



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 BCB97.2x94.4x32.1mm series as the right table	BCB1012GHF	BCB1012EHF			

Representative Test P/N : BCB1012UHF-F00

Equipment: 1.Oven: E24-F0052 On/Off Cycles: Every 500 hours

☉ **L₁₀ Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40 °C**

According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 350,000 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	4,968	4,969.0	350,052	50,007

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2005/5/20 9:30 PM	2006/3/28 7:15 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	4969.0

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	990,097	141,442
30	8.00	700,104	100,015
40	4.00	350,052	50,007
50	2.00	175,026	25,004
60	1.00	87,513	12,502

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

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
DG05FNL086	2505.50	2006/3/28 8:00 AM	Guie.Lin	Gx.Xu



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)
4,968	2005/5/20 9:30 PM	2006/3/28 7:15 AM	56	0	4969.0

Representative Test P/N : BCB1012UHF-F00	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-F0052	On/Off Cycles: Every 500 hours
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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)	
	4.38Max.	4.38Max.		8370-10230	8370-10230		73.4Max	73.4Max	
1	4.26	3.84	-9.9	9434	9254	-1.9	70.2	70.1	-0.1
2	4.25	3.80	-10.6	9289	9233	-0.6	70.0	69.7	-0.4
3	4.17	3.79	-9.1	9232	9242	0.1	70.3	70.4	0.1
4	4.25	3.86	-9.2	9332	9348	0.2	69.9	70.1	0.3
5	4.38	3.90	-11.0	9469	9372	-1.0	70.1	69.8	-0.4
6	4.15	3.84	-7.5	9369	9321	-0.5	70.2	70.3	0.1
7	4.31	3.84	-10.9	9352	9281	-0.8	69.9	70.0	0.1
8	4.22	3.85	-8.8	9237	9309	0.8	70.0	69.9	-0.1
9	4.16	3.85	-7.5	9393	9290	-1.1	69.8	70.2	0.6
10	4.24	3.86	-9.0	9252	9331	0.9	70.1	70.1	0.0
11	4.23	3.85	-9.0	9209	9338	1.4	69.9	69.8	-0.1
12	4.18	3.79	-9.3	9304	9232	-0.8	70.2	70.4	0.3
13	4.27	3.83	-10.3	9391	9296	-1.0	70.0	70.1	0.1
14	3.68	3.74	1.6	9385	9160	-2.4	69.9	69.9	0.0
15	4.26	3.83	-10.1	9223	9311	1.0	70.1	70.4	0.4
16	4.28	3.88	-9.3	9273	9332	0.6	70.3	70.2	-0.1
17	4.25	3.81	-10.4	9478	9311	-1.8	69.9	70.0	0.1
18	4.13	3.80	-8.0	9253	9245	-0.1	70.3	69.7	-0.9
19	4.22	3.84	-9.0	9387	9209	-1.9	69.9	70.2	0.4
20	4.22	3.85	-8.8	9218	9261	0.5	70.2	69.8	-0.6
21	4.15	3.83	-7.7	9146	9368	2.4	70.0	69.6	-0.6
22	4.12	3.75	-9.0	9377	9188	-2.0	70.1	70.0	-0.1
23	4.21	3.81	-9.5	9320	9282	-0.4	69.9	69.7	-0.3
24	4.36	3.90	-10.6	9251	9384	1.4	70.0	70.4	0.6
25	4.20	3.84	-8.6	9201	9355	1.7	70.3	70.1	-0.3
26	4.22	3.82	-9.5	9263	9233	-0.3	70.2	69.9	-0.4
27	4.18	3.73	-10.8	9323	9165	-1.7	70.2	70.2	0.0
28	4.26	3.91	-8.2	9534	9390	-1.5	69.9	70.1	0.3
29	4.24	3.80	-10.4	9128	9284	1.7	70.0	69.8	-0.3
30	4.36	4.12	-5.5	9503	9250	-2.7	69.9	70.1	0.3
31	4.20	3.78	-10.0	9292	9195	-1.0	69.9	70.1	0.3
32	4.21	3.92	-6.9	9256	9158	-1.1	70.1	70.2	0.1
33	4.02	3.90	-3.0	9325	9258	-0.7	70.2	70.3	0.1
34	4.14	3.75	-9.4	9416	9208	-2.2	69.9	70.2	0.4
35	4.22	3.79	-10.2	9275	9298	0.2	70.1	70.4	0.4

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG05FNL086	2505.50	2006/3/28 8:00 AM	Guie.Lin	Gx.Xu



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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.	Current Spec.		Speed Spec.	Speed Spec.		Noise Spec.	Noise Spec.	
	(A) 4.38Max.	(A) 4.38Max.		(RPM) 8370-10230	(RPM) 8370-10230		(dB A) 73.4Max	(dB A) 73.4Max	
36	4.27	3.84	-10.1	9341	9273	-0.7	70.3	69.9	-0.6
37	4.18	3.83	-8.4	9385	9265	-1.3	70.2	69.7	-0.7
38	4.23	3.81	-9.9	9230	9356	1.4	69.9	70.4	0.7
39	4.24	3.81	-10.1	9413	9230	-1.9	69.8	70.1	0.4
40	4.20	3.87	-7.9	9264	9256	-0.1	70.2	69.9	-0.4
41	4.15	3.89	-6.3	9368	9383	0.2	70.1	70.3	0.3
42	4.21	3.88	-7.8	9320	9346	0.3	70.1	69.7	-0.6
43	4.17	3.82	-8.4	9224	9240	0.2	70.3	70.0	-0.4
44	4.21	3.87	-8.1	9265	9371	1.1	70.0	70.4	0.6
45	4.25	3.88	-8.7	9307	9414	1.1	70.3	70.1	-0.3
46	4.23	3.85	-9.0	9104	9293	2.1	69.9	69.8	-0.1
47	4.17	3.74	-10.3	9126	9208	0.9	70.3	69.8	-0.7
48	4.18	3.73	-10.8	9248	9201	-0.5	70.0	70.4	0.6
49	4.21	3.74	-11.2	9500	9209	-3.1	70.2	70.0	-0.3
50	4.70	3.87	-17.7	9387	9480	1.0	69.9	69.9	0.0
51	4.18	3.81	-8.9	9312	9357	0.5	70.1	70.3	0.3
52	4.08	3.88	-4.9	9387	9365	-0.2	69.9	70.1	0.3
53	4.32	3.88	-10.2	9278	9459	2.0	70.2	69.7	-0.7
54	4.26	3.85	-9.6	9322	9308	-0.2	69.9	70.4	0.7
55	4.30	3.88	-9.8	9216	9360	1.6	70.2	70.1	-0.1
56	4.16	3.83	-7.9	9254	9268	0.2	70.0	70.0	0.0
X-Bar	4.216	3.837	-	9310.5	9292.7	-	70.07	70.06	-
σ	0.117	0.062	-	97.091	73.707	-	0.153	0.232	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG05FNL086	2505.50	2006/3/28 8:00 AM	Guie.Lin	Gx.Xu