



# 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 PFR 60x60x38.0 mm series as the right table	PFR0612XHE-01AF2	PFR0612XHE-01XJB		
	PFR0612XHE-01BON	PFR0612XHE-01ZCE		
	PFR0612XHE-01AMX	PFR0648SE-00EP3		
	PFR0612XHE-01BEY	PFC0648SE-00FA3		

**Representative Test P/N : PFR0612XHE-01A53**

**Equipment: 1.Oven: E24-F0118** On/Off Cycles: Every 500 hours

⊙ **L<sub>10</sub> Expectancy: 30,000 hours minimum @ fan rated voltage and the temperature of 55°C**

According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 210,000 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,

$$t = 1.036 \times \text{MTTF} \times [(B_{r,c}) \div n]^{0.91} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

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 55 °C (hours)	Verified L <sub>10</sub> 55 °C (hours)
<b>70</b>	<b>55</b>	<b>1.84</b>	<b>100</b>	<b>2.303</b>	<b>3,829</b>	<b>9,360.0</b>	<b>513,293</b>	<b>73,328</b>

**Test Progress:**

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
<b>2014/12/9 8:00 AM</b>	<b>2015/12/24 4:23 AM</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	<b>9360.0</b>

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)
<b>25</b>	<b>6.20</b>	<b>1,732,365</b>	<b>247,481</b>
<b>30</b>	<b>5.06</b>	<b>1,414,470</b>	<b>202,067</b>
<b>40</b>	<b>3.38</b>	<b>942,980</b>	<b>134,711</b>
<b>50</b>	<b>2.25</b>	<b>628,653</b>	<b>89,808</b>
<b>55</b>	<b>1.84</b>	<b>513,293</b>	<b>73,328</b>
<b>60</b>	<b>1.50</b>	<b>419,102</b>	<b>59,872</b>
<b>70</b>	<b>1.00</b>	<b>279,401</b>	<b>39,914</b>

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 >7dB 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
<b>DG14FNL162</b>	<b>11440.00</b>	<b>2017/4/24</b>	<b>NaNa.Wang</b>	<b>Tim.Yi</b>

BGN (dBA) :15.8

Temp (°C) : 21.4



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				PFR0612XHE-01BON	PFR0612XHE-01ZCE					
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				PFR0612XHE-01BEY	PFC0648SE-00FA3					
<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>					
3,829	2014/12/9 8:00 AM	2015/12/24 4:23 AM	100	0	<b>9360.0</b>					
Representative Test P/N : PFR0612XHE-01A53				<b>Current Test Status</b>		<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination		
Equipment: 1.Oven: E24-F0118						On/Off Cycles: Every 500 hours				
<b>Test Data Between Initial Test and Final Test</b>										
Sample No.	Initial Test Current Spec. ( A ) <b>5 Max.</b>	Final Test Current Spec. ( A ) <b>5 Max.</b>	Deviation (%)	Initial Test Speed Spec. ( RPM ) <b>17550-21450</b>	Final Test Speed Spec. ( RPM ) <b>17550-21450</b>	Deviation (%)	Initial Test Noise Spec. ( dB A ) <b>73.0Max</b>	Final Test Noise Spec. ( dB A ) <b>73.0Max</b>	Deviation <b>7 dBMax.</b>	
1	2.31	2.36	2.4	18377	19107	4.0	65.7	65.9	0.2	
2	2.36	2.43	2.7	18963	19203	1.3	66.5	66.1	-0.4	
3	2.29	2.28	-0.7	18240	18900	3.6	66.3	67.1	0.8	
4	2.37	2.37	0.1	18841	19108	1.4	65.6	66.7	1.1	
5	2.33	2.16	-7.3	18532	18455	-0.4	65.6	67.9	2.3	
6	2.29	2.35	2.6	18872	19021	0.8	67.0	67.6	0.6	
7	2.34	2.42	3.5	18952	19198	1.3	65.7	66.5	0.8	
8	2.26	2.27	0.6	18287	18922	3.5	66.1	66.3	0.2	
9	2.26	2.37	4.8	18404	19170	4.2	66.5	67.1	0.6	
10	2.35	2.33	-0.8	18860	18992	0.7	65.8	66.3	0.5	
11	2.30	2.36	2.3	18361	19043	3.7	66.2	67.1	0.9	
12	2.27	2.42	6.6	18786	19200	2.2	66.6	66.9	0.3	
13	2.33	2.35	1.2	18443	19060	3.3	65.9	65.3	-0.6	
14	2.35	2.37	1.0	18677	19132	2.4	66.3	69.1	2.8	
15	2.48	2.43	-2.1	19210	19255	0.2	65.6	67.1	1.5	
16	2.27	2.37	4.6	18307	19021	3.9	66.0	68.6	2.6	
17	2.39	2.30	-3.9	18885	18928	0.2	66.4	67.0	0.6	
18	2.17	2.14	-1.6	18375	18534	0.9	65.7	67.9	2.2	
19	2.33	2.42	4.1	19090	19184	0.5	66.1	66.7	0.6	
20	2.33	2.55	9.1	18050	19507	8.1	66.5	66.4	-0.1	
21	2.35	2.38	1.3	18274	19172	4.9	65.8	66.3	0.5	
22	2.41	2.42	0.2	19048	19194	0.8	66.2	65.7	-0.5	
23	2.32	2.42	4.2	18443	19201	4.1	66.6	66.1	-0.5	
24	2.43	2.29	-5.7	18725	18907	1.0	65.7	67.8	2.1	
25	2.26	2.38	5.4	18331	19116	4.3	65.9	65.7	-0.2	
26	2.39	2.35	-1.6	18946	18938	0.0	66.1	67.9	1.8	
27	2.22	2.33	5.1	18246	19063	4.5	66.3	67.3	1.0	
28	2.36	2.37	0.5	18941	19105	0.9	66.5	66.3	-0.2	
29	2.23	2.33	4.7	18479	19054	3.1	65.8	67.1	1.3	
30	2.37	2.34	-1.3	18713	19007	1.6	66.1	67.5	1.4	
31	2.24	2.57	14.7	18449	19416	5.2	65.6	67.0	1.4	
32	2.34	2.27	-2.9	18279	18964	3.7	65.9	67.5	1.6	
33	2.36	2.35	-0.6	19186	19027	-0.8	66.2	65.9	-0.3	
34	2.27	2.26	-0.3	18402	18729	1.8	66.5	68.0	1.5	
35	2.28	2.32	1.8	18585	19061	2.6	65.8	66.9	1.1	
<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>			
DG14FNL162	11440.00		2017/4/24		NaNa.Wang		Tim.Yi			



## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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PFR0612XHE-01BON	PFR0612XHE-01ZCE
PFR0612XHE-01AMX	PFR0648SE-00EP3
PFR0612XHE-01BEY	PFC0648SE-00FA3

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,829	2014/12/9 8:00 AM	2015/12/24 4:23 AM	100	0	<b>9360.0</b>

Representative Test P/N : PFR0612XHE-01A53	<b>Current Test Status</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-F0118 On/Off Cycles: Every 500 hours

### Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. ( A ) <b>5 Max.</b>	Final Test Current Spec. ( A ) <b>5 Max.</b>	Deviation (%)	Initial Test Speed Spec. ( RPM ) <b>17550-21450</b>	Final Test Speed Spec. ( RPM ) <b>17550-21450</b>	Deviation (%)	Initial Test Noise Spec. ( dB A ) <b>73.0Max</b>	Final Test Noise Spec. ( dB A ) <b>73.0Max</b>	Deviation <b>7 dBMax.</b>
36	2.48	2.31	-6.8	19199	18729	-2.4	66.2	68.0	1.8
37	2.29	2.16	-5.6	18914	19061	0.8	66.6	66.9	0.3
38	2.28	2.45	7.6	18374	18564	1.0	65.9	67.4	1.5
39	2.37	2.27	-4.2	18343	18892	3.0	66.3	68.1	1.8
40	2.30	2.34	1.5	18335	18467	0.7	65.6	66.0	0.4
41	2.33	2.35	1.2	18427	19289	4.7	66.0	66.2	0.2
42	2.32	2.34	0.8	19018	19100	0.4	66.4	67.6	1.2
43	2.39	2.42	1.5	18253	18801	3.0	65.7	68.3	2.6
44	2.33	2.37	2.0	18711	19149	2.3	66.1	66.8	0.7
45	2.30	2.36	2.5	18309	19077	4.2	66.5	68.0	1.5
46	2.24	2.29	2.5	18473	19148	3.7	65.9	67.3	1.4
47	2.30	2.18	-5.4	19158	19129	-0.2	66.2	67.5	1.3
48	2.29	2.28	-0.2	18474	19131	3.6	66.6	66.9	0.3
49	2.34	2.29	-1.8	19095	19073	-0.1	65.9	67.2	1.3
50	2.23	2.34	5.2	18350	18754	2.2	66.3	67.8	1.5
51	2.27	2.42	6.7	18285	18924	3.5	65.6	67.0	1.4
52	2.31	2.22	-4.2	19147	18666	-2.5	65.8	68.6	2.8
53	2.25	2.43	8.0	18887	19068	1.0	66.0	67.0	1.0
54	2.29	2.41	5.4	18424	19202	4.2	66.2	67.4	1.2
55	2.25	2.29	1.9	18355	18946	3.2	66.4	67.3	0.9
56	2.37	2.17	-8.3	18393	19192	4.3	66.6	68.0	1.4
57	2.33	2.44	4.8	18437	19202	4.1	65.9	65.3	-0.6
58	2.26	2.31	2.3	18647	18947	1.6	66.2	67.5	1.3
59	2.25	2.36	4.7	18391	18337	-0.3	65.7	67.2	1.5
60	2.37	2.35	-0.5	19050	19185	0.7	66.0	67.3	1.3
61	2.32	2.28	-1.8	18357	18962	3.3	66.3	66.3	0.0
62	2.31	2.45	5.7	18700	19118	2.2	66.6	67.0	0.4
63	2.39	2.42	1.0	19147	19034	-0.6	65.9	66.6	0.7
64	2.28	2.35	3.3	18339	18676	1.8	66.3	67.1	0.8
65	2.38	2.42	1.7	18451	19310	4.7	65.6	67.9	2.3
66	2.36	2.42	2.5	18942	19286	1.8	66.0	67.4	1.4
67	2.27	2.34	3.2	18494	19105	3.3	66.4	68.1	1.7
68	2.29	2.43	6.2	18296	19298	5.5	65.7	66.4	0.7
69	2.36	2.44	3.4	18609	19259	3.5	66.1	67.7	1.6
70	2.27	2.44	7.4	18381	19018	3.5	66.5	66.6	0.1

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG14FNL162	11440.00	2017/4/24	NaNa.Wang	Tim.Yi



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				PFR0612XHE-01AMX	PFR0648SE-00EP3				
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<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>				
3,829	2014/12/9 8:00 AM	2015/12/24 4:23 AM	100	0	<b>9360.0</b>				
Representative Test P/N : PFR0612XHE-01A53			<b>Current Test Status</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination			
Equipment: 1.Oven: E24-F0118				On/Off Cycles: Every 500 hours					
<b>Test Data Between Initial Test and Final Test</b>									
Sample No.	Initial Test Current Spec. (A) 5 Max.	Final Test Current Spec. (A) 5 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 17550-21450	Final Test Speed Spec. (RPM) 17550-21450	Deviation (%)	Initial Test Noise Spec. (dB A) 73.0Max	Final Test Noise Spec. (dB A) 73.0Max	Deviation 7 dBMax.
71	2.38	2.44	2.4	19164	19319	0.8	65.8	66.9	1.1
72	2.36	2.43	2.7	18603	19105	2.7	66.2	66.5	0.3
73	2.33	2.33	0.1	19140	19018	-0.6	66.6	66.5	-0.1
74	2.34	2.14	-8.6	18304	18509	1.1	65.9	65.6	-0.3
75	2.31	2.15	-6.8	18947	18345	-3.2	66.3	66.2	-0.1
76	2.27	2.34	3.0	18187	19001	4.5	65.6	67.9	2.3
77	2.37	2.41	1.5	19077	19205	0.7	66.0	68.6	2.6
78	2.31	2.36	1.9	18756	19095	1.8	66.4	68.1	1.7
79	2.42	2.30	-4.8	18400	18932	2.9	66.0	66.7	0.7
80	2.30	2.33	1.3	18281	18920	3.5	66.4	67.2	0.8
81	2.25	2.34	4.1	19037	19051	0.1	65.8	67.8	2.0
82	2.26	2.25	-0.3	18353	19023	3.7	66.1	67.0	0.9
83	2.32	2.42	4.4	18331	19205	4.8	66.4	68.2	1.8
84	2.31	2.42	5.1	18825	19207	2.0	65.6	67.0	1.4
85	2.40	2.33	-2.6	19073	18996	-0.4	66.0	66.4	0.4
86	2.31	2.32	0.2	18415	18998	3.2	66.4	67.3	0.9
87	2.38	2.36	-0.5	19095	19105	0.1	65.7	68.3	2.6
88	2.21	2.26	2.6	18370	18718	1.9	66.1	67.1	1.0
89	2.46	2.43	-1.1	19230	19212	-0.1	66.5	68.4	1.9
90	2.31	2.39	3.2	18181	19069	4.9	65.8	66.2	0.4
91	2.20	2.27	3.2	18185	18738	3.0	66.2	66.0	-0.2
92	2.32	2.43	5.0	18686	19192	2.7	66.6	67.2	0.6
93	2.31	2.33	0.9	18510	18998	2.6	65.9	65.8	-0.1
94	2.38	2.35	-1.3	19048	19083	0.2	66.3	66.2	-0.1
95	2.29	2.30	0.1	18306	18947	3.5	65.6	66.2	0.6
96	2.32	2.35	1.3	18908	19074	0.9	66.0	66.9	0.9
97	2.41	2.38	-1.5	19147	19188	0.2	66.4	66.7	0.3
98	2.27	2.28	0.2	18347	18894	3.0	65.7	67.3	1.6
99	2.37	2.38	0.6	19038	19155	0.6	66.1	68.2	2.1
100	2.33	2.51	7.7	18416	19244	4.5	66.5	67.4	0.9
X-Bar	2.32	2.35	-	18630.8	19025.39	-	66.10	67.08	-
$\sigma$	0.059	0.082	-	327.690	219.819	-	0.327	0.802	-
<b>QE File No.</b>	<b>Time-out for function test or others (hrs)</b>		<b>Issued Date</b>		<b>Reported By</b>		<b>Approved By</b>		
<b>DG14FNL162</b>	<b>11440.00</b>		<b>2017/4/24</b>		<b>NaNa.Wang</b>		<b>Tim.Yi</b>		