



DC FAN CUSTOMIZED 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 92x92x38.0 mm series as the right table

PFD0948HE				
PFD0912HE				

Representative Test P/N : THD0948VE-03HHG

Equipment: 1.Oven: E24-F0108

◎ **L₁₀ Expectancy:** **70,000** hours minimum @ fan rated voltage and the temperature of 40℃

According to the equation for **Weibull distribution**,

$$MTTF \doteq 1.89 \times L_{10} = 132,300 \text{ hours}$$

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,

$$t = 1.119 \times MTTF \times [(B_{r,c}) \div n]^{0.33} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

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)
90	40	7.59	30	2.303	8,357	5,360.0	84,856	44,898

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2022/2/23 9:00 AM	2023/7/6 8:48 PM	☐ In process	☐ In process (exceed requested)	☒ Termination	5360.0

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	13.95	155,891	82,482
30	11.39	127,284	67,346
40	7.59	84,856	44,898
50	5.06	56,571	29,932
55	4.13	46,190	24,439
60	3.38	37,714	19,954
70	2.25	25,143	13,303
80	1.50	16,762	8,869
90	1.00	11,174	5,912

Fan permission criteria for the measurement after test :

1. Speed can not drop of $\geq 15\%$ below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Test Method according to IPC-9591.

Test Result

☒ Accept
☐ Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG22FNL015	3607.00	2023/3/4	Poppy.Liang	Blandy.Yang

BGN (dBA) : 16.0

Temp (°C) : 23.2



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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PFD0948HE				
PFD0912HE				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
8,357	2022/2/23 9:00 AM	2023/7/6 8:48 PM	30	0	5360.0

Representative Test P/N : THD0948VE-03HHG	Current Test Status	☐ In process	☐ In process (exceed requested)	☒ Termination
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Equipment: 1.Oven: E24-F0108

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 1.56 Max.	Final Test Current Spec. (A) 1.56 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 13775-15225	Final Test Speed Spec. (RPM) 13775-15225	Deviation (%)	Initial Test Noise Spec. (dB A) 73.0 Max	Final Test Noise Spec. (dB A) 73.0 Max	Deviation 3 dBMax.
1	1.26	1.42	12.9	14636	14626	-0.1	71.0	72.9	1.9
2	1.26	1.30	2.8	14640	14641	0.0	70.4	72.4	2.0
3	1.27	1.30	2.7	14631	14637	0.0	70.8	72.0	1.2
4	1.26	1.30	3.7	14580	14646	0.5	70.6	73.3	2.7
5	1.23	1.33	8.6	14628	14676	0.3	70.3	72.6	2.3
6	1.23	1.30	5.5	14623	14604	-0.1	69.7	72.6	2.9
7	1.25	1.30	4.1	14597	14631	0.2	71.8	72.6	0.8
8	1.26	1.30	3.4	14666	14649	-0.1	70.5	72.3	1.8
9	1.25	1.32	5.5	14582	14592	0.1	69.8	72.1	2.3
10	1.26	1.32	4.4	14712	14612	-0.7	70.4	71.9	1.5
11	1.27	1.32	4.1	14709	14646	-0.4	70.6	73.1	2.5
12	1.26	1.31	4.2	14696	14608	-0.6	70.7	72.0	1.3
13	1.25	1.32	6.1	14585	14590	0.0	70.5	72.9	2.4
14	1.22	1.36	11.3	14623	14660	0.3	70.6	72.0	1.4
15	1.26	1.30	3.2	14624	14633	0.1	70.5	72.1	1.6
16	1.26	1.32	4.9	14658	14586	-0.5	71.1	73.5	2.4
17	1.25	1.32	5.8	14640	14630	-0.1	70.6	72.5	1.9
18	1.25	1.33	6.8	14686	14626	-0.4	71.0	72.5	1.5
19	1.22	1.31	7.5	14636	14635	0.0	70.0	72.6	2.6
20	1.26	1.31	4.1	14694	14649	-0.3	70.5	72.4	1.9
21	1.27	1.31	2.8	14655	14658	0.0	70.9	71.5	0.6
22	1.25	1.32	5.5	14659	14649	-0.1	70.8	71.7	0.9
23	1.25	1.32	5.8	14627	14587	-0.3	70.5	72.4	1.9
24	1.27	1.30	2.4	14655	14634	-0.1	70.0	72.9	2.9
25	1.26	1.31	3.8	14597	14676	0.5	71.8	72.5	0.7
26	1.23	1.31	6.6	14599	14625	0.2	70.8	72.3	1.5
27	1.23	1.32	7.0	14604	14641	0.3	71.0	72.8	1.8
28	1.27	1.33	4.7	14678	14654	-0.2	71.2	71.6	0.4
29	1.24	1.38	11.6	14616	14695	0.5	70.7	72.0	1.3
30	1.24	1.30	5.0	14603	14636	0.2	70.2	72.4	2.2
X-Bar	1.25	1.32	-	14637.97	14634.40	-	70.64	72.41	-
σ	0.01	0.03	-	37.65	26.57	-	0.48	0.48	-

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG22FNL015	3607.00	2023/3/4	Poppy.Liang	Blandy.Yang