



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 208x208x70.0 mm series as the right table	THB2048CTAXK			
	THB2048CT			

Representative Test P/N : THB2048CT-9E1Y

Equipment: 1.Oven: E24-T0169 On/Off Cycles: Every 500 hours

⊙ **L₁₀ Expectancy: 80,000 hours minimum @ fan rated voltage and the temperature of 40°C**

According to the equation for **Weibull distribution**, **MTTF ≅ 7×L₁₀ = 560,000 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	15	2.303	13,180	25,360.0	1,077,544	153,935

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2010/5/22 3:30 PM	2011/11/22 7:06 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	25360.0

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.

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.

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	3,047,755	435,394
30	16.00	2,155,088	307,870
40	8.00	1,077,544	153,935
50	4.00	538,772	76,967
60	2.00	269,386	38,484
70	1.00	134,693	19,242

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
DG10FNL062	30616.50	2016/10/10	DongQian.Liang	Tim.Yi

BGN (dBA) : 16.1

Temp (°C) : 24.8



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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				THB2048CT						
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)					
13,180	2010/5/22 3:30 PM	2011/11/22 7:06 PM	15	0	25360.0					
Representative Test P/N : THB2048CT-9E1Y			Current Test Status		<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination			
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. (A)	Final Test Current Spec. (A)	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	
	5.88 Max.	5.88 Max.		5220-6380	5220-6380		79.5 Max	79.5 Max	3 dBMax.	
1	5.27	4.95	-6.0	5961	5844	-2.0	75.1	73.4	-1.7	
2	5.30	4.98	-5.9	5973	6018	0.8	75.4	73.7	-1.7	
3	5.32	4.94	-7.2	5988	5814	-2.9	75.6	73.6	-2.0	
4	5.22	4.96	-5.1	5992	5934	-1.0	75.3	73.5	-1.8	
5	5.21	4.98	-4.5	5985	6017	0.5	75.2	73.3	-1.9	
6	5.13	4.94	-3.7	5952	5877	-1.3	75.5	73.8	-1.7	
7	5.33	4.94	-7.3	5994	5872	-2.0	75.4	73.6	-1.8	
8	5.35	4.93	-7.9	5907	5865	-0.7	75.6	73.2	-2.4	
9	5.24	4.98	-5.1	6015	5984	-0.5	75.4	73.3	-2.1	
10	5.32	4.94	-7.1	5936	5899	-0.6	75.2	73.4	-1.8	
11	5.21	5.01	-3.9	6022	6016	-0.1	75.6	73.0	-2.6	
12	5.23	5.01	-4.2	5952	5901	-0.9	75.1	73.6	-1.5	
13	5.31	5.01	-5.7	5972	6065	1.6	75.4	73.6	-1.8	
14	5.20	4.99	-4.0	6024	5953	-1.2	75.5	73.5	-2.0	
15	5.21	5.00	-4.0	5983	5960	-0.4	75.3	73.0	-2.3	
X-Bar	5.256	4.970	-	5977.1	5934.6	-	75.37	73.43	-	
σ	0.062	0.029	-	32.228	74.656	-	0.171	0.238	-	
QE File No.	Time-out for function test or others (hrs)		Issued Date		Reported By		Approved By			
DG10FNL062	30616.50		2016/10/10		DongQian.Liang		Tim.Yi			