



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 GFB80x80x88.0 mm series as the right table	GFB0812GHU-8M02		
	GFB0812DHU-9T41		
	GFB0848DHU-9L96		

Representative Test P/N :GFB0812DHU-F00

Equipment: 1. Oven :E24-T0163 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 Ts (°C) (Actual Test Temperature)	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 40 °C (hours)	Verified L ₁₀ 40 °C (hours)
60	40	4.00	56	2.303	6,956	14,956.0	1,053,609	150,516

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2007/4/7 3:00 PM	2009/11/1 8:33 AM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	14956.0

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	11.31	2,980,055	425,722
30	8.00	2,107,217	301,031
40	4.00	1,053,609	150,516
50	2.00	526,804	75,258
60	1.00	263,402	37,629

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
DG07FNL030	15574.00	2010/11/27	Nan.Yang	Jack Li



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GFB0812GHU-8M02	
GFB0812DHU-9T41	
GFB0848DHU-9L96	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2007/4/7 3:00 PM	2009/11/1 8:33 AM	56	0	14956.0

Representative Test P/N :GFB0812DHU-F00	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1. Oven :E24-T0163 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A)	Final Test Current Spec. (A)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Check. (dB A)	Deviation
	5.40Max.	5.40Max.		8532-10428 8280-10120	8532-10428 8280-10120		78.0Max	78.0Max	
1	4.88	4.73	-3.1	9613	9486	-1.3	72.3	72.7	0.4
				9189	9109	-0.9			
2	4.77	4.85	1.7	9526	9496	-0.3	72.2	73.1	0.9
				9200	9170	-0.3			
3	4.87	4.75	-2.5	9519	9465	-0.6	72.0	72.7	0.7
				9271	9171	-1.1			
4	4.77	4.82	1.1	9450	9488	0.4	72.5	73.1	0.6
				9243	9311	0.7			
5	5.03	4.77	-5.2	9605	9446	-1.7	72.4	73.2	0.8
				9342	9213	-1.4			
6	4.83	5.10	5.5	9414	9527	1.2	71.9	72.8	0.9
				9200	9037	-1.8			
7	4.85	4.81	-0.9	9553	9535	-0.2	72.1	73.3	1.2
				9273	9302	0.3			
8	5.03	4.88	-3.0	9596	9511	-0.9	72.3	73.4	1.1
				9366	9224	-1.5			
9	4.84	4.88	0.8	9549	9560	0.1	72.4	73.5	1.1
				9333	9307	-0.3			
10	4.91	4.91	0.1	9563	9579	0.2	71.9	73.1	1.2
				9259	9267	0.1			
11	4.88	4.77	-2.2	9535	9430	-1.1	72.0	73.6	1.6
				9171	9280	1.2			
12	4.88	4.69	-3.9	9526	9485	-0.4	72.2	72.7	0.5
				9252	9300	0.5			
13	4.79	4.58	-4.4	9484	9418	-0.7	71.9	72.9	1.0
				9266	9149	-1.3			
14	4.86	4.79	-1.5	9617	9477	-1.5	72.4	72.8	0.4
				9092	9252	1.8			
15	4.82	4.84	0.3	9547	9552	0.1	72.0	74.1	2.1
				9223	9185	-0.4			
16	4.88	4.75	-2.7	9523	9512	-0.1	72.2	72.9	0.7
				9285	9121	-1.8			
17	4.77	4.87	2.1	9448	9540	1.0	72.1	73.0	0.9
				9040	9191	1.7			
18	4.93	4.91	-0.4	9552	9562	0.1	72.0	73.0	1.0
				9312	9241	-0.8			

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG07FNL030	15574.00	2010/11/27	Nan.Yang	Jack Li



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GFB0812GHU-8M02	
GFB0812DHU-9T41	
GFB0848DHU-9L96	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
6,956	2007/4/7 3:00 PM	2009/11/1 8:33 AM	56	0	14956.0

Representative Test P/N :GFB0812DHU-F00	Current Test Status	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	In process	In process (exceed requested)	Termination	

Equipment: 1. Oven :E24-T0163 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A)	Final Test Current Spec. (A)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Check. (dB A)	Deviation
	5.40Max.	5.40Max.		8532-10428 8280-10120	8532-10428 8280-10120		78.0Max	78.0Max	
19	4.98	4.81	-3.4	9590	9517	-0.8	72.1	73.1	1.0
				9321	9277	-0.5			
20	4.83	4.93	2.1	9437	9597	1.7	72.1	73.2	1.1
				9272	9348	0.8			
21	4.69	4.86	3.6	9474	9473	0.0	72.5	73.3	0.8
				9196	9262	0.7			
22	4.79	4.90	2.3	9535	9456	-0.8	72.1	71.3	-0.8
				9171	9261	1.0			
23	4.86	4.69	-3.5	9516	9456	-0.6	72.3	73.4	1.1
				9187	9230	0.5			
24	4.76	4.63	-2.8	9547	9334	-2.2	72.5	73.5	1.0
				9150	9186	0.4			
25	4.87	4.71	-3.2	9489	9508	0.2	72.4	73.1	0.7
				9317	9293	-0.3			
26	4.81	4.69	-2.4	9550	9480	-0.7	72.3	73.5	1.2
				9146	9141	-0.1			
27	4.81	4.83	0.4	9161	9613	4.9	72.1	72.7	0.6
				9518	9210	-3.2			
28	4.86	4.73	-2.6	9158	9454	3.2	72.0	73.2	1.2
				9584	9234	-3.7			
29	4.73	4.74	0.3	9222	9376	1.7	72.1	72.8	0.7
				9556	9174	-4.0			
30	4.86	4.76	-2.1	9304	9566	2.8	72.1	72.7	0.6
				9511	9202	-3.2			
31	5.19	4.85	-6.5	9207	9567	3.9	72.5	72.9	0.4
				9283	9288	0.1			
32	4.95	4.78	-3.5	9638	9474	-1.7	72.3	73.0	0.7
				9354	9224	-1.4			
33	4.95	4.79	-3.2	9591	9429	-1.7	72.1	73.3	1.2
				9336	9231	-1.1			
34	4.89	4.88	-0.2	9531	9540	0.1	72.2	73.3	1.1
				9134	9164	0.3			
35	4.81	4.77	-0.8	9506	9493	-0.1	72.4	73.1	0.7
				9274	9139	-1.5			
36	4.89	4.79	-2.1	9663	9430	-2.4	72.2	72.7	0.5
				9213	9250	0.4			
37	4.76	4.78	0.5	9525	9494	-0.3	72.1	73.4	1.3
				9268	9275	0.1			

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	5.40Max.	5.40Max.		8532-10428 8280-10120	8532-10428 8280-10120		78.0Max	78.0Max	
38	4.93	4.75	-3.7	9577	9481	-1.0	72.1	72.9	0.8
				9233	9227	-0.1			
39	4.85	4.88	0.6	9485	9520	0.4	72.2	72.2	0.0
				9250	9266	0.2			
40	4.94	4.82	-2.4	9642	9575	-0.7	72.5	73.0	0.5
				9238	9236	0.0			
41	4.72	4.70	-0.4	9391	9469	0.8	72.4	73.1	0.7
				9168	9212	0.5			
42	4.89	4.82	-1.4	9513	9601	0.9	72.3	73.5	1.2
				9332	9185	-1.6			
43	5.35	4.99	-6.7	9315	9425	1.2	72.1	73.2	1.1
				9343	9211	-1.4			
44	4.88	4.69	-3.9	9479	9499	0.2	72.5	73.3	0.8
				9338	9285	-0.6			
45	4.83	4.75	-1.7	9495	9512	0.2	72.4	73.6	1.2
				9226	9126	-1.1			
46	5.02	4.77	-5.0	9593	9512	-0.8	71.9	73.4	1.5
				9225	9125	-1.1			
47	4.79	4.92	2.7	9462	9489	0.3	72.3	73.5	1.2
				9279	9236	-0.5			
48	4.92	4.82	-2.0	9537	9478	-0.6	72.5	72.8	0.3
				9180	9202	0.2			
49	4.96	4.79	-3.4	9657	9545	-1.2	72.4	73.5	1.1
				9216	9195	-0.2			
50	4.79	4.69	-2.1	9532	9569	0.4	72.0	72.7	0.7
				9209	9182	-0.3			
51	4.90	4.58	-6.5	9537	9569	0.3	72.2	72.9	0.7
				9281	9301	0.2			
52	4.88	4.85	-0.6	9462	9545	0.9	72.4	72.7	0.3
				9300	9278	-0.2			
53	4.89	4.82	-1.4	9544	9596	0.5	72.3	72.8	0.5
				9138	9230	1.0			
54	4.93	4.82	-2.2	9560	9496	-0.7	72.0	73.0	1.0
				9231	9169	-0.7			
55	4.82	4.75	-1.5	9538	9495	-0.5	71.9	72.9	1.0
				9162	9201	0.4			
56	4.66	4.70	0.9	9413	9523	1.2	72.2	73.4	1.2
				9262	9199	-0.7			
X-Bar	4.872	4.795	-	9381.4	9361.7	-	72.21	73.07	-
σ	0.111	0.094	-	161.239	154.477	-	0.187	0.408	-

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DG07FNL030	15574.00	2010/11/27	Nan.Yang	Jack Li