



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 AFL 120x120x38.0mm series as the right table					
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Representative Test P/N : AFL12AUHE-00

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)
60	40	4.00	56	2.303	6,956	4,360.0	307,150	43,879

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2017/7/7 3:30 PM	2018/6/23 3:33 AM	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	4360.0

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	868,751	124,107
30	8.00	614,300	87,757
40	4.00	307,150	43,879
50	2.00	153,575	21,939
60	1.00	76,787	10,970

- 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
DG17FNL096	1456.50	2018/3/7	LolyWang	Tim.Yi

BGN (dBA) : 16.8

Temp (°C) : 20.3



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)
6,956	2017/7/7 3:30 PM	2018/6/23 3:33 AM	56	0	4360.0
Representative Test P/N : AFL12AUHE-00			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 Power Spec. (W) 4.3 Typ.	Final Test Power Spec. (W) 4.3 Typ.	Deviation (%)	Initial Test Speed Spec. (RPM) 32200	Final Test Speed Spec. (RPM) 32200	Deviation (%)	Initial Test Noise Spec. (dB A) 44.0 Typ.	Final Test Noise Spec. (dB A) 44.0 Typ.	Deviation 3 dBMax.
1	4.30	4.47	4.0	3240	3312	2.2	44.6	44.2	-0.4
2	4.20	4.23	0.7	3222	3238	0.5	43.8	44.1	0.3
3	4.30	4.33	0.7	3199	3223	0.8	44.3	44.0	-0.3
4	4.10	4.41	7.6	3251	3253	0.1	45.1	44.7	-0.4
5	4.30	4.49	4.4	3206	3234	0.9	44.7	45.4	0.7
6	4.40	4.49	2.0	3245	3242	-0.1	45.0	44.7	-0.3
7	4.30	4.37	1.6	3245	3220	-0.8	44.3	44.0	-0.3
8	4.30	4.45	3.5	3255	3231	-0.7	44.6	44.0	-0.6
9	4.10	4.38	6.8	3235	3265	0.9	44.1	44.7	0.6
10	4.30	4.34	0.9	3269	3250	-0.6	44.7	44.5	-0.2
11	4.30	4.37	1.6	3255	3254	0.0	45.1	44.6	-0.5
12	4.30	4.34	0.9	3257	3248	-0.3	45.5	44.6	-0.9
13	4.40	4.42	0.5	3247	3212	-1.1	44.6	44.5	-0.1
14	4.20	4.28	1.9	3217	3241	0.7	45.4	44.5	-0.9
15	4.50	4.42	-1.8	3260	3256	-0.1	45.4	44.7	-0.7
16	4.30	4.54	5.6	3206	3237	1.0	45.1	44.5	-0.6
17	4.30	4.47	4.0	3245	3305	1.8	44.6	44.8	0.2
18	4.30	4.45	3.5	3258	3252	-0.2	45.0	44.6	-0.4
19	4.20	4.43	5.5	3236	3246	0.3	44.8	43.9	-0.9
20	4.30	4.43	3.0	3320	3243	-2.3	44.8	44.6	-0.2
21	4.20	4.30	2.4	3255	3246	-0.3	44.8	44.6	-0.2
22	4.50	4.47	-0.7	3273	3277	0.1	44.3	44.0	-0.3
23	4.30	4.37	1.6	3224	3215	-0.3	44.9	44.3	-0.6
24	4.20	4.46	6.2	3232	3239	0.2	44.6	44.0	-0.6
25	4.20	4.36	3.8	3246	3219	-0.8	45.5	45.0	-0.5
26	4.20	4.37	4.0	3231	3266	1.1	44.2	43.7	-0.5
27	4.20	4.22	0.5	3225	3235	0.3	44.8	44.1	-0.7
28	4.30	4.46	3.7	3215	3267	1.6	45.7	45.0	-0.7
29	4.40	4.29	-2.5	3255	3257	0.1	45.2	44.5	-0.7
30	4.30	4.57	6.3	3247	3230	-0.5	44.4	44.5	0.1
31	4.40	4.50	2.3	3231	3239	0.2	45.0	44.6	-0.4
32	4.40	4.36	-0.9	3200	3250	1.6	44.6	44.0	-0.6

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG17FNL096	1456.50	2018/3/7	LolyWang	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)	
6,956		2017/7/7 3:30 PM		2018/6/23 3:33 AM		56	0	4360.0	
Representative Test P/N : AFL12AUHE-00				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 Power Spec. (W) 4.3 Typ.	Final Test Power Spec. (W) 4.3 Typ.	Deviation (%)	Initial Test Speed Spec. (RPM) 32200	Final Test Speed Spec. (RPM) 32200	Deviation (%)	Initial Test Noise Spec. (dB A) 44.0 Typ.	Final Test Noise Spec. (dB A) 44.0 Typ.	Deviation 3 dBMax.
33	4.40	4.48	1.8	3241	3218	-0.7	44.6	44.1	-0.5
34	4.40	4.36	-0.9	3224	3245	0.7	45.2	44.4	-0.8
35	4.40	4.55	3.4	3251	3242	-0.3	44.7	44.0	-0.7
36	4.40	4.50	2.3	3240	3240	0.0	44.4	44.1	-0.3
37	4.30	4.19	-2.6	3230	3241	0.3	44.8	43.9	-0.9
38	4.20	4.34	3.3	3186	3281	3.0	44.5	44.2	-0.3
39	4.30	4.33	0.7	3238	3255	0.5	44.8	44.3	-0.5
40	4.40	4.30	-2.3	3225	3224	0.0	44.5	44.1	-0.4
41	4.20	4.44	5.7	3236	3236	0.0	44.3	43.9	-0.4
42	4.30	4.39	2.1	3230	3239	0.3	45.5	44.8	-0.7
43	4.30	4.56	6.0	3250	3284	1.0	44.2	43.8	-0.4
44	4.50	4.37	-2.9	3249	3249	0.0	44.3	44.0	-0.3
45	4.40	4.47	1.6	3245	3245	0.0	44.8	44.2	-0.6
46	4.60	4.49	-2.4	3238	3241	0.1	44.4	44.0	-0.4
47	4.40	4.10	-6.8	3228	3232	0.1	45.4	44.7	-0.7
48	4.10	4.48	9.3	3241	3247	0.2	45.5	44.5	-1.0
49	4.30	4.35	1.2	3236	3226	-0.3	44.5	43.7	-0.8
50	4.30	4.35	1.2	3229	3244	0.5	44.6	44.1	-0.5
51	4.10	4.49	9.5	3204	3227	0.7	44.5	43.8	-0.7
52	4.20	4.45	6.0	3232	3210	-0.7	45.1	44.3	-0.8
53	4.40	4.55	3.4	3247	3251	0.1	45.0	44.4	-0.6
54	4.40	4.45	1.1	3219	3202	-0.5	44.6	44.6	0.0
55	4.50	4.35	-3.3	3222	3261	1.2	45.4	45.1	-0.3
56	4.50	4.54	0.9	3251	3245	-0.2	45.2	44.5	-0.7
X-Bar	4.31	4.41	-	3237.39	3244.41	-	44.79	44.35	-
σ	0.11	0.10	-	21.31	18.65	-	0.43	0.38	-
QE File No.		Time-out for function test or others (hrs)		Issued Date		Reported By		Approved By	
DG17FNL096		1456.50		2018/3/7		LolyWang		Tim.Yi	