



DC FAN CUSTOMIZED LIFE EXPERIMENT TEST 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 FFB 140x140x38 mm series as the right table	FFB1424UHE	FFB1448GHE	FFB1424GHE		

Representative Test P/N : FFB1448UHE-MF00

Instruments used: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D On/Off Cycles: Every 500 hours

© L₁₀ Expectancy: **80,000** hours minimum @ fan rated voltage and the temperature of 40°C

According to the equation for **Weibull distribution**, $MTTF \cong 7 \times L_{10} = 560,000$ 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,

$$t = 1.036 \times MTTF \times [(B_{r;c}) \div n]^{0.91 \div A_F}, \text{ and } A_F = 2^{(T_s - T_u)/10}$$

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%), and

Stress/Elevated Temperature Ts (°C)	Unstress Temperature Tu (°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 (hours)	Verified L ₁₀ (hours)
70	40	8.00	56	2.303	3,975	11,478	1,617,186	231,027

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2-Nov-04	11-Jun-05	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	11,478

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. **Basically, MTBF is equal to MTTF, they use same formula to work out a life data.**)

Fan permission criteria for the measurement after test :

1. For current, the limit is less than spec.(max.).
2. For speed, the allowable decrease is less than 15%.
3. For noise, the limit is less than spec.(max.). + 3 dB

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	4,574,094	653,442
30	16.00	3,234,373	462,053
40	8.00	1,617,186	231,027
50	4.00	808,593	115,513
60	2.00	404,297	57,757
70	1.00	202,148	28,878

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
TH04FNL063	1,313	19-Apr-06	Ch.Sirirote	Luc



DC FAN FUNCTION

TEST RECORD FOR LIFE EXPERIMENT

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	FFB1424UHE	FFB1448GHE	FFB1424GHE		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
9,421	2-Nov-04	11-Jun-05	56	0	11,478

Representative Test P/N : FFB1448UHE-MF00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Instruments used: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample P/N : FFB1448UHE-MF00									
Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)
	Current Spec. (A) 2.16 Max.	Current Spec. (A) 2.16 Max.		Speed Spec. (RPM) 5500 Ref.	Speed Spec. (RPM) 5500-15%Min.		Noise Spec. (dB A) 78 Max.	Noise Spec. (dB A) 81 Max.	
1	1.76	1.74	-1.1	5663	5620	-0.8	74.5	74.8	0.5
2	1.67	1.73	3.6	5613	5656	0.8	73.4	74.5	1.4
3	1.63	1.64	0.6	5567	5610	0.8	72.3	74.2	2.6
4	1.68	1.70	1.2	5625	5674	0.9	73.2	74.6	1.9
5	1.70	1.71	0.6	5614	5662	0.9	73.0	74.7	2.3
6	1.64	1.64	0.0	5573	5462	-2.0	71.9	72.9	1.4
7	1.78	1.78	0.0	5728	5680	-0.8	74.0	74.1	0.1
8	1.66	1.69	1.8	5594	5510	-1.5	72.4	74.2	2.4
9	1.59	1.62	1.9	5565	5504	-1.1	71.9	73.8	2.7
10	1.70	1.63	-4.1	5638	5530	-1.9	71.7	74.1	3.3
11	1.67	1.60	-4.2	5604	5490	-2.0	72.9	74.7	2.4
12	1.63	1.65	1.2	5530	5526	-0.1	71.9	73.6	2.4
13	1.73	1.73	0.0	5653	5640	-0.2	73.9	74.8	1.3
14	1.68	1.68	0.0	5663	5661	0.0	72.5	74.9	3.3
15	1.72	1.70	-1.2	5613	5676	1.1	71.5	74.6	4.3
16	1.69	1.70	0.6	5597	5616	0.3	72.8	74.4	2.1
17	1.73	1.75	1.2	5654	5692	0.7	74.0	74.7	1.0
18	1.76	1.80	2.3	5687	5686	0.0	74.3	74.5	0.3
19	1.94	1.97	1.5	5704	5646	-1.0	73.6	74.0	0.6
20	1.96	1.98	1.0	5620	5740	2.1	74.0	74.9	1.2
21	1.81	1.94	7.2	5716	5610	-1.9	73.8	74.5	1.0
22	1.70	1.74	2.4	5625	5686	1.1	74.0	74.7	1.0
23	1.69	1.73	2.4	5633	5646	0.2	73.7	75.1	1.9
24	1.89	1.92	1.6	5588	5700	2.0	74.4	74.4	0.1
25	1.64	1.62	-1.2	5523	5559	0.7	72.3	75.0	3.7
26	1.62	1.72	6.2	5684	5562	-2.1	72.2	74.4	3.1
27	1.72	1.75	1.7	5694	5701	0.1	74.1	74.1	0.1
28	1.76	1.73	-1.7	5637	5740	1.8	73.7	74.0	0.4
29	1.73	1.73	0.0	5652	5686	0.6	74.6	74.8	0.2
30	1.71	1.70	-0.6	5476	5660	3.4	71.8	74.4	3.6
31	1.58	1.73	9.5	5504	5611	1.9	73.3	74.7	1.9
32	1.55	1.70	9.7	5594	5492	-1.8	71.5	74.0	3.5
33	1.67	1.53	-8.4	5585	5523	-1.1	73.1	74.3	1.6
34	1.67	1.79	7.2	5652	5695	0.8	73.6	74.9	1.8
35	1.74	1.74	0.0	5596	5601	0.1	73.7	74.4	1.0



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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)					
9,421	2-Nov-04	11-Jun-05	56	0	11,478					
Representative Test P/N : FFB1448UHE-MF00				Current Test Status		<input type="checkbox"/>	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination		
Instruments used: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D						On/Off Cycles: Every 500 hours				
Test Data Between Initial Test and Final Test										
Sample P/N : FFB1448UHE-MF00										
Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	
	Current Spec. (A) 2.16 Max.	Current Spec. (A) 2.16 Max.		Speed Spec. (RPM) 5500 Ref.	Speed Spec. (RPM) 5500-15%Min.		Noise Spec. (dB A) 78 Max.	Noise Spec. (dB A) 81 Max.		
36	1.69	1.68	-0.6	5596	5592	-0.1	72.9	74.7	2.4	
37	1.71	1.73	1.2	5631	5531	-1.8	73.5	74.9	1.9	
38	1.78	1.76	-1.1	5708	5630	-1.4	73.4	74.3	1.2	
39	1.72	1.70	-1.2	5675	5639	-0.6	73.0	74.5	2.1	
40	1.71	1.73	1.2	5634	5660	0.5	72.9	74.4	2.0	
41	1.64	1.68	2.4	5447	5615	3.1	71.6	73.8	3.1	
42	1.73	1.75	1.2	5664	5570	-1.7	71.5	74.6	4.4	
43	1.70	1.60	-5.9	5684	5669	-0.3	71.7	74.1	3.4	
44	1.60	1.64	2.5	5468	5520	1.0	71.4	73.7	3.2	
45	1.69	1.70	0.6	5613	5584	-0.5	73.9	74.2	0.4	
46	1.78	1.78	0.0	5692	5650	-0.7	74.9	74.9	0.1	
47	1.72	1.75	1.7	5633	5585	-0.9	74.0	74.9	1.3	
48	1.72	1.75	1.7	5624	5590	-0.6	73.2	75.5	3.2	
49	1.72	1.73	0.6	5593	5595	0.0	73.8	74.0	0.3	
50	1.74	1.72	-1.1	5649	5594	-1.0	74.1	73.8	-0.4	
51	1.82	1.98	8.8	5542	5638	1.7	74.4	73.9	-0.6	
52	1.50	1.62	8.0	5420	5530	2.0	71.5	73.1	2.3	
53	1.72	1.78	3.5	5598	5610	0.2	74.0	74.7	0.9	
54	1.73	1.74	0.6	5648	5639	-0.2	74.4	75.1	1.0	
55	1.72	1.73	0.6	5612	5660	0.9	74.2	74.6	0.5	
56	1.79	1.78	-0.6	5657	5659	0.0	73.9	75.7	2.4	
X-Bar	1.71	1.73	-	5615	5616	-	73.2	74.4	-	
σ	0.081	0.091	-	66	67	-	1.00	0.51	-	
QE File No.		Time-out for function test or others (hrs)		Issued Date		Reported By		Approved By		
TH04FNL063		1,313		19-Apr-06		Ch.Sirote		Luc		