



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 120x120x25.4 mm series as the right table	THB1248B-AXHG				
Representative Test P/N : THB1248B-AC98					
Equipment: 1.Oven: E24-T0169			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 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 L ₁₀ 40 °C (hours)
70	40	8.00	56	2.303	3,478	4,478.0	630,925	90,132

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2011/1/26 5:00 PM	2012/2/24 6:46 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	4478.0

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	1,784,526	254,932
30	16.00	1,261,851	180,264
40	8.00	630,925	90,132
50	4.00	315,463	45,066
60	2.00	157,731	22,533
70	1.00	78,866	11,267

Fan permission criteria for the measurement after test :

1. Speed can not drop of ≥ 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB 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
DG11FNL003	5968.00	2012/4/7	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	2011/1/26 5:00 PM	2012/2/24 6:46 AM	56	0	4478.0

Representative Test P/N : THB1248B-AC98	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-T0169 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (mA)	Final Test Current Spec. (mA)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Spec. (dB A)	Deviation
	480 Max.	480 Max.		4680-5720	4680-5720		63.0 Max	63.0 Max	
1	381	373	-2.1	5310	5289	-0.4	58.1	58.0	-0.1
2	403	385	-4.5	5318	5305	-0.2	58.4	58.3	-0.1
3	391	374	-4.3	5225	5284	1.1	57.9	58.5	0.6
4	381	391	2.6	5309	5303	-0.1	58.4	58.6	0.2
5	391	375	-4.1	5311	5297	-0.3	58.2	58.2	0.0
6	423	383	-9.5	5304	5309	0.1	57.8	58.7	0.9
7	394	389	-1.3	5304	5307	0.1	58.2	58.3	0.1
8	396	380	-4.0	5322	5296	-0.5	57.9	58.5	0.6
9	367	359	-2.2	5286	5261	-0.5	58.2	58.6	0.4
10	380	349	-8.2	5236	5311	1.4	58.0	58.2	0.2
11	408	367	-10.0	5323	5325	0.0	57.9	58.6	0.7
12	392	369	-5.9	5311	5306	-0.1	58.2	58.7	0.5
13	401	372	-7.2	5302	5310	0.2	58.1	58.6	0.5
14	377	398	5.6	5323	5310	-0.2	58.2	58.3	0.1
15	381	376	-1.3	5310	5295	-0.3	57.8	58.2	0.4
16	389	369	-5.1	5307	5309	0.0	58.0	58.6	0.6
17	399	379	-5.0	5312	5317	0.1	58.2	58.7	0.5
18	395	376	-4.8	5319	5294	-0.5	57.8	58.3	0.5
19	405	381	-5.9	5312	5320	0.2	58.0	58.6	0.6
20	390	384	-1.5	5296	5284	-0.2	58.2	58.5	0.3
21	382	387	1.3	5322	5306	-0.3	57.8	58.2	0.4
22	395	351	-11.1	5308	5303	-0.1	58.1	58.7	0.6
23	407	380	-6.6	5308	5308	0.0	58.3	58.6	0.3
24	396	365	-7.8	5300	5307	0.1	58.2	58.5	0.3
25	402	379	-5.7	5285	5297	0.2	58.1	58.6	0.5
26	413	377	-8.7	5300	5303	0.1	58.3	58.7	0.4
27	391	367	-6.1	5279	5308	0.5	58.0	58.6	0.6
28	377	357	-5.3	5213	5274	1.2	58.4	58.5	0.1
29	384	382	-0.5	5321	5313	-0.2	58.3	58.6	0.3
30	369	346	-6.2	5159	5233	1.4	58.5	58.7	0.2
31	393	381	-3.1	5290	5319	0.5	58.0	58.3	0.3
32	410	372	-9.3	5313	5295	-0.3	58.4	58.6	0.2
33	388	359	-7.5	5289	5302	0.2	58.2	58.4	0.2
34	423	386	-8.7	5326	5297	-0.5	58.3	58.3	0.0
35	393	363	-7.6	5233	5283	1.0	58.2	58.6	0.4

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG11FNL003	5968.00	2012/4/7	Nan Yang	Tim Yi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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THB1248B-AXHG					

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2011/1/26 5:00 PM	2012/2/24 6:46 AM	56	0	4478.0

Representative Test P/N : THB1248B-AC98	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-T0169 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (mA) 480 Max.	Final Test Current Spec. (mA) 480 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 4680-5720	Final Test Speed Spec. (RPM) 4680-5720	Deviation (%)	Initial Test Noise Spec. (dB A) 63.0 Max	Final Test Noise Spec. (dB A) 63.0 Max	Deviation 3 dBMax.
36	378	380	0.5	5314	5288	-0.5	58.1	58.7	0.6
37	384	375	-2.3	5289	5326	0.7	58.0	58.5	0.5
38	401	377	-6.0	5287	5310	0.4	58.0	58.3	0.3
39	388	365	-5.9	5313	5296	-0.3	57.9	58.2	0.3
40	399	381	-4.5	5314	5283	-0.6	58.1	58.6	0.5
41	390	375	-3.8	5312	5318	0.1	58.2	58.7	0.5
42	394	374	-5.1	5286	5309	0.4	57.8	58.6	0.8
43	398	401	0.8	5306	5312	0.1	58.0	58.7	0.7
44	404	389	-3.7	5323	5302	-0.4	57.8	58.6	0.8
45	382	385	0.8	5275	5294	0.4	58.2	58.5	0.3
46	384	379	-1.3	5321	5295	-0.5	58.0	58.3	0.3
47	384	387	0.8	5293	5299	0.1	57.8	58.6	0.8
48	401	378	-5.7	5308	5306	0.0	58.0	58.7	0.7
49	389	366	-5.9	5225	5301	1.5	58.1	58.6	0.5
50	378	356	-5.8	5195	5254	1.1	58.3	58.7	0.4
51	381	381	0.0	5308	5300	-0.2	58.4	58.6	0.2
52	423	374	-11.6	5326	5308	-0.3	58.3	58.5	0.2
53	394	370	-6.1	5292	5285	-0.1	58.1	58.9	0.8
54	399	379	-5.0	5327	5318	-0.2	58.2	58.6	0.4
55	412	377	-8.5	5288	5314	0.5	58.3	58.5	0.2
56	381	369	-3.1	5309	5294	-0.3	58.5	58.3	-0.2
X-Bar	393.1	375.0	-	5294.6	5299.9	-	58.12	58.51	-
σ	12.615	11.252	-	35.028	16.654	-	0.193	0.184	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG11FNL003	5968.00	2012/4/7	Nan Yang	Tim Yi