



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 PFM 60x60x38.0mm series as the right table	PFM0612SE-03F4B	PFB0612EE-E		
	PFM0612SE-04FGH			
	FA121A06-K1L			
	PFM0612SE-04E9E			
Representative Test P/N : PFM0612SE-03DCF				
Equipment: 1.Oven: E24-T0161			On/Off Cycles: Every 500 hours	

◎ **L₁₀ Expectancy:** **100,000** hours minimum @ fan rated voltage and the temperature of 50°C
 According to the equation for **Weibull distribution**, **MTTF ≈ 7×L₁₀ = 700,000** 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) (Actual Test Temperature)	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)
60	50	2.00	52	2.303	21,259	5,360.0	176,486	25,212

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2019/4/8 9:30 AM	2022/4/24 11:27 AM	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	5360.0

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	11.31	998,356	142,622
30	8.00	705,945	100,849
40	4.00	352,972	50,425
50	2.00	176,486	25,212
60	1.00	88,243	12,606

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
 Accept
 Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG19FNL020	5430.50	2020/7/1	Loly.Wang	Tim.Yi

BGN (dBA) : 15.9

Temp (°C) : 25.0



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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				PFM0612SE-04FGH						
				FAI21A06-K1L						
				PFM0612SE-04E9E						
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)					
21,259	2019/4/8 9:30 AM	2022/4/24 11:27 AM	52	0	5360.0					
Representative Test P/N : PFM0612SE-03DCF				Current Test Status		<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination		
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) 5.0 Max.	Final Test Current Spec. (A) 5.0 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 22500-27500	Final Test Speed Spec. (RPM) 22500-27500	Deviation (%)	Initial Test Noise Spec. (dB A) 78.7 Max	Final Test Noise Spec. (dB A) 78.7 Max	Deviation 3 dBMax.	
1	4.33	3.71	-14.3	24729	22922	-7.3	74.6	74.1	-0.5	
2	4.15	4.41	6.2	24511	24874	1.5	75.6	75.9	0.3	
3	4.42	4.45	0.8	24735	24977	1.0	74.8	75.2	0.4	
4	4.17	4.34	4.1	24730	24804	0.3	73.7	74.1	0.4	
5	4.38	4.45	1.5	24748	25008	1.1	75.3	74.3	-1.0	
6	4.29	4.42	3.0	24866	24830	-0.1	74.6	74.4	-0.2	
7	4.17	3.61	-13.3	24535	22888	-6.7	74.2	74.6	0.4	
8	4.36	3.75	-14.0	25200	23393	-7.2	75.1	75.3	0.2	
9	4.16	3.92	-5.8	24663	23402	-5.1	75.0	74.8	-0.2	
10	4.43	3.65	-17.5	25265	22670	-10.3	74.3	75.8	1.5	
11	4.37	3.75	-14.3	25196	23138	-8.2	76.0	75.3	-0.7	
12	4.15	4.38	5.8	24875	25194	1.3	74.0	75.2	1.2	
13	4.34	3.64	-16.2	24984	22512	-9.9	73.6	74.7	1.1	
14	4.26	3.64	-14.6	24697	23051	-6.7	74.9	75.0	0.1	
15	4.16	4.32	3.8	24397	25186	3.2	75.8	75.7	-0.1	
16	4.22	3.27	-22.5	24781	23616	-4.7	75.7	75.1	-0.6	
17	4.20	3.68	-12.3	24476	23076	-5.7	75.0	75.7	0.7	
18	4.20	4.44	5.5	25166	24831	-1.3	75.6	74.1	-1.5	
19	4.27	4.36	2.1	24760	24944	0.7	74.8	75.3	0.5	
20	4.38	3.72	-15.1	24969	23168	-7.2	75.3	75.6	0.3	
21	4.36	3.65	-16.4	25154	22611	-10.1	75.0	73.6	-1.4	
22	4.07	3.68	-9.6	24858	22769	-8.4	74.8	76.1	1.3	
23	4.35	4.30	-1.3	25166	24858	-1.2	75.2	74.1	-1.1	
24	4.28	3.95	-7.8	25049	23649	-5.6	75.4	75.0	-0.4	
25	4.25	4.39	3.1	25163	24739	-1.7	74.3	74.6	0.3	
26	4.15	4.36	5.2	24400	25194	3.3	74.7	74.5	-0.2	
27	4.39	4.19	-4.6	25036	24889	-0.6	75.2	74.0	-1.2	
28	4.24	4.07	-4.1	24886	24527	-1.4	74.5	73.8	-0.7	
29	4.14	3.94	-4.9	24273	23894	-1.6	74.4	74.5	0.1	
30	4.42	4.33	-2.0	25091	24936	-0.6	75.2	74.3	-0.9	
31	4.23	3.58	-15.2	24808	22504	-9.3	76.0	75.5	-0.5	
32	4.44	3.59	-19.2	25210	22741	-9.8	75.5	74.4	-1.1	
QE File No.	Time-out for function test or others (hours)			Issued Date		Reported By		Approved By		
DG19FNL020	5430.50			2020/7/1		Loly.Wang		Tim.Yi		



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	FAI21A06-K1L			
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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)
21,259	2019/4/8 9:30 AM	2022/4/24 11:27 AM	52	0	5360.0

Representative Test P/N : PFM0612SE-03DCF	Current Test Status	<input checked="" type="checkbox"/> In process	<input 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)	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.
	5.0 Max.	5.0 Max.		22500-27500	22500-27500		78.7 Max	78.7 Max	
33	4.20	4.12	-2.0	25102	24203	-3.6	75.7	74.5	-1.2
34	4.17	3.86	-7.5	24421	23199	-5.0	74.3	74.4	0.1
35	4.18	4.48	7.2	24896	25020	0.5	75.0	75.6	0.6
36	4.20	3.71	-11.6	24655	23080	-6.4	76.0	75.5	-0.5
37	4.22	4.51	6.7	24638	24837	0.8	74.9	75.0	0.1
38	4.40	3.59	-18.3	25142	22504	-10.5	75.0	76.4	1.4
39	4.36	3.74	-14.1	24944	23228	-6.9	75.6	76.0	0.4
40	4.23	4.08	-3.5	24972	23922	-4.2	75.3	74.3	-1.0
41	4.41	4.24	-3.8	24839	24773	-0.3	74.2	75.9	1.7
42	4.23	3.93	-7.1	24850	23701	-4.6	74.9	74.8	-0.1
43	4.12	4.48	8.7	24159	25141	4.1	74.4	73.4	-1.0
44	4.24	3.91	-7.8	25060	23562	-6.0	74.9	74.6	-0.3
45	4.33	4.45	2.7	24989	24959	-0.1	75.2	74.8	-0.4
46	4.49	3.89	-13.3	25157	23216	-7.7	75.6	74.5	-1.1
47	4.23	3.58	-15.4	24813	22807	-8.1	74.7	74.7	0.0
48	4.17	3.67	-12.1	24551	22813	-7.1	75.2	74.9	-0.3
49	4.18	3.59	-14.1	24316	22743	-6.5	74.2	75.1	0.9
50	4.33	4.47	3.1	24911	25193	1.1	75.3	74.1	-1.2
51	4.13	4.43	7.2	24737	23675	-4.3	76.0	75.1	-0.9
52	4.37	4.18	-4.3	24817	24463	-1.4	75.6	74.0	-1.6
X-Bar	4.27	4.02	-	24833.58	23900.65	-	75.00	74.85	-
σ	0.10	0.35	-	271.81	952.81	-	0.59	0.69	-

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DG19FNL020	5430.50	2020/7/1	Loly.Wang	Tim.Yi