



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 120x120x25.4mm series as the right table	THB1248B-AC98			
	THB1212B-ABZZ			
	THB1212B-AXHF			

Representative Test P/N : THB1212B-AH04	
Equipment: 1.Oven: E24-T0167	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	15,478.0	2,180,764	311,538

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2012/7/26 10:00 AM	2014/1/10 11:16 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	15478.0

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	6,168,132	881,162
30	16.00	4,361,528	623,075
40	8.00	2,180,764	311,538
50	4.00	1,090,382	155,769
60	2.00	545,191	77,884
70	1.00	272,596	38,942

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
DG12FNL093	9315.50	2015/10/17	NaNa.Wang	Tim.Yi

BGN (dBA) : 16.1

Temp (°C) : 25.0



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				THB1212B-ABZZ					
				THB1212B-AXHF					
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)				
3,478	2012/7/26 10:00 AM	2014/1/10 11:16 AM	56	0	15478.0				
Representative Test P/N : THB1212B-AH04				Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination		
Equipment: 1.Oven: E24-T0167					On/Off Cycles: Every 500 hours				
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test Current Spec. (A) 1.92 Max.	Final Test Current Spec. (A) 1.92 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 4770-5830	Final Test Speed Spec. (RPM) 4770-5830	Deviation (%)	Initial Test Noise Spec. (dB A) 62.0 Max	Final Test Noise Spec. (dB A) 62.0 Max	Deviation 3 dBMax.
1	1.40	1.42	1.4	5365	5416	1.0	59.6	57.8	-1.8
2	1.53	1.42	-7.4	5369	5374	0.1	59.0	58.3	-0.7
3	1.53	1.46	-5.0	5409	5394	-0.3	59.1	58.6	-0.5
4	1.52	1.54	1.5	5386	5389	0.1	59.3	58.6	-0.7
5	1.57	1.41	-9.9	5386	5406	0.4	59.6	58.4	-1.2
6	1.44	1.57	9.0	5345	5403	1.1	59.2	58.1	-1.1
7	1.59	1.45	-8.6	5402	5357	-0.8	59.7	58.0	-1.7
8	1.55	1.46	-5.6	5350	5371	0.4	59.1	57.9	-1.2
9	1.51	1.49	-1.2	5362	5380	0.3	59.3	58.4	-0.9
10	1.46	1.55	6.7	5339	5376	0.7	59.2	58.6	-0.6
11	1.59	1.46	-7.6	5358	5359	0.0	59.1	58.1	-1.0
12	1.51	1.47	-2.6	5395	5409	0.3	59.7	58.3	-1.4
13	1.54	1.50	-2.7	5345	5401	1.0	59.3	58.5	-0.8
14	1.54	1.49	-3.4	5381	5389	0.1	59.6	57.8	-1.8
15	1.54	1.47	-4.5	5343	5340	-0.1	59.2	58.0	-1.2
16	1.42	1.41	-0.4	5356	5394	0.7	59.3	58.2	-1.1
17	1.57	1.42	-9.9	5395	5382	-0.2	59.2	58.4	-0.8
18	1.54	1.41	-8.7	5356	5394	0.7	59.6	58.6	-1.0
19	1.59	1.48	-6.9	5409	5381	-0.5	59.1	57.9	-1.2
20	1.47	1.49	0.7	5366	5392	0.5	59.7	58.1	-1.6
21	1.52	1.45	-4.7	5325	5388	1.2	59.3	58.3	-1.0
22	1.41	1.41	-0.1	5357	5390	0.6	59.2	58.5	-0.7
23	1.56	1.41	-9.4	5361	5405	0.8	59.6	57.8	-1.8
24	1.53	1.44	-5.6	5351	5367	0.3	59.2	58.0	-1.2
25	1.55	1.41	-9.5	5396	5388	-0.1	59.7	58.2	-1.5
26	1.46	1.47	0.5	5352	5391	0.7	59.6	58.4	-1.2
27	1.62	1.42	-12.5	5383	5379	-0.1	59.3	58.6	-0.7
28	1.42	1.58	11.9	5343	5387	0.8	59.7	58.0	-1.7
29	1.57	1.51	-4.0	5376	5405	0.5	59.3	58.0	-1.3
30	1.41	1.52	7.8	5349	5356	0.1	59.2	58.2	-1.0
31	1.47	1.41	-3.9	5350	5394	0.8	59.1	57.9	-1.2
32	1.54	1.44	-6.7	5364	5378	0.3	59.6	58.5	-1.1
QE File No.	Time-out for function test or others (hours)			Issued Date		Reported By		Approved By	
DG12FNL093	9315.50			2015/10/17		NaNa.Wang		Tim.Yi	



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Test Data Between Initial Test and Final Test										
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33	1.56	1.50	-3.9	5347	5382	0.7	59.7	57.8	-1.9	
34	1.47	1.45	-1.6	5381	5379	0.0	59.3	58.1	-1.2	
35	1.46	1.53	5.3	5371	5386	0.3	59.1	58.3	-0.8	
36	1.53	1.50	-2.0	5359	5410	1.0	59.6	58.5	-1.1	
37	1.44	1.42	-1.0	5339	5382	0.8	59.2	57.8	-1.4	
38	1.56	1.50	-4.0	5341	5396	1.0	59.6	58.0	-1.6	
39	1.57	1.44	-8.6	5378	5392	0.3	59.7	58.2	-1.5	
40	1.43	1.53	6.7	5330	5375	0.8	59.3	58.4	-0.9	
41	1.58	1.50	-5.1	5400	5393	-0.1	59.2	58.6	-0.6	
42	1.41	1.45	2.9	5396	5389	-0.1	59.2	57.9	-1.3	
43	1.62	1.46	-9.9	5336	5409	1.4	59.3	58.1	-1.2	
44	1.40	1.50	7.0	5357	5231	-2.4	59.1	58.3	-0.8	
45	1.61	1.46	-9.8	5382	5310	-1.3	59.7	58.5	-1.2	
46	1.43	1.54	8.1	5360	5410	0.9	59.3	57.8	-1.5	
47	1.53	1.65	8.4	5333	5421	1.7	59.5	58.0	-1.5	
48	1.43	1.54	7.5	5386	5320	-1.2	59.0	58.2	-0.8	
49	1.42	1.57	11.1	5369	5324	-0.8	59.2	58.4	-0.8	
50	1.56	1.52	-2.3	5356	5430	1.4	59.5	58.6	-0.9	
51	1.43	1.53	7.0	5386	5215	-3.2	59.2	58.1	-1.1	
52	1.61	1.54	-4.5	5382	5301	-1.5	59.7	58.3	-1.4	
53	1.47	1.53	4.5	5402	5203	-3.7	59.3	58.5	-0.8	
54	1.55	1.56	0.5	5336	5361	0.5	59.1	57.9	-1.2	
55	1.42	1.54	8.5	5350	5412	1.2	59.7	58.2	-1.5	
56	1.55	1.52	-1.8	5374	5324	-0.9	59.6	58.4	-1.2	
X-Bar	1.5	1.5	-	5365.6	5373.0	-	59.37	58.2	-	
σ	0.067	0.056	-	21.953	46.311	-	0.230	0.261	-	
QE File No.	Time-out for function test or others (hrs)			Issued Date		Reported By		Approved By		
DG12FNL093	9315.50			2015/10/17		NaNa.Wang		Tim.Yi		