



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 THA 92x92x38.0 mm series as the right table	THA0948BE-CE43			

Representative Test P/N : THA0948BE	
Equipment: 1.Oven: E24-F0158	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	5,478.0	771,820	110,260

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2009/12/12 8:00 AM	2010/9/3 6:16 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	5478.0

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	2,183,036	311,862
30	16.00	1,543,639	220,520
40	8.00	771,820	110,260
50	4.00	385,910	55,130
60	2.00	192,955	27,565
70	1.00	96,477	13,782

Fan permission criteria for the measurement after test :

1. Speed can not drop of $\geq 15\%$ below the original measured rpm.
2. Current cannot increase $> 15\%$ of original measure current.
3. Noise cannot $> 3\text{dB}$ over the original measure noise.

Test Result	<input checked="" type="checkbox"/> Accept
	<input type="checkbox"/> Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG09FNL180	2892.50	2010/11/29	Nan Yang	Jack Li



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 THA 92x92x38.0 mm series as the right table

THA0948BE-CE43				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2009/12/12 8:00 AM	2010/9/3 6:16 PM	56	0	5478.0

Representative Test P/N : THA0948BE	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
-------------------------------------	----------------------------	-------------------------------------	---	---

Equipment: 1.Oven: E24-F0158 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) 1.68 Max.	(A) 1.68 Max.		(RPM) 8550-10450	(RPM) 8550-10450		(dB A) 75.0 Max	(dB A) 75.0 Max	
1	1.40	1.44	3.2	9422	9584	1.7	71.2	69.6	-1.6
2	1.43	1.46	1.7	9473	9503	0.3	71.5	69.2	-2.3
3	1.45	1.44	-0.6	9476	9450	-0.3	71.1	69.5	-1.6
4	1.46	1.44	-1.1	9528	9471	-0.6	71.7	69.1	-2.6
5	1.49	1.42	-4.6	9580	9455	-1.3	71.3	69.3	-2.0
6	1.46	1.46	-0.1	9572	9579	0.1	70.8	69.7	-1.1
7	1.45	1.46	0.6	9553	9469	-0.9	71.4	69.5	-1.9
8	1.46	1.44	-1.4	9597	9478	-1.2	71.6	69.0	-2.6
9	1.47	1.46	-0.3	9568	9513	-0.6	71.3	69.7	-1.6
10	1.45	1.46	1.1	9506	9603	1.0	71.1	69.1	-2.0
11	1.46	1.45	-0.1	9537	9379	-1.7	70.1	70.0	-0.1
12	1.46	1.45	-0.4	9523	9499	-0.3	71.2	69.6	-1.6
13	1.48	1.47	-0.7	9526	9535	0.1	71.7	69.7	-2.0
14	1.43	1.46	2.0	9455	9639	1.9	71.5	69.3	-2.2
15	1.45	1.46	0.6	9539	9599	0.6	71.3	69.5	-1.8
16	1.42	1.41	-0.8	9437	9471	0.4	71.1	69.8	-1.3
17	1.46	1.43	-2.2	9511	9466	-0.5	71.5	69.4	-2.1
18	1.49	1.48	-0.7	9571	9610	0.4	71.2	69.7	-1.5
19	1.46	1.44	-1.8	9505	9411	-1.0	70.9	69.6	-1.3
20	1.46	1.45	-0.7	9572	9609	0.4	71.1	69.8	-1.3
21	1.44	1.46	0.8	9427	9570	1.5	71.2	69.5	-1.7
22	1.44	1.44	0.5	9506	9610	1.1	70.7	69.3	-1.4
23	1.45	1.45	0.1	9531	9637	1.1	71.4	69.6	-1.8
24	1.47	1.46	-0.5	9488	9401	-0.9	71.3	69.5	-1.8
25	1.50	1.45	-3.7	9636	9541	-1.0	71.1	69.8	-1.3
26	1.47	1.49	1.6	9415	9574	1.7	71.5	69.5	-2.0
27	1.45	1.49	3.0	9551	9668	1.2	71.1	69.9	-1.2
28	1.39	1.39	0.0	9412	9419	0.1	70.9	70.1	-0.8
29	1.47	1.47	0.1	9524	9503	-0.2	71.4	69.1	-2.3
30	1.49	1.45	-2.6	9607	9499	-1.1	71.6	69.6	-2.0
31	1.42	1.46	2.9	9475	9579	1.1	71.2	69.6	-1.6
32	1.46	1.44	-0.9	9618	9617	0.0	71.5	69.3	-2.2
33	1.43	1.41	-1.2	9470	9458	-0.1	71.3	69.8	-1.5
34	1.47	1.41	-4.3	9497	9515	0.2	71.4	69.4	-2.0
35	1.43	1.46	2.4	9412	9617	2.2	71.6	69.7	-1.9

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG09FNL180	2892.50	2010/11/29	Nan Yang	Jack Li



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 THA 92x92x38.0 mm series as the right table

THA0948BE-CE43			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2009/12/12 8:00 AM	2010/9/3 6:16 PM	56	0	5478.0
Representative Test P/N : THA0948BE			Current Test Status		<input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination
Equipment: 1.Oven: E24-F0158				On/Off Cycles: Every 500 hours	

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 1.68 Max.	Final Test Current Spec. (A) 1.68 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 8550-10450	Final Test Speed Spec. (RPM) 8550-10450	Deviation (%)	Initial Test Noise Spec. (dB A) 75.0 Max	Final Test Noise Spec. (dB A) 75.0 Max	Deviation 3 dBMax.
36	1.44	1.45	1.2	9555	9634	0.8	71.2	69.5	-1.7
37	1.50	1.50	0.4	9686	9466	-2.3	71.5	69.2	-2.3
38	1.41	1.42	0.4	9523	9523	0.0	71.7	69.6	-2.1
39	1.45	1.44	-0.3	9486	9468	-0.2	71.6	69.3	-2.3
40	1.45	1.45	0.0	9482	9548	0.7	71.3	69.7	-1.6
41	1.40	1.44	2.7	9395	9538	1.5	71.4	69.4	-2.0
42	1.47	1.41	-3.8	9545	9496	-0.5	71.6	69.8	-1.8
43	1.49	1.46	-2.0	9574	9604	0.3	71.7	69.3	-2.4
44	1.48	1.47	-0.5	9590	9706	1.2	71.2	69.7	-1.5
45	1.44	1.47	2.0	9530	9472	-0.6	71.5	69.4	-2.1
46	1.46	1.44	-1.5	9655	9388	-2.8	71.7	69.7	-2.0
47	1.42	1.44	1.2	9506	9424	-0.9	71.2	69.5	-1.7
48	1.47	1.45	-1.6	9513	9486	-0.3	71.1	69.8	-1.3
49	1.42	1.46	2.8	9543	9461	-0.9	71.4	69.4	-2.0
50	1.45	1.48	1.7	9558	9652	1.0	71.3	69.7	-1.6
51	1.46	1.46	0.0	9628	9588	-0.4	71.5	69.3	-2.2
52	1.44	1.47	2.1	9479	9622	1.5	70.8	69.6	-1.2
53	1.46	1.48	1.6	9586	9733	1.5	71.3	69.5	-1.8
54	1.46	1.47	0.5	9533	9542	0.1	71.4	69.8	-1.6
55	1.47	1.43	-2.1	9585	9585	0.0	71.2	69.6	-1.6
56	1.45	1.43	-1.4	9512	9538	0.3	71.6	69.4	-2.2
X-Bar	1.453	1.451	-	9526.5	9535.8	-	71.30	69.54	-
σ	0.024	0.022	-	63.797	82.029	-	0.293	0.235	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG09FNL180	2892.50	2010/11/29	Nan Yang	Jack Li