

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 40x40x28mm series as the right table	THA0412BN				

Representative Test P/N : THA0412HN

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 MTF 40 °C (hours)	Verified L ₁₀ 40 °C (hours)
70	40	8.00	56	2.303	3,478	6,478.0	912,714	130,388

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2012/3/22 8:00 AM	2012/11/3 10:46 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	6478.0

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 MTF 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 MTF 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 MTF Estimation (°C)	Acceleration Factor A _F	Estimated MTF (hours)	Estimated L ₁₀ (hours)
25	22.63	2,581,546	368,792
30	16.00	1,825,428	260,775
40	8.00	912,714	130,388
50	4.00	456,357	65,194
60	2.00	228,179	32,597
70	1.00	114,089	16,298

- 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
DG12FNL048	1961.00	2013/3/21	Chaoping.Duan	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	2012/3/22 8:00 AM	2012/11/3 10:46 PM	56	0	6478.0

Representative Test P/N : THA0412HN	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-T0161 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 1.32Max.	Final Test Current Spec. (A) 1.32 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 17100-20900	Final Test Speed Spec. (RPM) 17100-20900	Deviation (%)	Initial Test Noise Spec. (dB A) 63.0Max	Final Test Noise Spec. (dB A) 63.0 Max	Deviation 3 dBMax.
1	0.90	0.90	-0.6	18731	19782	5.6	58.0	57.8	-0.2
2	0.89	0.88	-1.7	18942	19482	2.9	58.2	58.2	0.0
3	0.84	0.89	5.4	19564	19234	-1.7	57.7	57.9	0.2
4	0.78	0.87	12.1	19190	19662	2.5	57.9	58.4	0.5
5	0.80	0.85	6.2	19068	20132	5.6	58.3	58.1	-0.2
6	0.80	0.84	5.0	18636	19942	7.0	58.1	57.5	-0.6
7	0.91	0.86	-6.0	18656	19184	2.8	57.8	57.7	-0.1
8	0.91	0.87	-4.8	19295	19285	-0.1	57.6	58.3	0.7
9	0.74	0.82	11.1	20258	19023	-6.1	58.2	57.6	-0.6
10	0.80	0.87	8.2	18173	19212	5.7	58.0	58.0	0.0
11	0.86	0.97	12.3	19974	19797	-0.9	58.5	57.7	-0.8
12	0.77	0.84	9.1	17806	19781	11.1	58.1	58.1	0.0
13	0.95	0.90	-4.9	20625	19620	-4.9	58.4	58.5	0.1
14	0.90	0.94	4.7	18056	19837	9.9	58.0	57.9	-0.1
15	0.82	0.90	10.2	18540	19404	4.7	57.7	58.3	0.6
16	0.70	0.75	7.8	17167	19274	12.3	57.8	58.0	0.2
17	0.85	0.89	4.7	20174	19413	-3.8	58.3	57.6	-0.7
18	0.88	0.89	1.4	18652	19613	5.2	58.1	58.3	0.2
19	0.90	0.89	-1.3	18346	19444	6.0	58.5	57.8	-0.7
20	0.89	0.88	-1.0	18772	19287	2.7	57.6	58.2	0.6
21	0.84	0.86	2.1	19274	19386	0.6	57.9	58.4	0.5
22	0.73	0.82	12.9	17533	19650	12.1	58.0	57.7	-0.3
23	0.93	0.92	-1.2	19624	19907	1.4	58.4	58.1	-0.3
24	0.78	0.88	13.2	18306	19597	7.1	58.1	57.6	-0.5
25	0.92	0.86	-6.5	17989	19332	7.5	58.3	57.9	-0.4
26	0.76	0.84	10.5	19309	19746	2.3	57.8	58.3	0.5
27	0.84	0.80	-4.8	19255	17501	-9.1	58.0	58.0	0.0
28	0.86	0.86	-0.6	20005	19457	-2.7	57.9	58.0	0.1
29	0.86	0.80	-6.4	18106	19348	6.9	58.1	57.7	-0.4
30	0.75	0.84	12.4	19556	19238	-1.6	58.4	58.3	-0.1
31	0.76	0.83	9.2	19139	19859	3.8	57.8	58.0	0.2
32	0.88	0.83	-5.9	19722	19525	-1.0	58.0	57.9	-0.1

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG12FNL048	1961.00	2013/3/21	Chaoping.Duan	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	2012/3/22 8:00 AM	2012/11/3 10:46 PM	56	0	6478.0					
Representative Test P/N : THA0412HN				Current Test Status		<input type="checkbox"/> In process		<input type="checkbox"/> In process (exceed requested)		<input checked="" 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) 1.32 Max.	Final Test Current Spec. (A) 1.32 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 17100-20900	Final Test Speed Spec. (RPM) 17100-20900	Deviation (%)	Initial Test Noise Spec. (dB A) 63.0Max	Final Test Noise Spec. (dB A) 63.0 Max	Deviation	3 dBMax.
33	0.89	0.89	0.3	19739	19657	-0.4	57.6	58.5	0.9	
34	0.85	0.88	3.6	18488	19497	5.5	58.3	58.1	-0.2	
35	0.87	0.79	-9.2	18088	17958	-0.7	58.5	57.8	-0.7	
36	0.85	0.87	2.4	19222	19555	1.7	58.1	57.5	-0.6	
37	0.78	0.86	9.9	18766	19464	3.7	57.7	57.9	0.2	
38	0.80	0.82	2.5	19625	19522	-0.5	57.9	58.2	0.3	
39	0.92	0.96	4.7	18066	19807	9.6	57.8	58.4	0.6	
40	0.89	0.92	2.9	18293	19718	7.8	58.4	57.7	-0.7	
41	0.89	0.96	7.5	18892	19786	4.7	58.0	58.1	0.1	
42	0.75	0.80	6.7	19281	19607	1.7	57.6	57.6	0.0	
43	0.90	0.98	8.1	19310	19510	1.0	58.3	58.2	-0.1	
44	0.75	0.80	6.7	19731	19286	-2.3	58.1	58.4	0.3	
45	0.95	0.87	-8.0	18344	19563	6.6	58.5	57.8	-0.7	
46	0.84	0.82	-3.0	19293	19317	0.1	57.8	58.3	0.5	
47	0.93	0.94	1.1	19520	20071	2.8	58.2	57.9	-0.3	
48	0.92	0.97	5.5	19738	19623	-0.6	57.9	58.0	0.1	
49	0.85	0.91	6.8	18269	19789	8.3	58.4	58.1	-0.3	
50	0.96	0.84	-12.4	19003	18805	-1.0	57.7	57.7	0.0	
51	0.90	0.91	1.0	17691	19844	12.2	58.2	58.4	0.2	
52	0.91	0.87	-4.1	19206	19344	0.7	58.5	57.9	-0.6	
53	0.92	0.92	-0.1	17716	19784	11.7	58.0	58.2	0.2	
54	0.75	0.79	5.3	19228	19362	0.7	57.8	58.0	0.2	
55	0.90	0.85	-4.9	18867	19021	0.8	58.2	57.8	-0.4	
56	0.75	0.80	6.7	17217	19036	10.6	58.1	58.1	0.0	
X-Bar	0.9	0.9	-	18867.0	19462.1	-	58.06	58.01	-	
σ	0.773	0.051	-	17867.000	435.076	-	0.268	0.272	-	
QE File No.	Time-out for function test or others (hrs)			Issued Date		Reported By		Approved By		
DG12FNL048	1961.00			2013/3/21		Chaoping.Duan		Tim.Yi		