



EC FAN CUSTOMIZED 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 EC FAN280x280x105mm series as the right table					
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Representative Test P/N : AFL28A2LU-BR

© **L₁₀ Expectancy: 60,000 hours minimum @ fan rated voltage and the temperature of 40°C**

According to the equation for **Weibull distribution**, **MTTF ≅ 1.89×L10 = 113,400 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,

$$t = 1.119 \times \text{MTTF} \times [(B_{r,c}) \div n]^{0.33} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

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) <small>(Actual Test Temperature)</small>	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	2.25	10	2.303	50,829	8,600.0	28,073	14,854

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2014/6/18 2:00 AM	2022/12/28 1:00 PM	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	8600.0

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	4.13	51,574	27,288
30	3.38	42,110	22,280
40	2.25	28,073	14,854
50	1.50	18,716	9,902
60	1.00	12,477	6,602

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 Method according to IPC-9591.

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
DG14FNL046	23942.00	2018/3/5	Percy.Su	Tim Yi



EC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)				
50,829	2014/6/18 2:00 AM	2020/4/4 11:00 PM	10	0	8600.0				
Representative Test P/N : AFL28A2LU-BR		Current Test Status	<input checked="" type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination				
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
	Power Spec. Max_Load 230VAC/50/60HZ (W) 33 Max.	Power Spec. Max_Load 230VAC/50/60HZ (W) 33 Max.		Speed Spec. 230VAC/50/60HZ (RPM) 1600+-10%	Speed Spec. 230VAC/50/60HZ (RPM) 1600+-10%		Noise Spec. Free_Air 230VAC/50/60HZ (dB A) 64 Max	Noise Spec. Free_Air 230VAC/50/60HZ (dB A) 64 Max	
1	27.89	24.55	-12.0	1615	1599	-1.0	58.2	58.7	0.5
2	28.24	19.33	-31.6	1619	1526	-5.7	57.3	55.2	-2.1
3	27.48	24.72	-10.0	1607	1598	-0.6	57.5	58.9	1.4
4	29.06	25.48	-12.3	1610	1606	-0.2	57.7	58.3	0.6
5	28.00	24.37	-13.0	1616	1600	-1.0	57.8	58.7	0.9
6	27.94	23.96	-14.2	1606	1584	-1.4	57.9	58.7	0.8
7	28.18	24.55	-12.9	1619	1588	-1.9	57.6	58.3	0.7
8	28.41	24.43	-14.0	1617	1598	-1.2	58.1	58.4	0.3
9	26.83	24.72	-7.9	1599	1595	-0.3	57.6	58.9	1.3
10	28.06	24.55	-12.5	1616	1588	-1.7	57.9	58.2	0.3
X-Bar	28.009	24.066	-	1612.4	1588.2	-	57.76	58.23	
σ	0.581	1.707	-	6.637	22.846	-	0.276	1.094	
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