



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 THD134X134X38.0mm series as the right table	THD1348HE				
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Representative Test P/N : THD1348HE-00BGV

Equipment: 1.Oven: E24-T0161 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	15	2.303	11,532	3,360.0	142,766	20,395

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2017/3/25 5:00 PM	2018/8/27 12:09 PM	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	3360.0

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	403,803	57,686
30	16.00	285,532	40,790
40	8.00	142,766	20,395
50	4.00	71,383	10,198
60	2.00	35,692	5,099
70	1.00	17,846	2,549

- 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
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG17FNL035	943.00	2017/9/21	Loly.Wang	Tim.Yi

BGN (dBA) : 17.2

Temp (°C) : 22.5



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)				
11,532	2017/3/25 5:00 PM	2018/8/27 12:09 PM	15	0	3360.0				
Representative Test P/N : THD1348HE-00BGV				Current Test Status	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination		
Equipment: 1.Oven: E24-T0161					On/Off Cycles: Every 500 hours				
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test Current Spec. (A) 9 Max.	Final Test Current Spec. (A) 9 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 11250-13750	Final Test Speed Spec. (RPM) 11250-13750	Deviation (%)	Initial Test Noise Spec. (dB A) 86.0Max.	Final Test Noise Spec. (dB A) 86.0Max.	Deviation 3 dBMax.
1	4.714	4.835	2.6	11998	12495	4.1	80.8	80.2	-0.6
2	4.767	4.718	-1.0	11692	12491	6.8	80.7	81.0	0.3
3	4.712	4.716	0.1	11536	12441	7.8	82.2	81.3	-0.9
4	4.790	4.776	-0.3	11452	12485	9.0	81.5	81.0	-0.5
5	4.767	4.712	-1.2	11269	12501	10.9	81.3	80.5	-0.8
6	4.694	4.794	2.1	11486	12469	8.6	82.1	81.1	-1.0
7	4.718	4.687	-0.7	11546	12447	7.8	82.2	81.5	-0.7
8	4.930	4.854	-1.5	11509	12488	8.5	82.7	81.8	-0.9
9	4.783	4.835	1.1	11482	12467	8.6	82.3	80.9	-1.4
10	4.803	4.752	-1.1	11489	12504	8.8	81.3	80.9	-0.4
11	4.821	4.761	-1.2	11521	12473	8.3	81.3	80.8	-0.5
12	4.824	4.810	-0.3	11392	12477	9.5	82.0	81.1	-0.9
13	4.783	4.797	0.3	11298	12446	10.2	82.3	79.2	-3.1
14	4.741	4.819	1.6	11529	12451	8.0	83.0	80.0	-3.0
15	4.779	4.830	1.1	11519	12485	8.4	81.9	81.2	-0.7
X-Bar	4.78	4.78	-	11514.53	12474.67	-	81.84	80.83	-
σ	4.78	4.78	-	11482.30	12473.31	-	81.91	80.88	-
QE File No.	Time-out for function test or others (hrs)			Issued Date		Reported By		Approved By	
DG17FNL035	943.00			2017/9/21		Loly.Wang		Tim.Yi	