



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 PFC 139x139x38.0mm series as the right table	PFC1412HE-00EGB			
	PFC1412HE-00EJ2			
	PFC1448HEE79			

Representative Test P/N : PFC1412HE-00CH8

Equipment: 1.Oven: E24-T0161 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)
70	40	8.00	56	2.303	3,478	6,478.0	912,714	130,388

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2017/7/7 4:30 PM	2018/10/31 11:46 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	6478.0

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	2,581,546	368,792
30	16.00	1,825,428	260,775
40	8.00	912,714	130,388
50	4.00	456,357	65,194
60	2.00	228,179	32,597
70	1.00	114,089	16,298

- 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
DG17FNL095	14865.50	2019/12/14	Loly.Wang	Tim.Yi

BGN (dBA) :16.0

Temp (°C) : 21.2



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PFC1412HE-00EGB			
PFC1412HE-00EJ2			
PFC1448HEE79			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2017/7/7 4:30 PM	2018/10/31 11:46 PM	56	0	6478.0

Representative Test P/N : PFC1412HE-00CH8	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: E24-T0161 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 6.3 Max.	Final Test Current Spec. (A) 6.3 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 7110-8690	Final Test Speed Spec. (RPM) 7110-8690	Deviation (%)	Initial Test Noise Spec. (dB A) 74.0 Max	Final Test Noise Spec. (dB A) 74.0 Max	Deviation 3 dBMax.
1	4.27	4.16	-2.4	7748	7586	-2.1	73.6	73.4	-0.2
2	4.25	4.12	-3.1	7616	7597	-0.2	73.0	73.1	0.1
3	4.20	4.39	4.6	7739	7617	-1.6	73.0	73.6	0.6
4	4.25	4.13	-2.7	7517	7581	0.9	73.5	73.1	-0.4
5	4.25	4.15	-2.3	7804	7663	-1.8	73.8	74.6	0.8
6	4.16	4.00	-3.7	7532	7541	0.1	73.2	74.1	0.9
7	4.20	4.18	-0.6	7744	7574	-2.2	73.0	73.2	0.2
8	4.40	4.28	-2.6	7735	7701	-0.4	73.3	73.0	-0.3
9	4.15	4.04	-2.7	7688	7637	-0.7	73.2	73.2	0.0
10	4.21	4.17	-1.0	7654	7665	0.1	73.4	73.5	0.1
11	4.38	4.16	-5.0	7578	7616	0.5	73.2	73.6	0.4
12	4.37	4.18	-4.3	7579	7564	-0.2	72.8	72.7	-0.1
13	4.16	4.17	0.3	7792	7637	-2.0	72.9	74.7	1.8
14	4.20	4.16	-0.9	7633	7571	-0.8	73.1	72.7	-0.4
15	4.14	4.19	1.2	7753	7746	-0.1	72.1	72.6	0.5
16	4.36	4.20	-3.7	7624	7549	-1.0	73.1	74.0	0.9
17	4.39	4.37	-0.4	7703	7672	-0.4	73.3	73.4	0.1
18	4.08	4.10	0.5	7655	7553	-1.3	73.2	73.0	-0.2
19	4.22	4.22	0.0	7804	7554	-3.2	72.9	72.8	-0.1
20	4.20	4.11	-2.2	7484	7590	1.4	73.5	73.7	0.2
21	4.17	4.14	-0.8	7570	7616	0.6	73.3	73.6	0.3
22	4.16	4.21	1.3	7719	7542	-2.3	73.2	73.0	-0.2
23	4.31	4.14	-3.9	7527	7601	1.0	72.6	73.1	0.5
24	4.21	4.00	-5.1	7536	7530	-0.1	73.3	73.9	0.6
25	4.46	4.25	-4.7	7740	7640	-1.3	72.8	73.0	0.2
26	4.23	4.13	-2.3	7596	7564	-0.4	73.1	73.5	0.4
27	4.48	4.17	-6.9	7600	7557	-0.6	73.3	73.6	0.3
28	4.51	4.16	-7.6	7589	7606	0.2	73.0	73.4	0.4
29	4.35	4.14	-4.8	7584	7581	0.0	73.5	74.0	0.5
30	4.49	4.19	-6.7	7606	7637	0.4	73.6	73.2	-0.4
31	4.30	4.23	-1.7	7663	7623	-0.5	73.4	74.3	0.9
32	4.38	4.24	-3.1	7581	7631	0.7	73.6	73.4	-0.2

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG17FNL095	14865.50	2019/12/14	Loly.Wang	Tim.Yi



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)
3,478	2017/7/7 4:30 PM	2018/10/31 11:46 PM	56	0	6478.0

Representative Test P/N : PFC1412HE-00CH8	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: E24-T0161	On/Off Cycles: Every 500 hours
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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
	6.3 Max.	6.3 Max.		7110-8690	7110-8690		74.0 Max	74.0 Max	
33	4.34	4.06	-6.4	7688	7633	-0.7	73.2	72.8	-0.4
34	4.52	4.32	-4.5	7732	7706	-0.3	73.6	73.2	-0.4
35	4.39	4.18	-4.8	7693	7655	-0.5	73.1	73.0	-0.1
36	4.40	4.26	-3.3	7783	7643	-1.8	73.3	73.5	0.2
37	4.60	4.29	-6.7	7598	7578	-0.3	72.8	73.3	0.5
38	4.45	4.19	-5.8	7626	7607	-0.2	73.7	73.4	-0.3
39	4.39	4.11	-6.2	7670	7597	-1.0	73.2	73.3	0.1
40	4.41	4.18	-5.2	7649	7621	-0.4	73.3	73.6	0.3
41	4.29	4.12	-3.9	7623	7573	-0.7	73.1	74.5	1.4
42	4.39	4.17	-5.0	7630	7536	-1.2	73.7	74.6	0.9
43	4.33	4.25	-2.0	7739	7515	-2.9	73.1	73.4	0.3
44	4.10	4.41	7.5	7852	7690	-2.1	73.5	74.3	0.8
45	4.15	4.17	0.4	7600	7653	0.7	73.2	73.0	-0.2
46	4.30	4.04	-6.0	7647	7695	0.6	73.8	74.4	0.6
47	4.36	4.20	-3.7	7490	7692	2.7	73.9	73.5	-0.4
48	4.42	4.14	-6.4	7870	7621	-3.2	73.1	73.5	0.4
49	4.26	4.37	2.5	7641	7671	0.4	73.3	73.3	0.0
50	4.37	4.26	-2.5	7695	7604	-1.2	73.5	72.9	-0.6
51	4.44	4.13	-7.0	7768	7568	-2.6	73.1	72.5	-0.6
52	4.19	4.14	-1.2	7740	7652	-1.1	73.3	72.6	-0.7
53	4.26	4.14	-2.8	7824	7685	-1.8	73.2	73.0	-0.2
54	4.24	4.18	-1.3	7587	7649	0.8	73.6	73.2	-0.4
55	4.26	4.01	-5.9	7779	7606	-2.2	73.3	73.5	0.2
56	4.37	4.14	-5.4	7598	7464	-1.8	73.5	73.0	-0.5
X-Bar	4.31	4.18	-	7664.55	7611.71	-	73.25	73.42	-
σ	0.12	0.09	-	93.42	55.41	-	0.32	0.54	-

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