



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 THB 120x120x38.0 mm series as the right table

Representative Test P/N : THB1248CE
Equipment: 1.Oven: E24-T0162 On/Off Cycles: Every 500 hours

☉ **L₁₀ Expectancy: 70,000 hours minimum @ fan rated voltage and the temperature of 40°C**
 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,

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

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 Ts (°C)	Unstress Temperature Tu (°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 L ₁₀ 40 °C (hours)
70	40	8.00	56	2.303	3,478	11,478.0	1,617,186	231,027

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2009/8/12 11:00 AM	2010/8/20 7:16 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	11478.0

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' 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 L ₁₀ (hours)
25	22.63	4,574,094	653,442
30	16.00	3,234,373	462,053
40	8.00	1,617,186	231,027
50	4.00	808,593	115,513
60	2.00	404,297	57,757
70	1.00	202,148	28,878

Fan permission criteria for the measurement after test :

- Speed can not drop of ≥ 15% below the original measured rpm.
- Current cannot increase > 15% of original measure current.
- Noise cannot >3dB over the original measure noise.

Test Result	<input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG09FNL108	5482.50	2011/9/25	Nan Yang	Tim Yi



DC FAN FUNCTION TEST RECORD FOR 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)
3,478	2009/8/12 11:00 AM	2010/8/20 7:16 PM	56	0	11478.0

Representative Test P/N : THB1248CE	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-T0162 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 1.14 Max.	Final Test Current Spec. (A) 1.14 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 7020-8580	Final Test Speed Spec. (RPM) 7020-8580	Deviation (%)	Initial Test Noise Spec. (dB A) 73.0 Max	Final Test Noise Spec. (dB A) 73.0 Max	Deviation 3 dBMax.
1	1.04	1.00	-4.1	7589	7861	3.6	68.1	67.5	-0.6
2	1.03	1.01	-1.5	7693	7913	2.9	68.4	67.2	-1.2
3	1.03	1.01	-2.2	7760	7871	1.4	68.2	67.1	-1.1
4	1.01	0.96	-5.0	7603	7826	2.9	67.9	68.1	0.2
5	1.01	1.01	0.3	7527	7918	5.2	68.3	67.3	-1.0
6	1.06	1.03	-2.7	7700	7923	2.9	68.0	67.8	-0.2
7	1.07	0.99	-6.9	7724	7884	2.1	68.5	67.7	-0.8
8	1.07	0.98	-8.2	7713	7902	2.5	68.1	67.5	-0.6
9	1.10	0.99	-9.7	7577	7823	3.2	68.3	67.4	-0.9
10	1.03	1.02	-1.5	7600	7862	3.4	68.2	67.3	-0.9
11	1.05	1.01	-3.3	7702	7861	2.1	68.6	67.5	-1.1
12	1.04	1.04	0.4	7732	7952	2.8	67.8	67.3	-0.5
13	1.08	1.05	-3.0	7753	7957	2.6	68.3	67.1	-1.2
14	1.08	1.01	-7.0	7783	7882	1.3	68.1	67.4	-0.7
15	1.04	0.97	-6.7	7714	7816	1.3	68.5	67.8	-0.7
16	1.01	0.99	-2.3	7642	7798	2.0	68.2	67.6	-0.6
17	1.04	1.02	-1.7	7646	7913	3.5	68.4	67.4	-1.0
18	1.03	1.04	0.5	7617	7925	4.0	67.8	67.8	0.0
19	1.09	0.94	-13.7	7788	7814	0.3	68.3	67.7	-0.6
20	1.04	0.99	-4.0	7659	7857	2.6	67.8	67.5	-0.3
21	1.03	0.99	-3.5	7693	7868	2.3	68.2	67.8	-0.4
22	1.02	0.95	-7.1	7628	7782	2.0	68.0	67.5	-0.5
23	1.02	0.98	-3.9	7579	7827	3.3	68.3	67.4	-0.9
24	1.02	1.03	0.2	7590	7874	3.7	68.5	67.7	-0.8
25	1.12	0.99	-11.5	7860	7772	-1.1	67.9	67.8	-0.1
26	1.00	1.02	2.0	7615	7965	4.6	68.2	67.7	-0.5
27	1.03	1.02	-1.3	7723	7851	1.7	68.1	67.4	-0.7
28	1.08	0.99	-8.1	7640	7839	2.6	68.4	67.4	-1.0
29	1.04	1.01	-2.6	7635	7779	1.9	67.8	67.1	-0.7
30	1.03	0.98	-4.4	7666	7894	3.0	68.1	67.5	-0.6
31	1.07	1.00	-6.4	7703	7954	3.3	67.9	67.4	-0.5
32	1.02	0.98	-3.9	7552	7812	3.4	68.6	67.4	-1.2
33	1.03	1.00	-2.6	7657	7885	3.0	68.2	67.8	-0.4
34	1.01	1.01	0.0	7578	7876	3.9	68.4	67.7	-0.7
35	1.06	0.97	-8.3	7717	7802	1.1	68.1	67.5	-0.6

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
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3,478	2009/8/12 11:00 AM	2010/8/20 7:16 PM	56	0	11478.0
Representative Test P/N : THB1248CE			Current Test Status		<input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination

Equipment: 1.Oven: E24-T0162 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec.	Final Test Current Spec.	Deviation (%)	Initial Test Speed Spec.	Final Test Speed Spec.	Deviation (%)	Initial Test Noise Spec.	Final Test Noise Spec.	Deviation
	(A) 1.14 Max.	(A) 1.14 Max.		(RPM) 7020-8580	(RPM) 7020-8580		(dB A) 73.0 Max	(dB A) 73.0 Max	
36	1.01	0.97	-3.8	7704	7824	1.6	68.3	67.3	-1.0
37	1.04	0.94	-9.2	7496	7783	3.8	68.2	67.4	-0.8
38	1.03	1.00	-2.9	7605	7836	3.0	68.5	67.5	-1.0
39	1.02	1.00	-2.2	7717	7937	2.9	68.1	67.3	-0.8
40	1.01	1.01	0.1	7668	7882	2.8	67.8	67.5	-0.3
41	1.05	0.92	-12.4	7545	7343	-2.7	68.3	67.8	-0.5
42	1.01	1.00	-0.9	7614	7816	2.7	68.5	67.5	-1.0
43	1.04	1.00	-4.0	7614	7848	3.1	67.9	67.8	-0.1
44	1.02	0.97	-4.9	7676	7813	1.8	68.4	67.7	-0.7
45	1.03	0.98	-5.4	7573	7861	3.8	68.2	67.8	-0.4
46	1.03	1.02	-0.8	7664	7928	3.4	68.3	67.1	-1.2
47	1.06	0.93	-12.6	7632	7444	-2.5	68.5	67.5	-1.0
48	1.05	1.00	-5.0	7670	7951	3.7	68.1	67.1	-1.0
49	1.05	1.00	-5.0	7587	7744	2.1	67.9	67.8	-0.1
50	1.05	1.00	-4.7	7621	7901	3.7	68.4	67.7	-0.7
51	1.05	0.99	-5.0	7445	7573	1.7	67.8	67.5	-0.3
52	1.03	1.03	0.3	7541	7860	4.2	68.1	67.3	-0.8
53	1.04	0.98	-5.8	7681	7874	2.5	68.3	67.5	-0.8
54	1.04	1.01	-3.4	7568	7888	4.2	67.9	67.4	-0.5
55	1.03	0.99	-3.7	7696	7850	2.0	68.2	67.4	-0.8
56	1.04	0.99	-4.8	7573	7809	3.1	68.5	67.1	-1.4
X-Bar	1.040	0.995	-	7647.3	7841.1	-	68.19	67.50	-
σ	0.024	0.027	-	77.446	108.816	-	0.231	0.232	-

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