



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 THD 120x120x38.0 mm series as the right table				

Representative Test P/N : THD1248HE	Date Code: 4705PR
Equipment: 1.Oven: E24-T0170	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	1,360.0	191,616	27,374

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2014/7/30 3:40 PM	2015/1/11 1:56 PM	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	1360.0

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	541,973	77,425
30	16.00	383,233	54,748
40	8.00	191,616	27,374
45	5.66	135,493	19,356
50	4.00	95,808	13,687
60	2.00	47,904	6,843
70	1.00	23,952	3,422
Test Result		<input checked="" type="checkbox"/> Accept	<input type="checkbox"/> Reject

- 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.

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG14FNL086	480.50	2014/10/20	NaNa.Wang	Tim.Yi

BGN (dBA) :16.2

Temp (°C) : 24.0



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 THD 120x120x38.0 mm series as the right table

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)				
3,478	2014/7/30 3:40 PM	2015/1/11 1:56 PM	56	0	1360.0				
Representative Test P/N : THD1248HE			Current Test Status	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested) <input type="checkbox"/> Termination				
Equipment: 1.Oven: E24-T0170				On/Off Cycles: Every 500 hours					
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test Current Spec. (A) 2.7 Max.	Final Test Current Spec. (A) 2.7 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 9810-11990	Final Test Speed Spec. (RPM) 9810-11990	Deviation (%)	Initial Test Noise Spec. (dB A) 79.0 Max	Final Test Noise Spec. (dB A) 79.0 Max	Deviation 3 dBMax.
1	1.90	2.13	12.1	10989	10855	-1.2	74.8	74.1	-0.7
2	1.92	2.17	13.0	10992	10894	-0.9	75.0	74.9	-0.1
3	1.95	2.19	12.3	10982	11031	0.4	75.5	75.4	-0.1
4	2.06	2.21	7.3	10985	10841	-1.3	74.9	75.0	0.1
5	1.87	2.11	12.6	10978	10912	-0.6	75.2	75.5	0.3
6	2.03	2.26	11.7	10999	10941	-0.5	75.7	74.6	-1.1
7	1.93	2.10	8.6	11004	10954	-0.5	74.9	74.8	-0.1
8	1.96	2.20	12.0	10984	10952	-0.3	75.1	75.3	0.2
9	1.90	2.12	11.9	11014	11011	0.0	75.3	74.1	-1.2
10	1.99	2.21	11.5	11015	11019	0.0	75.6	74.3	-1.3
11	1.90	2.16	13.5	11020	10978	-0.4	74.9	74.5	-0.4
12	1.94	2.18	12.4	10975	10986	0.1	75.1	75.1	0.0
13	1.88	2.12	12.6	10980	10944	-0.3	75.3	74.1	-1.2
14	2.08	2.12	2.0	10968	11001	0.3	75.5	75.2	-0.3
15	1.91	2.20	14.9	10974	10999	0.2	74.8	75.4	0.6
16	1.95	2.14	9.6	10968	10987	0.2	75.6	75.1	-0.5
17	1.88	2.15	14.5	10975	10963	-0.1	75.1	74.1	-1.0
18	1.96	2.17	10.6	10962	10852	-1.0	75.3	74.3	-1.0
19	1.90	2.13	12.3	11014	11026	0.1	75.5	74.5	-1.0
20	2.12	2.22	5.2	10983	10985	0.0	75.7	74.7	-1.0
21	1.85	2.12	14.7	11006	10868	-1.3	74.9	74.9	0.0
22	2.07	2.19	6.2	10965	10935	-0.3	75.1	75.1	0.0
23	1.97	2.22	12.6	10973	10949	-0.2	75.3	75.3	0.0
24	2.08	2.21	6.4	10984	10955	-0.3	75.5	74.2	-1.3
25	1.94	2.21	14.3	10987	10991	0.0	75.7	75.4	-0.3
26	2.07	2.20	6.2	10988	10974	-0.1	74.8	74.4	-0.4
27	1.86	2.13	14.5	10961	10832	-1.2	75.0	74.6	-0.4
28	2.01	2.24	11.3	10978	10966	-0.1	75.4	74.8	-0.6
29	1.85	2.12	14.7	10983	10988	0.0	75.1	74.2	-0.9
30	2.00	2.23	11.6	11012	11007	0.0	75.3	74.4	-0.9
31	1.86	2.11	13.3	10960	10901	-0.5	75.6	75.1	-0.5
32	2.00	2.23	11.8	10982	11015	0.3	75.4	74.3	-1.1
QE File No.	Time-out for function test or others (hours)		Issued Date	Reported By		Approved By			
DG14FNL086	480.50		2014/10/20	NaNa.Wang		Tim.Yi			



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

Available for these models with lower speed and same physical structure. All model may be followed byRxx orFxx series suffixes. This test report applies to THD 120x120x38.0 mm series as the right table	
---	--

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2014/7/30 3:40 PM	2015/1/11 1:56 PM	56	0	1360.0
Representative Test P/N : THD1248HE			Current Test Status		<input checked="" type="checkbox"/> In process <input type="checkbox"/> (exceed requested) <input type="checkbox"/> Termination

Equipment: 1.Oven: E24-T0170	On/Off Cycles: Every 500 hours
------------------------------	--------------------------------

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation
	Current Spec. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	2.7 Max.	2.7 Max.		9810-11990	9810-11990		79.0 Max	79.0 Max	3 dBMax.
33	2.07	2.13	3.0	10994	10961	-0.3	74.8	74.5	-0.3
34	1.96	2.24	14.3	10963	11020	0.5	75.0	74.7	-0.3
35	2.01	2.17	8.4	10989	10922	-0.6	75.2	75.2	0.0
36	1.98	2.26	14.5	10973	10989	0.1	75.4	75.4	0.0
37	1.91	2.11	10.3	11011	11017	0.1	75.5	74.2	-1.3
38	1.97	2.11	7.2	10956	10994	0.3	74.8	74.4	-0.4
39	1.93	2.11	9.7	10988	10944	-0.4	75.7	75.0	-0.7
40	2.08	2.25	7.9	10993	11020	0.2	75.0	74.6	-0.4
41	2.00	2.25	12.6	10994	11022	0.3	75.2	74.8	-0.4
42	1.98	2.13	7.6	10985	11001	0.1	75.4	75.3	-0.1
43	1.89	2.13	12.8	10980	11016	0.3	75.5	75.5	0.0
44	1.95	2.25	14.9	10995	11017	0.2	74.8	75.0	0.2
45	1.94	2.11	8.7	10995	10974	-0.2	75.7	74.2	-1.5
46	2.01	2.17	8.1	11018	10948	-0.6	75.0	74.4	-0.6
47	1.88	2.11	12.5	10982	11012	0.3	75.2	74.6	-0.6
48	2.08	2.13	2.7	10980	10973	-0.1	75.4	74.8	-0.6
49	1.88	2.12	13.0	10988	11015	0.2	74.9	75.0	0.1
50	1.99	2.26	13.7	10995	11016	0.2	75.7	75.2	-0.5
51	1.91	2.18	14.0	10978	10958	-0.2	75.0	74.1	-0.9
52	1.98	2.12	7.4	11020	10996	-0.2	75.2	74.3	-0.9
53	1.88	2.13	13.5	10941	11024	0.8	75.4	75.5	0.1
54	1.96	2.24	14.3	10950	10922	-0.3	75.6	74.5	-1.1
55	1.86	2.11	13.6	10996	11020	0.2	74.8	74.7	-0.1
56	1.95	2.11	8.3	10972	11017	0.4	75.0	74.9	-0.1
X-Bar	1.96	2.17	-	10985.3	10969.8	-	75.23	74.76	-
σ	0.070	0.052	-	17.842	51.399	-	0.296	0.440	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG14FNL086	480.50	2014/10/20	NaNa.Wang	Tim.Yi