



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 BUB 70x70x25.0mm series as the right table	BUB0712HJ-01BQN				
	BUB0712HJ-00Z8K				
	BUB0712HJ-00Y8V				

Representative Test P/N : BUB0712HJ-00BQE

Equipment: 1.Oven: E24-T0161

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

According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 280,000 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	1,987	3,360.0	473,405	67,629

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2017/8/7 3:00 PM	2017/12/17 11:18 AM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	3360.0

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	1,338,992	191,285
30	16.00	946,811	135,259
40	8.00	473,405	67,629
50	4.00	236,703	33,815
60	2.00	118,351	16,907
70	1.00	59,176	8,454

- 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
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG17FNL112	1761.00	2018/3/9	Loly.wang	Tim.Yi

BGN (dBA) : 16.8

Temp (°C) : 21.8



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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				BUB0712HJ-00Z8K						
				BUB0712HJ-00Y8V						
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)					
1,987	2017/8/7 3:00 PM	2017/12/17 11:18 AM	56	0	3360.0					
Representative Test P/N : BUB0712HJ-00BQE				Current Test Status		<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination		
Equipment: 1.Oven: E24-T0161										
Test Data Between Initial Test and Final Test										
Sample No.	Initial Test Current Spec. (mA) 700 Max.	Final Test Current Spec. (mA) 700 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 4165-5390	Final Test Speed Spec. (RPM) 4165-5390	Deviation (%)	Initial Test Noise Spec. (dB A) 49.5 Max	Final Test Noise Spec. (dB A) 49.5 Max	Deviation 3 dBMax.	
1	0.411	0.411	0.0	4558	4565	0.2	44.2	46.1	1.9	
2	0.413	0.405	-1.9	4558	4665	2.3	44.4	44.0	-0.4	
3	0.410	0.412	0.5	4568	4557	-0.2	44.5	44.7	0.2	
4	0.409	0.406	-0.7	4617	4571	-1.0	44.5	44.1	-0.4	
5	0.404	0.402	-0.5	4595	4596	0.0	44.7	44.0	-0.7	
6	0.412	0.413	0.2	4575	4637	1.4	44.4	44.1	-0.3	
7	0.406	0.406	0.0	4708	4572	-2.9	44.3	44.1	-0.2	
8	0.407	0.409	0.5	4586	4619	0.7	44.7	45.1	0.4	
9	0.407	0.408	0.2	4658	4573	-1.8	44.4	44.6	0.2	
10	0.412	0.411	-0.2	4521	4559	0.8	44.3	44.7	0.4	
11	0.413	0.412	-0.2	4539	4509	-0.7	44.7	44.5	-0.2	
12	0.409	0.404	-1.2	4534	4599	1.4	44.2	44.6	0.4	
13	0.406	0.412	1.5	4590	4601	0.2	44.5	45.2	0.7	
14	0.418	0.405	-3.1	4582	4593	0.2	44.6	44.0	-0.6	
15	0.399	0.410	2.8	4747	4519	-4.8	44.1	44.4	0.3	
16	0.411	0.407	-1.0	4481	4559	1.7	44.6	44.6	0.0	
17	0.409	0.409	0.0	4498	4649	3.4	44.6	44.6	0.0	
18	0.398	0.411	3.3	4739	4625	-2.4	44.8	44.0	-0.8	
19	0.411	0.406	-1.2	4459	4620	3.6	44.6	44.2	-0.4	
20	0.397	0.414	4.3	4736	4566	-3.6	44.7	44.7	0.0	
21	0.407	0.410	0.7	4509	4616	2.4	44.7	44.7	0.0	
22	0.395	0.407	3.0	4747	4567	-3.8	44.8	44.9	0.1	
23	0.410	0.406	-1.0	4448	4620	3.9	44.5	45.3	0.8	
24	0.394	0.409	3.8	4743	4431	-6.6	44.7	43.9	-0.8	
25	0.408	0.403	-1.2	4484	4597	2.5	44.8	44.5	-0.3	
26	0.395	0.408	3.3	4741	4537	-4.3	44.4	44.1	-0.3	
27	0.393	0.409	4.1	4732	4588	-3.0	45.0	44.5	-0.5	
28	0.392	0.416	6.1	4735	4541	-4.1	44.7	45.1	0.4	
29	0.406	0.414	2.0	4456	4617	3.6	44.7	45.0	0.3	
30	0.403	0.408	1.2	4527	4643	2.6	45.1	44.9	-0.2	
31	0.403	0.405	0.5	4522	4601	1.7	44.5	43.7	-0.8	
32	0.408	0.409	0.2	4475	4589	2.5	44.5	44.8	0.3	
QE File No.	Time-out for function test or others (hours)			Issued Date		Reported By		Approved By		
DG17FNL112	1761.00			2018/3/9		Loly.wang		Tim.Yi		



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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BUB0712HJ-01BQN				
BUB0712HJ-00Z8K				
BUB0712HJ-00Y8V				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,987	2017/8/7 3:00 PM	2017/12/17 11:18 AM	56	0	3360.0
Representative Test P/N : BUB0712HJ-00BQE			Current Test Status <input type="checkbox"/> In process <input checked="" type="checkbox"/> In process (exceed requested) <input type="checkbox"/> Termination		
Equipment: 1.Oven: E24-T0161					

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (mA)	Final Test Current Spec. (mA)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Spec. (dB A)	Deviation 3 dBMax.
	700 Max.	700 Max.		4165-5390	4165-5390		49.5 Max	49.5 Max	
33	0.403	0.404	0.2	4526	4559	0.7	44.4	44.7	0.3
34	0.406	0.417	2.7	4476	4545	1.5	44.4	44.6	0.2
35	0.397	0.413	4.0	4674	4585	-1.9	44.8	44.8	0.0
36	0.408	0.409	0.2	4481	4651	3.8	45.1	44.5	-0.6
37	0.393	0.410	4.3	4758	4508	-5.3	44.5	44.5	0.0
38	0.407	0.414	1.7	4495	4624	2.9	44.9	45.0	0.1
39	0.393	0.407	3.6	4733	4620	-2.4	44.8	44.2	-0.6
40	0.408	0.403	-1.2	4472	4581	2.4	44.7	44.0	-0.7
41	0.393	0.412	4.8	4733	4617	-2.5	44.8	44.2	-0.6
42	0.407	0.414	1.7	4446	4639	4.3	44.7	44.7	0.0
43	0.393	0.404	2.8	4728	4604	-2.6	44.6	44.6	0.0
44	0.408	0.404	-1.0	4457	4606	3.3	44.7	44.0	-0.7
45	0.395	0.406	2.8	4741	4639	-2.2	44.5	44.9	0.4
46	0.409	0.408	-0.2	4446	4525	1.8	44.5	44.6	0.1
47	0.395	0.407	3.0	4746	4561	-3.9	44.9	44.3	-0.6
48	0.407	0.398	-2.2	4489	4600	2.5	44.2	44.7	0.5
49	0.410	0.406	-1.0	4406	4608	4.6	44.4	45.3	0.9
50	0.394	0.412	4.6	4737	4618	-2.5	45.0	44.6	-0.4
51	0.408	0.403	-1.2	4485	4613	2.9	44.6	44.5	-0.1
52	0.392	0.402	2.6	4760	4584	-3.7	44.7	44.3	-0.4
53	0.408	0.408	0.0	4439	4648	4.7	44.9	44.8	-0.1
54	0.410	0.411	0.2	4468	4561	2.1	44.1	44.0	-0.1
55	0.393	0.412	4.8	4728	4568	-3.4	44.5	44.6	0.1
56	0.408	0.411	0.7	4728	4568	-3.4	45.1	44.2	-0.9
X-Bar	0.40	0.41	-	4591.43	4588.09	-	44.61	44.54	-
σ	0.01	0.00	-	118.42	42.94	-	0.24	0.38	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG17FNL112	1761.00	2018/3/9	Loly.wang	Tim.Yi