



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 AUB 92x92x25.0mm series as the right table	AUB0912HJ-00XNT
Representative Test P/N : AUB0912HJ-00ADP	
Equipment: 1.Oven: E24-T0161	

◎ **L₁₀ Expectancy: 20,000 hours minimum @ fan rated voltage and the temperature of 60°C**
 According to the equation for **Weibull distribution**, **MTTF ≅ 7×L10 = 140,000 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 60 °C (hours)	Verified L ₁₀ 60 °C (hours)
90	60	8.00	56	2.303	994	1,360.0	191,616	27,374

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2015/11/23 10:30 AM	2016/1/8 3:09 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	1360.0

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	90.51	2,167,893	309,699
30	64.00	1,532,931	218,990
40	32.00	766,466	109,495
50	16.00	383,233	54,748
60	8.00	191,616	27,374
70	4.00	95,808	13,687
80	2.00	47,904	6,843
90	1.00	23,952	3,422

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

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG15FNL157	115.00	2016/1/29	Loly.Wang	Tim.Yi

BGN (dBA) : 15.9

Temp (°C) : 21.0



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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)				
994	2015/11/23 10:30 AM	2016/1/8 3:09 PM	56	0	1360.0				
Representative Test P/N : AUB0912HJ-00ADP			Current Test Status		<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination		
Equipment: 1.Oven: E24-T0161									
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test Current Spec. (mA) 500 Max.	Final Test Current Spec. (mA) 500 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 4140-5060	Final Test Speed Spec. (RPM) 4140-5060	Deviation (%)	Initial Test Noise Spec. (dB A) 49.0 Max	Final Test Noise Spec. (dB A) 49.0 Max	Deviation 3 dBMax.
1	299	334	11.7	4650	4571	-1.7	43.6	43.4	-0.2
2	337	336	-0.3	4576	4419	-3.4	43.4	43.5	0.1
3	307	349	13.7	4526	4461	-1.4	43.9	43.7	-0.2
4	338	342	1.2	4617	4622	0.1	43.4	43.6	0.2
5	306	339	10.8	4576	4610	0.7	43.8	43.3	-0.5
6	338	368	8.9	4566	4479	-1.9	43.5	43.6	0.1
7	304	338	11.2	4557	4574	0.4	44.4	43.2	-1.2
8	348	372	6.9	4602	4529	-1.6	43.6	43.4	-0.2
9	282	321	13.8	4757	4670	-1.8	44.0	43.6	-0.4
10	335	374	11.6	4535	4424	-2.4	44.2	44.0	-0.2
11	303	340	12.2	4586	4605	0.4	43.9	44.2	0.3
12	313	321	2.6	4715	4600	-2.4	44.4	43.7	-0.7
13	296	327	10.5	4632	4575	-1.2	43.5	43.9	0.4
14	334	354	6.0	4781	4512	-5.6	44.1	43.2	-0.9
15	303	307	1.3	4541	4510	-0.7	43.7	43.4	-0.3
16	339	351	3.5	4589	4625	0.8	43.9	43.6	-0.3
17	302	319	5.6	4551	4618	1.5	44.3	43.9	-0.4
18	336	345	2.7	4577	4517	-1.3	43.4	44.1	0.7
19	336	330	-1.8	4583	4537	-1.0	43.6	43.2	-0.4
20	309	340	10.0	4573	4531	-0.9	44.0	43.4	-0.6
21	338	381	12.7	4569	4289	-6.1	43.8	43.6	-0.2
22	308	328	6.5	4616	4602	-0.3	44.3	43.8	-0.5
23	289	303	4.8	4691	4580	-2.4	43.4	44.0	0.6
24	338	305	-9.8	4615	4579	-0.8	43.6	43.3	-0.3
25	305	333	9.2	4599	4634	0.8	44.1	44.2	0.1
26	328	306	-6.7	4580	4451	-2.8	43.7	43.5	-0.2
27	313	322	2.9	4617	4679	1.3	43.9	43.7	-0.2
28	333	305	-8.4	4574	4510	-1.4	44.3	43.9	-0.4
29	309	338	9.4	4773	4582	-4.0	43.7	44.2	0.5
30	305	341	11.8	4598	4621	0.5	44.0	43.3	-0.7
31	307	305	-0.7	4604	4527	-1.7	44.2	43.8	-0.4
32	335	329	-1.8	4589	4598	0.2	43.5	44.0	0.5
QE File No.	Time-out for function test or others (hours)		Issued Date		Reported By		Approved By		
DG15FNL157	115.00		2016/1/29		Loly.Wang		Tim.Yi		



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33	297	312	5.1	4617	4610	-0.2	44.3	44.1	-0.2
34	329	363	10.3	4582	4364	-4.8	43.4	43.9	0.5
35	305	316	3.6	4602	4516	-1.9	43.7	43.3	-0.4
36	333	340	2.1	4632	4518	-2.5	44.1	43.5	-0.6
37	339	317	-6.5	4610	4393	-4.7	43.8	43.2	-0.6
38	297	313	5.4	4613	4436	-3.8	44.3	44.1	-0.2
39	300	341	13.7	4574	4605	0.7	43.4	43.6	0.2
40	337	328	-2.7	4542	4654	2.5	44.0	43.8	-0.2
41	302	318	5.3	4587	4588	0.0	43.6	43.3	-0.3
42	338	330	-2.4	4557	4604	1.0	43.8	43.5	-0.3
43	306	341	11.4	4577	4564	-0.3	44.2	43.7	-0.5
44	332	327	-1.5	4589	4564	-0.5	44.4	43.8	-0.6
45	301	312	3.7	4574	4566	-0.2	43.5	44.0	0.5
46	335	336	0.3	4570	4637	1.5	44.1	44.2	0.1
47	307	322	4.9	4627	4644	0.4	43.7	43.3	-0.4
48	335	316	-5.7	4589	4591	0.0	44.2	43.5	-0.7
49	307	327	6.5	4543	4621	1.7	43.9	43.7	-0.2
50	291	315	8.2	4628	4517	-2.4	44.4	43.9	-0.5
51	338	337	-0.3	4554	4539	-0.3	43.5	44.1	0.6
52	278	301	8.3	4765	4563	-4.2	44.0	43.2	-0.8
53	343	345	0.6	4518	4623	2.3	43.8	43.4	-0.4
54	267	302	13.1	4862	4551	-6.4	44.2	43.6	-0.6
55	334	327	-2.1	4574	4667	2.0	44.4	43.8	-0.6
56	307	303	-1.3	4627	4605	-0.5	43.8	44.0	0.2
X-Bar	316.63	330.21	-	4607.64	4556.80	-	43.89	43.67	-
σ	19.32	19.18	-	68.48	80.04	-	0.32	0.30	-
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DG15FNL157	115.00		2016/1/29		Loly.Wang		Tim.Yi		