



DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed byRxx orFxx series suffixes. This test report applies to BUB 79.5x79.5x26.0mm series as the right table	BUB0812HN-00FL4			
Representative Test P/N : BUB0812HN-00E4X				
Equipment: 1.Oven: E24-T0161				

◎ **L₁₀ Expectancy:** **10,000 hours minimum @ fan rated voltage and the temperature of 60°C**
 According to the equation for **Weibull distribution**, **MTTF ≅ 7×L10 = 70,000 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 60 °C (hours)	Verified L ₁₀ 60 °C (hours)
70	60	2.00	56	2.303	1,987	10,987.0	387,002	55,286

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2018/4/19 3:30 PM	2018/7/14 12:18 AM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	10987.0

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	4,378,426	625,489
30	16.00	3,096,014	442,288
40	8.00	1,548,007	221,144
50	4.00	774,004	110,572
60	2.00	387,002	55,286
70	1.00	193,501	27,643

Fan permission criteria for the measurement after test :

- Speed can not drop of $\geq 15\%$ below the original measured rpm.
- Current cannot increase $> 15\%$ of original measure current.
- Noise cannot $> 3\text{dB}$ 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
DG18FNL026	7693.50	2020/6/6	Loly.Wang	Tim.Yi

BGN (dBA) : 15.9

Temp (°C) : 24.9



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)					
1,987	2018/4/19 3:30 PM	2018/7/14 12:18 AM	56	0	10987.0					
Representative Test P/N : BUB0812HN-00E4X				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. (A) 0.8 Max.	Final Test Current Spec. (A) 0.8 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 3780-4620	Final Test Speed Spec. (RPM) 3780-4620	Deviation (%)	Initial Test Noise Spec. (dB A) 47.5 Max	Final Test Noise Spec. (dB A) 47.5 Max	Deviation 3 dBMax.	
1	0.48	0.47	-2.1	4333	4363	0.7	43.3	44.2	0.9	
2	0.49	0.48	-2.1	4379	4346	-0.8	44.1	44.1	0.0	
3	0.48	0.47	-2.1	4376	4353	-0.5	43.7	44.3	0.6	
4	0.48	0.48	-0.4	4366	4324	-1.0	44.0	44.4	0.4	
5	0.47	0.48	0.6	4306	4389	1.9	44.0	44.2	0.2	
6	0.48	0.49	0.6	4351	4303	-1.1	44.2	44.3	0.1	
7	0.48	0.48	-1.2	4323	4397	1.7	44.2	44.1	-0.1	
8	0.48	0.48	-0.4	4339	4370	0.7	44.1	44.6	0.5	
9	0.47	0.48	1.7	4303	4374	1.7	43.8	44.2	0.4	
10	0.48	0.48	-1.5	4327	4379	1.2	43.7	44.1	0.4	
11	0.47	0.48	2.3	4278	4373	2.2	43.4	44.3	0.9	
12	0.47	0.48	2.3	4306	4375	1.6	44.0	44.2	0.2	
13	0.48	0.48	-0.2	4330	4417	2.0	44.1	44.5	0.4	
14	0.48	0.48	0.8	4340	4381	0.9	43.9	44.1	0.2	
15	0.48	0.47	-1.7	4309	4364	1.3	44.0	44.3	0.3	
16	0.48	0.48	0.8	4343	4398	1.3	44.2	44.5	0.3	
17	0.48	0.47	-0.8	4317	4385	1.6	44.4	44.7	0.3	
18	0.47	0.48	0.6	4324	4354	0.7	43.9	44.5	0.6	
19	0.49	0.47	-2.3	4304	4336	0.7	44.2	44.3	0.1	
20	0.48	0.47	-1.1	4334	4329	-0.1	43.8	44.2	0.4	
21	0.49	0.48	-1.4	4349	4274	-1.7	44.1	44.2	0.1	
22	0.48	0.47	-1.3	4372	4410	0.9	44.3	44.2	-0.1	
23	0.51	0.47	-7.4	4432	4362	-1.6	44.3	44.4	0.1	
24	0.48	0.49	1.4	4320	4405	2.0	44.1	44.3	0.2	
25	0.49	0.48	-1.8	4348	4312	-0.8	44.0	44.5	0.5	
26	0.48	0.48	-0.8	4333	4399	1.5	44.1	43.7	-0.4	
27	0.48	0.48	-1.4	4394	4379	-0.3	44.2	43.8	-0.4	
28	0.48	0.47	-2.9	4334	4341	0.2	44.1	43.7	-0.4	
29	0.48	0.47	-2.5	4341	4341	0.0	44.0	44.4	0.4	
30	0.49	0.48	-1.2	4351	4375	0.6	43.9	44.0	0.1	
31	0.48	0.49	2.9	4357	4380	0.5	44.2	44.3	0.1	
32	0.48	0.48	0.4	4337	4402	1.5	44.1	44.3	0.2	
QE File No.	Time-out for function test or others (hours)		Issued Date			Reported By		Approved By		
DG18FNL026	7693.50		2020/6/6			Loly.Wang		Tim.Yi		



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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BUB0812HN-00FL4				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,987	2018/4/19 3:30 PM	2018/7/14 12:18 AM	56	0	10987.0
Representative Test P/N : BUB0812HN-00E4X			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. (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 Spec. (dB A)	Deviation 3 dBMax.
	0.8 Max.	0.8 Max.		3780-4620	3780-4620		47.5 Max	47.5 Max	
33	0.48	0.49	2.9	4324	4380	1.3	44.2	44.2	0.0
34	0.49	0.48	-1.2	4364	4402	0.9	44.0	44.2	0.2
35	0.48	0.48	0.2	4343	4411	1.6	44.1	44.5	0.4
36	0.49	0.48	-1.9	4334	4354	0.5	43.8	44.1	0.3
37	0.50	0.48	-4.4	4348	4373	0.6	43.6	44.2	0.6
38	0.48	0.48	-0.2	4337	4395	1.3	43.8	44.5	0.7
39	0.48	0.48	-0.2	4290	4383	2.2	43.9	44.3	0.4
40	0.48	0.48	-1.2	4375	4402	0.6	44.0	44.3	0.3
41	0.48	0.47	-1.9	4348	4303	-1.0	44.1	44.2	0.1
42	0.49	0.48	-2.7	4382	4373	-0.2	44.0	44.2	0.2
43	0.48	0.51	5.6	4367	4147	-5.0	43.9	44.3	0.4
44	0.49	0.47	-3.3	4358	4386	0.6	44.0	44.3	0.3
45	0.48	0.47	-1.7	4338	4341	0.1	43.2	44.5	1.3
46	0.49	0.47	-3.5	4362	4365	0.1	43.5	44.7	1.2
47	0.48	0.47	-3.1	4409	4358	-1.2	44.0	44.3	0.3
48	0.49	0.48	-0.4	4367	4392	0.6	43.5	44.3	0.8
49	0.48	0.47	-3.3	4371	4357	-0.3	43.7	44.6	0.9
50	0.49	0.48	-0.8	4346	4359	0.3	43.7	44.3	0.6
51	0.48	0.46	-2.7	4327	4315	-0.3	43.4	44.2	0.8
52	0.48	0.48	-0.4	4356	4398	1.0	43.3	44.3	1.0
53	0.49	0.47	-2.7	4345	4368	0.5	43.4	44.0	0.6
54	0.49	0.49	1.0	4343	4354	0.3	44.0	44.3	0.3
55	0.49	0.49	0.6	4379	4349	-0.7	43.4	41.9	-1.5
56	0.48	0.47	-2.9	4346	4373	0.6	43.7	41.9	-1.8
X-Bar	0.48	0.48	-	4344.91	4363.00	-	43.90	44.19	-
σ	0.01	0.01	-	28.18	42.40	-	0.28	0.49	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG18FNL026	7693.50	2020/6/6	Loly.Wang	Tim.Yi