



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 EFB 172x150x50.8mm series as the right table					
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Representative Test P/N : EFB1524VHGBLJ

Equipment: 1.Oven: E24-T0161

☉ 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) <small>(Actual Test Temperature)</small>	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)
70	40	8.00	53	2.303	3,656	18,478.0	2,476,217	353,745

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2016/9/16 2:30 PM	2017/12/19 11:46 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process <small>(exceed requested)</small>	<input type="checkbox"/> Termination	18478.0

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	7,003,800	1,000,543
30	16.00	4,952,435	707,491
40	8.00	2,476,217	353,745
50	4.00	1,238,109	176,873
60	2.00	619,054	88,436
70	1.00	309,527	44,218

- 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
DG16FNL110	25595.50	2021/9/27	Loly.Wang	Tim.Yi

BGN (dBA) : 15.9

Temp (°C) : 25.0



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)				
3,656	2016/9/16 2:30 PM	2017/12/19 11:46 PM	53	0	18478.0				
Representative Test P/N : EFB1524VHGBLJ			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) 1.80 Max.	Final Test Current Spec. (A) 1.80 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 4050-4950	Final Test Speed Spec. (RPM) 4050-4950	Deviation (%)	Initial Test Noise Spec. (dB A) 66.0 Max	Final Test Noise Spec. (dB A) 66.0 Max	Deviation 3 dBMax.
1	1.56	1.54	-1.6	4606	4589	-0.4	61.6	63.1	1.5
2	1.59	1.52	-3.9	4548	4556	0.2	62.0	63.3	1.3
3	1.57	1.54	-1.6	4632	4634	0.0	61.9	63.4	1.5
4	1.64	1.59	-3.6	4595	4611	0.3	62.2	63.0	0.8
5	1.53	1.53	-0.1	4633	4640	0.2	62.4	63.2	0.8
6	1.58	1.47	-7.2	4629	4568	-1.3	61.7	62.7	1.0
7	1.59	1.52	-4.4	4599	4601	0.0	61.7	63.0	1.3
8	1.62	1.49	-8.2	4571	4661	2.0	62.2	63.5	1.3
9	1.63	1.50	-7.9	4591	4628	0.8	61.8	63.6	1.8
10	1.59	1.53	-3.5	4531	4478	-1.2	62.3	62.6	0.3
11	1.59	1.57	-1.2	4590	4523	-1.5	61.3	62.7	1.4
12	1.57	1.57	-0.2	4593	4599	0.1	62.0	62.9	0.9
13	1.61	1.54	-4.4	4629	4593	-0.8	61.7	62.8	1.1
14	1.56	1.44	-7.7	4616	4594	-0.5	61.5	63.4	1.9
15	1.56	1.51	-2.8	4591	4598	0.2	61.8	63.6	1.8
16	1.59	1.48	-7.0	4617	4604	-0.3	61.8	63.3	1.5
17	1.62	1.48	-8.2	4608	4579	-0.6	61.6	62.9	1.3
18	1.58	1.55	-1.6	4601	4608	0.2	62.0	63.2	1.2
19	1.57	1.54	-2.4	4614	4619	0.1	62.4	63.1	0.7
20	1.61	1.62	0.7	4593	4533	-1.3	62.1	62.9	0.8
21	1.58	1.60	1.4	4588	4592	0.1	62.3	63.1	0.8
22	1.60	1.52	-5.1	4540	4621	1.8	61.9	63.2	1.3
23	1.62	1.53	-5.3	4464	4597	3.0	61.6	63.2	1.6
24	1.60	1.50	-6.1	4596	4642	1.0	61.9	63.0	1.1
25	1.56	1.55	-0.3	4660	4561	-2.1	62.4	62.8	0.4
26	1.58	1.52	-3.9	4593	4596	0.1	61.9	63.2	1.3
27	1.60	1.45	-9.3	4586	4590	0.1	62.5	63.2	0.7
28	1.60	1.47	-8.1	4581	4594	0.3	61.6	63.3	1.7
29	1.57	1.54	-1.7	4610	4587	-0.5	61.7	63.0	1.3
30	1.57	1.49	-5.0	4611	4587	-0.5	61.9	62.3	0.4
31	1.60	1.55	-3.2	4569	4564	-0.1	61.8	63.1	1.3
32	1.60	1.47	-7.8	4594	4610	0.3	61.9	63.2	1.3
QE File No.	Time-out for function test or others (hours)		Issued Date		Reported By		Approved By		
DG16FNL110	25595.50		2021/9/27		Loly.Wang		Tim.Yi		



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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3,656	2016/9/16 2:30 PM	2017/12/19 11:46 PM	53	0	18478.0
Representative Test P/N : EFB1524VHGBlJ			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) 1.80 Max.	Final Test Current Spec. (A) 1.80 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 4050-4950	Final Test Speed Spec. (RPM) 4050-4950	Deviation (%)	Initial Test Noise Spec. (dB A) 66.0 Max	Final Test Noise Spec. (dB A) 66.0 Max	Deviation 3 dBMax.
33	1.60	1.51	-5.6	4508	4654	3.2	62.0	63.1	1.1
34	1.57	1.51	-3.6	4609	4625	0.3	61.8	63.4	1.6
35	1.59	1.46	-8.0	4560	4597	0.8	61.4	63.0	1.6
36	1.60	1.47	-8.5	4548	4597	1.1	62.3	63.5	1.2
37	1.61	1.56	-3.1	4598	4564	-0.7	62.1	63.7	1.6
38	1.60	1.53	-4.4	4537	4627	2.0	62.0	63.1	1.1
39	1.61	1.52	-5.6	4551	4602	1.1	61.7	63.4	1.7
40	1.61	1.52	-5.6	4545	4586	0.9	61.7	63.0	1.3
41	1.59	1.54	-3.1	4604	4627	0.5	61.8	62.6	0.8
42	1.65	1.52	-7.8	4597	4584	-0.3	61.4	62.8	1.4
43	1.60	1.55	-3.1	4597	4650	1.2	62.3	63.4	1.1
44	1.58	1.53	-3.0	4604	4641	0.8	61.8	63.6	1.8
45	1.60	1.50	-6.2	4586	4617	0.7	62.1	62.8	0.7
46	1.61	1.57	-2.5	4562	4609	1.0	61.5	62.7	1.2
47	1.62	1.52	-5.8	4560	4612	1.1	62.0	63.1	1.1
48	1.61	1.53	-5.2	4563	4623	1.3	62.5	63.5	1.0
49	1.58	1.48	-6.3	4606	4638	0.7	61.6	63.1	1.5
50	1.56	1.50	-4.1	4664	4623	-0.9	62.4	63.2	0.8
51	1.60	1.58	-1.4	4585	4538	-1.0	62.2	63.3	1.1
52	1.64	1.54	-6.4	4523	4562	0.9	61.5	63.0	1.5
53	1.61	1.48	-7.6	4558	4598	0.9	62.1	63.1	1.0
X-Bar	1.59	1.52	-	4585.74	4598.70	-	61.92	63.12	-
σ	0.02	0.04	-	36.48	34.42	-	0.31	0.29	-

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