



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 FFB 40x40x28.0 mm series as the right table	FFB0412VN-00A7C	FFB0412VN-00ANQ	FFB0412SN-00Y2F	
	FFB0412SN-00ARQ	FFB0412VN-00BZF		
	FFB0412VN-00B2M	FFB0412VN-00Y9H(S)		
	FFB0412VN-00BR8	FFB0412VN-00BP3(F)		

Representative Test P/N : FFB0412SN-00A7D	
Equipment: 1.Oven: E24-T0171	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 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)
80	40	16.00	56	2.303	1,739	11,739.0	3,307,920	472,560

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2015/1/6 7:00 PM	2015/6/21 11:53 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	11739.0

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	45.25	9,356,210	1,336,601
30	32.00	6,615,839	945,120
40	16.00	3,307,920	472,560
50	8.00	1,653,960	236,280
60	4.00	826,980	118,140
70	2.00	413,490	59,070
80	1.00	206,745	29,535

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
DG14FNL181	2250.00	2016/9/1	NaNa.Wang	Tim.Yi

BGN (dBA) :16.2

Temp (°C) : 23.8



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 40x40x28.0 mm series as the right table

FFB0412VN-00A7C	FFB0412VN-00ANQ	FFB0412SN-00Y2F	
FFB0412SN-00ARQ	FFB0412VN-00BZF		
FFB0412VN-00B2M	FFB0412VN-00Y9H(S)		
FFB0412VN-00BR8	FFB0412VN-00BP3(F)		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,739	2015/1/6 7:00 PM	2015/6/21 11:53 PM	56	0	11739.0

Representative Test P/N : FFB0412SN-00A7D	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
---	----------------------------	-------------------------------------	---	--------------------------------------

Equipment: 1.Oven: E24-T0171 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 1.5 Max.	Final Test Current Spec. (A) 1.5 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 20240-23760	Final Test Speed Spec. (RPM) 20240-23760	Deviation (%)	Initial Test Noise Spec. (dB A) 65.5 Max	Final Test Noise Spec. (dB A) 65.5 Max	Deviation 3 dBMax.
1	0.92	0.91	-1.2	21942	21591	-1.6	60.2	60.5	0.3
2	0.91	0.92	0.7	21341	21686	1.6	60.0	60.2	0.2
3	0.95	0.90	-6.1	21535	22001	2.2	59.4	59.3	-0.1
4	0.88	0.94	7.6	21289	21898	2.9	60.1	59.5	-0.6
5	0.88	0.87	-0.8	21823	21540	-1.3	59.9	59.2	-0.7
6	0.88	0.88	0.7	21593	21943	1.6	60.4	59.9	-0.5
7	0.88	0.85	-3.6	21662	21538	-0.6	59.5	59.7	0.2
8	0.89	0.91	2.4	21208	21942	3.5	60.1	59.1	-1.0
9	0.90	0.86	-4.7	21624	21699	0.3	59.7	58.9	-0.8
10	0.91	0.91	0.8	21842	21753	-0.4	59.9	59.2	-0.7
11	0.91	0.88	-3.4	21583	21714	0.6	60.3	60.0	-0.3
12	0.92	0.93	2.0	21807	22067	1.2	59.4	59.7	0.3
13	0.90	0.86	-4.3	21895	21506	-1.8	59.6	60.3	0.7
14	0.90	0.92	1.6	21720	21918	0.9	60.1	59.4	-0.7
15	0.88	0.89	1.5	21060	21714	3.1	59.8	58.7	-1.1
16	0.92	0.90	-2.2	21814	21773	-0.2	60.3	58.9	-1.4
17	0.93	0.83	-10.6	21700	21445	-1.2	59.4	60.0	0.6
18	0.94	0.95	0.9	21763	21867	0.5	59.6	59.6	0.0
19	0.90	0.87	-3.4	21634	21701	0.3	60.0	59.0	-1.0
20	0.90	0.92	1.9	21792	21687	-0.5	59.7	58.7	-1.0
21	0.92	0.91	-0.5	21175	22091	4.3	60.2	59.5	-0.7
22	0.94	0.89	-5.1	21234	21375	0.7	59.9	59.1	-0.8
23	0.89	0.86	-3.1	21751	21608	-0.7	59.4	59.5	0.1
24	0.97	0.91	-5.4	21570	21844	1.3	59.6	58.7	-0.9
25	0.92	0.89	-3.2	21688	21789	0.5	60.0	59.9	-0.1
26	0.89	0.90	1.3	21615	21382	-1.1	59.8	59.8	0.0
27	0.94	0.90	-4.1	21879	21926	0.2	60.2	60.7	0.5
28	0.87	0.89	2.1	21736	21991	1.2	59.7	59.0	-0.7
29	0.92	0.89	-3.4	21142	21799	3.1	59.5	59.0	-0.5
30	0.94	0.93	-0.9	22082	22011	-0.3	59.7	59.2	-0.5
31	0.94	0.85	-9.3	21592	21490	-0.5	60.3	58.9	-1.4
32	1.00	0.92	-8.0	21994	21733	-1.2	59.6	58.9	-0.7

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG14FNL181	2250.00	2016/9/1	NaNa.Wang	Tim.Yi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 40x40x28.0 mm series as the right table

FFB0412VN-00A7C	FFB0412VN-00ANQ	FFB0412SN-00Y2F	
FFB0412SN-00ARQ	FFB0412VN-00BZF		
FFB0412VN-00B2M	FFB0412VN-00Y9H(S)		
FFB0412VN-00BR8	FFB0412VN-00BP3(F)		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,739	2015/1/6 7:00 PM	2015/6/21 11:53 PM	56	0	11739.0

Representative Test P/N : FFB0412SN-00A7D	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
---	----------------------------	-------------------------------------	---	--------------------------------------

Equipment: 1.Oven: E24-T0171 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 1.5 Max.	Final Test Current Spec. (A) 1.5 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 20240-23760	Final Test Speed Spec. (RPM) 20240-23760	Deviation (%)	Initial Test Noise Spec. (dB A) 65.5 Max	Final Test Noise Spec. (dB A) 65.5 Max	Deviation 3 dBMax.
33	0.88	0.89	1.8	21313	21920	2.8	59.8	58.5	-1.3
34	0.91	0.95	4.2	21729	22021	1.3	59.4	59.1	-0.3
35	0.86	0.85	-1.6	21696	21611	-0.4	60.0	59.5	-0.5
36	0.86	0.90	4.3	21524	21533	0.0	59.6	59.0	-0.6
37	0.94	0.89	-6.0	21903	21919	0.1	59.8	59.6	-0.2
38	0.86	0.91	5.1	21649	21740	0.4	60.2	59.3	-0.9
39	0.95	0.88	-7.2	21716	21694	-0.1	60.4	59.2	-1.2
40	0.87	0.90	3.3	21664	21536	-0.6	59.5	58.6	-0.9
41	0.92	0.87	-5.5	21593	21634	0.2	60.0	59.7	-0.3
42	0.93	0.93	0.1	22055	21812	-1.1	59.7	59.5	-0.2
43	0.83	0.88	6.0	21241	21889	3.1	60.2	58.8	-1.4
44	0.92	0.93	1.1	22062	21822	-1.1	59.9	60.1	0.2
45	0.87	0.86	-1.5	21751	21781	0.1	60.4	59.3	-1.1
46	0.94	0.94	0.2	22019	21869	-0.7	59.5	60.0	0.5
47	0.88	0.85	-3.3	21681	21535	-0.7	60.1	58.7	-1.4
48	0.86	0.92	7.1	21666	21644	-0.1	59.8	58.0	-1.8
49	0.88	0.84	-4.3	21610	21700	0.4	60.3	59.3	-1.0
50	0.97	0.97	0.0	21600	22165	2.6	59.5	59.6	0.1
51	0.88	0.86	-1.7	21569	21602	0.2	60.4	58.9	-1.5
52	0.87	0.93	6.3	21261	21962	3.3	59.7	59.1	-0.6
53	0.89	0.82	-7.8	21759	21286	-2.2	60.1	59.7	-0.4
54	0.88	0.94	6.3	21637	21807	0.8	59.9	59.5	-0.4
55	0.95	0.87	-8.6	21663	21903	1.1	60.3	59.4	-0.9
56	0.87	0.96	10.6	21488	21939	2.1	60.4	59.2	-1.2
X-Bar	0.90	0.90	-	21641.7	21756.18	-	59.90	59.35	-
σ	0.034	0.034	-	240.992	195.990	-	0.317	0.526	-

QE File No.	Time-out for function test or others (hrs)	Issued Date	Reported By	Approved By
DG14FNL181	2250.00	2016/9/1	NaNa.Wang	Tim.Yi