



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 120x120x38mm series as the right table					
Representative Test P/N: PFB1224UHEC8X_					
Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D					

Life Expectancy: L10 50,000 hours minimum @ fan rated voltage and the temperature of 40°C

According to the equation for **Weibull distribution**, **MTTF 7×L10 = 350,000 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,

$$t = 1.036 \times \text{MTTF} \times [(B_{r;c})/n]^{0.91}/AF, \text{ and } AF = 2^{(T_s-T_u)/10}$$

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 AF	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 L10 40°C (hours)
70	40	8.00	44	2.303	3,094	5,455	617,134	88,162

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
06-Apr-17	18-Nov-17	☐ In process	☒ In process (exceed requested)	☐ Termination	5,455

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 ()	Acceleration Factor AF	Estimated MTTF (hours)	Estimated L10 (hours)
25	22.63	1,745,518	249,360
30	16.00	1,234,268	176,324
40	8.00	617,134	88,162
50	4.00	308,567	44,081
60	2.00	154,283	22,040
65	1.41	109,095	15,585
70	1.00	77,142	11,020
Test Result		☒ Accept	☐ Reject

- Fan acceptance criteria for the measurements after test :
- Speed can not decrease ≥ 15% below the original measured RPM.
 - Current cannot increase > 15% over original measure current.
 - Noise cannot increase >3dB over the original measured noise.

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH17FNL003	1,601	25-Jan-18	Natthichakorn	Niranam



DC FAN FUNCTION TEST RECORD

FOR CUSTOMIZED 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)
3,094	6-Apr-17	18-Nov-17	44	0	5,455
Representative Test P/N: PFB1224UHEC8X_			Current Test Status	In pro ☐ (exceed ☒ In process (tested))	Terminat ☐
Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D					

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation dB
	Current Spec. TYP (A) 2	Current Spec. TYP (A) 2		Speed Spec. REF (RPM) 5500	Speed Spec. REF (RPM) 5500		Noise at 1 m Max (dB A) 70.5	Noise at 1 m Max (dB A) 70.5	
1	2.07	1.78	-13.8	5580	5525	-1.0	68.1	67.9	-0.2
2	2.18	1.73	-20.6	5564	5564	0.0	68.3	67.4	-0.9
3	2.32	1.79	-22.7	5732	5584	-2.6	68.6	67.5	-1.1
4	2.24	1.73	-22.7	5734	5729	-0.1	68.4	68.3	-0.1
5	2.28	1.77	-22.3	5646	5567	-1.4	68.5	68.2	-0.3
6	2.21	1.89	-14.7	5572	5709	2.5	68.4	67.6	-0.8
7	2.18	1.71	-21.3	5451	5665	3.9	68.6	68.0	-0.6
8	2.17	1.76	-19.0	5438	5618	3.3	68.2	67.7	-0.5
9	2.18	1.81	-16.9	5575	5625	0.9	68.6	68.3	-0.3
10	2.15	1.79	-16.8	5477	5554	1.4	68.4	67.9	-0.5
11	2.25	1.82	-19.1	5623	5697	1.3	68.5	67.4	-1.1
12	2.21	1.86	-15.7	5562	5898	6.0	68.7	68.0	-0.7
13	2.07	1.88	-9.2	5424	5691	4.9	68.5	67.4	-1.1
14	2.28	1.79	-21.5	5607	5545	-1.1	68.8	68.0	-0.8
15	2.22	1.89	-15.0	5562	5641	1.4	68.5	68.2	-0.3
16	2.27	1.78	-21.5	5611	5723	2.0	68.4	67.3	-1.1
17	2.29	1.85	-19.3	5611	5781	3.0	68.6	67.8	-0.8
18	2.29	1.84	-19.7	5607	5638	0.6	68.4	68.4	0.0
19	2.29	1.73	-24.5	5719	5699	-0.3	68.3	68.6	0.3
20	2.24	1.76	-21.6	5580	5589	0.2	68.7	67.5	-1.2
21	2.22	1.76	-21.0	5546	5590	0.8	68.4	67.9	-0.5
22	2.28	1.74	-23.7	5620	5568	-0.9	68.2	67.6	-0.6
23	2.13	1.94	-8.9	5485	5714	4.2	68.3	67.4	-0.9
24	2.17	1.85	-14.9	5470	5589	2.2	68.7	67.9	-0.8
25	2.15	1.82	-15.4	5449	5794	6.3	68.5	67.4	-1.1
26	2.30	1.79	-22.2	5611	5630	0.3	68.7	68.2	-0.5
27	2.31	1.88	-18.5	5610	5677	1.2	68.4	67.3	-1.1
28	2.12	1.92	-9.7	5493	5741	4.5	68.3	67.9	-0.4
29	2.28	1.87	-18.1	5599	5461	-2.5	68.6	68.1	-0.5
30	2.38	1.90	-20.3	5688	5652	-0.6	68.5	68.0	-0.5
31	2.21	1.75	-20.9	5549	5708	2.9	68.6	68.5	-0.1
32	2.22	1.83	-17.4	5462	5584	2.2	68.4	67.8	-0.6
33	2.29	1.73	-24.7	5543	5727	3.3	68.3	67.4	-0.9
34	2.27	1.83	-19.6	5605	5576	-0.5	68.7	68.2	-0.5
35	2.34	1.78	-23.9	5546	5546	0.0	68.4	67.8	-0.6

QE File No.	Time-out for function test or others (hours)	Date of issue	Reported By	Approved By
TH17FNL003	1,601	25-Jan-18	Natthichakorn	Niranam



DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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Representative Test P/N: PFB1224UHEC8X_			Current Test Status		In process (exceed re ed) ☒ Terminat ☐				
Equipment: 1.Oven: F00-5, E24-T060 2. DC Source: GW GPC-3060D									
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test	Final Test	Deviation (%) +15% Max	Initial Test	Final Test	Deviation (%) -15% Max	Initial Test	Final Test	Deviation dB +3 dB Max
	Current Spec. TYP (A) 2	Current Spec. TYP (A) 2		Speed Spec. REF (RPM) 5500	Speed Spec. REF (RPM) 5500		Noise at 1 m Max (dB A) 70.5	Noise at 1 m Max (dB A) 70.5	
36	2.29	1.78	-22.1	5744	5580	-2.9	68.6	67.8	-0.8
37	2.17	1.78	-18.2	5546	5793	4.5	68.6	67.4	-1.2
38	2.32	1.78	-23.4	5595	5602	0.1	68.4	68.0	-0.4
39	2.10	1.77	-16.0	5639	5560	-1.4	68.3	67.7	-0.6
40	2.17	1.76	-18.6	5419	5601	3.4	68.5	68.5	0.0
41	2.24	1.88	-16.0	5576	5697	2.2	68.4	67.7	-0.7
42	2.15	1.71	-20.4	5621	5544	-1.4	68.7	67.4	-1.3
43	2.21	1.70	-23.1	5565	5720	2.8	68.3	68.3	0.0
44	2.28	1.78	-21.8	5621	5652	0.6	68.5	67.5	-1.0
X-bar	2.23	1.80	-	5574	5644	-	68.5	67.8	-
σ	0.07	0.06	-	82	88	-	0.2	0.4	-
QE File No.		Time-out for function test or others (hours)		Date of issue		Reported By		Approved By	
TH17FNL003		1,601		25-Jan-18		Natthichakorn		Niranam	