3.156	1.97%	20047	20456	2.04%	64.5	64.3	-0.20	OK	OK
25	3.112	3.021	-2.92%	20031	20031	0.00%	64.2	64.0	-0.20	OK	OK
26	3.106	3.094	-0.39%	20069	20054	-0.07%	64.2	64.5	0.30	OK	OK
27	3.009	3.016	0.23%	20154	20123	-0.15%	64.6	64.9	0.30	OK	OK
28	3.124	3.095	-0.93%	19857	19632	-1.13%	64.1	64.6	0.50	OK	OK
29	3.052	3.065	0.43%	20056	20021	-0.17%	64.0	65.2	1.20	OK	OK
30	3.146	3.098	-1.53%	20145	20063	-0.41%	63.9	65.6	1.70	OK	OK
31	3.065	3.123	1.89%	20316	20024	-1.44%	64.5	64.5	0.00	OK	OK
32	3.252	3.069	-5.63%	20215	20062	-0.76%	64.2	64.9	0.70	OK	OK
33	2.985	3.026	1.37%	20160	20058	-0.51%	64.3	65.3	1.00	OK	OK
34	3.026	3.021	-0.17%	20145	20024	-0.60%	64.0	64.2	0.20	OK	OK
35	3.120	2.996	-3.97%	20216	20036	-0.89%	64.2	64.5	0.30	OK	OK
36	3.215	3.064	-4.70%	19764	20024	1.32%	64.6	64.6	0.00	OK	OK
37	3.230	3.165	-2.01%	20013	20012	0.00%	64.5	64.9	0.40	OK	OK
38	3.195	3.123	-2.25%	20032	20064	0.16%	64.3	64.3	0.00	OK	OK
39	3.120	3.054	-2.12%	20165	20031	-0.66%	64.2	64.6	0.40	OK	OK
40	3.125	3.099	-0.83%	20024	20036	0.06%	63.9	64.6	0.70	OK	OK
41	3.014	3.152	4.58%	20163	20001	-0.80%	64.2	64.5	0.30	OK	OK
42	3.062	3.084	0.72%	20069	19969	-0.50%	64.0	64.6	0.60	OK	OK
43	3.125	3.097	-0.90%	20156	20054	-0.51%	64.3	64.6	0.30	OK	OK
44	2.956	3.065	3.69%	20354	20013	-1.68%	64.6	64.9	0.30	OK	OK
45	3.026	3.054	0.93%	20162	20125	-0.18%	64.2	64.6	0.40	OK	OK
46	3.014	3.063	1.63%	20145	20106	-0.19%	64.5	64.9	0.40	OK	OK
47	3.102	3.125	0.74%	20235	20035	-0.99%	64.0	64.5	0.50	OK	OK
48	3.062	3.097	1.14%	20201	20201	0.00%	64.1	64.6	0.50	OK	OK
49	3.035	3.046	0.36%	19984	20015	0.16%	63.6	64.3	0.70	OK	OK
50	3.154	3.082	-2.28%	20214	20016	-0.98%	64.2	64.6	0.40	OK	OK
51	3.052	3.061	0.29%	20231	20034	-0.97%	64.6	64.9	0.30	OK	OK
52	3.029	3.096	2.21%	20202	20015	-0.93%	64.5	64.5	0.00	OK	OK
53	3.124	3.016	-3.46%	21023	20094	-4.42%	64.3	64.6	0.30	OK	OK
54	2.996	3.025	0.97%	20456	20015	-2.16%	64.2	64.6	0.40	OK	OK
55	3.065	3.036	-0.95%	19964	19998	0.17%	64.0	64.5	0.50	OK	OK
56	3.145	3.102	-1.37%	20031	20423	1.96%	64.5	64.3	-0.20	OK	OK

Actual test completion date	**Prepared By**	**Approved By**
2020/1/20 4:00 PM	**Wei Shuang**	**Jason Zhang**