



# 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 PFB 92x92x38.0mm series as the right table	PFB0924DHEP0				
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**Representative Test P/N : PFB0924DHEEQP**

**Equipment: 1.Oven: E24-T0161**

◎ **L<sub>10</sub> Expectancy: 70,000 hours minimum @ fan rated voltage and the temperature of 40°C**

According to the equation for **Weibull distribution**, **MTTF ≈ 7×L<sub>10</sub> = 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<sub>r,c</sub>) 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 <sub>s</sub> (°C) (Actual Test Temperature)	Unstress Temperature T <sub>u</sub> (°C)	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r,c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 °C (hours)	Verified L <sub>10</sub> 40 °C (hours)
80	40	16.00	56	2.303	1,739	9,739.0	2,744,342	392,049

**Test Progress:**

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2019/11/26 3:30 PM	2020/3/24 11:53 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	9739.0

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' L<sub>10</sub> 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 <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	45.25	7,762,171	1,108,882
30	32.00	5,488,684	784,098
40	16.00	2,744,342	392,049
50	8.00	1,372,171	196,024
60	4.00	686,085	98,012
70	2.00	343,043	49,006
80	1.00	171,521	24,503

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.

<b>Test Result</b>	<input checked="" type="checkbox"/> <b>Accept</b> <input type="checkbox"/> <b>Reject</b>
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG19FNL073	5797.50	2021/9/4	Loly.Wang	Tim.Yi

BGN (dBA) : 15.9

Temp (°C) : 25.0



## 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 PFB 92x92x38.0mm series as the right table				PFB0924DHEP0					
<b>Required Test Time (hrs)</b>	<b>Date for Test Beginning</b>	<b>Date for Test Termination</b>	<b>Sample Size (pcs):</b>	<b>Failure (pcs):</b>	<b>Current Total Test Time (hrs)</b>				
1,739	2019/11/26 3:30 PM	2020/3/24 11:53 PM	56	0	<b>9739.0</b>				
Representative Test P/N : PFB0924DHEEQP			<b>Current Test Status</b>		<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination		
Equipment: 1.Oven: E24-T0161									
<b>Test Data Between Initial Test and Final Test</b>									
Sample No.	Initial Test Current Spec. (A) <b>1.47 Max.</b>	Final Test Current Spec. (A) <b>1.47 Max.</b>	Deviation (%)	Initial Test Speed Spec. (RPM) <b>6480-7920</b>	Final Test Speed Spec. (RPM) <b>6480-7920</b>	Deviation (%)	Initial Test Noise Spec. (dB A) <b>67.7 Max</b>	Final Test Noise Spec. (dB A) <b>67.7 Max</b>	Deviation <b>3 dBMax.</b>
1	1.14	1.09	-4.6	7027	7264	3.4	61.9	61.8	-0.1
2	1.22	1.18	-3.2	7320	7416	1.3	61.7	61.9	0.2
3	1.10	1.10	0.0	7379	7242	-1.9	62.0	61.9	-0.1
4	1.10	1.11	0.8	7493	7301	-2.6	61.8	62.1	0.3
5	1.11	1.11	-0.3	7377	7276	-1.4	61.9	61.9	0.0
6	1.10	1.11	1.4	7467	7286	-2.4	62.1	62.0	-0.1
7	1.12	1.12	0.2	7533	7341	-2.5	62.2	61.5	-0.7
8	1.10	1.10	-0.1	7400	7303	-1.3	61.8	62.6	0.8
9	1.10	1.10	0.7	7362	7220	-1.9	61.5	61.2	-0.3
10	1.10	1.10	0.4	7487	7372	-1.5	61.7	61.7	0.0
11	1.11	1.11	0.5	7524	7301	-3.0	62.1	61.9	-0.2
12	1.09	1.10	0.9	7463	7255	-2.8	61.6	62.2	0.6
13	1.09	1.10	1.2	7450	7234	-2.9	61.6	62.0	0.4
14	1.08	1.09	0.6	7475	7284	-2.6	61.3	62.0	0.7
15	1.09	1.12	2.7	7458	7332	-1.7	61.5	61.7	0.2
16	1.11	1.10	-1.3	7530	7258	-3.6	61.8	61.9	0.1
17	1.10	1.11	0.9	7494	7257	-3.2	61.6	62.3	0.7
18	1.09	1.08	-0.8	7409	7288	-1.6	61.4	61.9	0.5
19	1.08	1.09	0.6	7476	7308	-2.2	61.7	61.8	0.1
20	1.09	1.10	0.5	7483	7275	-2.8	61.4	62.6	1.2
21	1.08	1.09	1.1	7508	7264	-3.2	61.7	61.8	0.1
22	1.10	1.10	-0.3	7448	7277	-2.3	61.4	62.4	1.0
23	1.09	1.11	1.7	7541	7310	-3.1	61.4	61.8	0.4
24	1.07	1.07	-0.2	7395	7248	-2.0	61.5	62.2	0.7
25	1.10	1.11	0.7	7529	7270	-3.4	61.9	62.3	0.4
26	1.10	1.11	0.4	7504	7305	-2.7	61.7	61.7	0.0
27	1.09	1.10	0.6	7497	7326	-2.3	61.5	62.0	0.5
28	1.12	1.13	1.1	7535	7333	-2.7	61.4	61.8	0.4
29	1.11	1.12	1.3	7545	7301	-3.2	61.7	62.7	1.0
30	1.18	1.18	0.0	7571	7409	-2.1	61.6	61.4	-0.2
31	1.16	1.18	1.6	7611	7417	-2.5	62.3	61.7	-0.6
32	1.13	1.14	0.9	7517	7330	-2.5	61.7	61.6	-0.1
<b>QE File No.</b>	<b>Time-out for function test or others (hours)</b>			<b>Issued Date</b>		<b>Reported By</b>		<b>Approved By</b>	
DG19FNL073	5797.50			2021/9/4		Loly.Wang		Tim.Yi	



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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)
1,739	2019/11/26 3:30 PM	2020/3/24 11:53 PM	56	0	<b>9739.0</b>
Representative Test P/N : PFB0924DHEEQP			<b>Current Test Status</b>		<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.
	<b>1.47 Max.</b>	<b>1.47 Max.</b>		<b>6480-7920</b>	<b>6480-7920</b>		<b>67.7 Max</b>	<b>67.7 Max</b>	
33	1.17	1.18	0.8	7632	7413	-2.9	61.8	61.7	-0.1
34	1.11	1.11	0.5	7499	7324	-2.3	61.2	62.0	0.8
35	1.12	1.13	0.9	7570	7325	-3.2	62.6	62.8	0.2
36	1.20	1.21	0.7	7681	7474	-2.7	61.9	62.0	0.1
37	1.18	1.20	1.4	7669	7418	-3.3	61.6	62.6	1.0
38	1.09	1.09	-0.2	7444	7277	-2.2	61.7	62.7	1.0
39	1.07	1.08	1.0	7484	7224	-3.5	61.6	61.6	0.0
40	1.08	1.08	0.2	7391	7239	-2.1	61.8	62.6	0.8
41	1.07	1.07	0.4	7429	7237	-2.6	61.7	62.1	0.4
42	1.12	1.13	0.6	7536	7369	-2.2	61.8	62.2	0.4
43	1.11	1.12	1.6	7558	7304	-3.4	62.0	63.5	1.5
44	1.07	1.08	0.8	7424	7225	-2.7	62.2	62.4	0.2
45	1.07	1.07	0.1	7430	7260	-2.3	62.1	61.9	-0.2
46	1.09	1.09	0.5	7448	7277	-2.3	61.6	61.7	0.1
47	1.06	1.08	1.6	7449	7227	-3.0	61.8	61.7	-0.1
48	1.10	1.11	0.8	7493	7284	-2.8	61.9	62.8	0.9
49	1.10	1.11	0.6	7480	7273	-2.8	62.0	62.6	0.6
50	1.10	1.10	-0.4	7419	7302	-1.6	61.8	62.0	0.2
51	1.16	1.17	0.9	7642	7391	-3.3	62.1	62.0	-0.1
52	1.11	1.12	0.9	7495	7322	-2.3	62.0	62.5	0.5
53	1.08	1.09	0.7	7482	7221	-3.5	61.8	62.1	0.3
54	1.10	1.11	1.1	7506	7288	-2.9	61.4	63.8	2.4
55	1.11	1.12	0.5	7492	7314	-2.4	61.9	62.5	0.6
56	1.09	1.09	0.2	7400	7232	-2.3	61.8	62.3	0.5
X-Bar	1.11	1.11	-	7479.66	7300.41	-	61.76	62.11	-
$\sigma$	0.03	0.03	-	72.11	56.92	-	0.27	0.48	-

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DG19FNL073	5797.50	2021/9/4	Loly.Wang	Tim.Yi