



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 ASB35x35x15mm series as the right table

Representative Test P/N : ASB03512HB

Equipment: 1.Oven: E24-W1851

On/Off Cycles: Every 500 hours

☉ **L₁₀ Expectancy:** **30,000** hours minimum @ fan rated voltage and the temperature of 40°C

According to the equation for **Weibull distribution**, **MTTF \cong 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,

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

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%), and

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)
85	40	22.63	56	2.303	527	4,360.0	1,737,502	248,215

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2010/7/3 10:00 AM	2010/8/5 12:57 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" 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	64.00	4,914,398	702,057
30	45.25	3,475,004	496,429
40	22.63	1,737,502	248,215
50	11.31	868,751	124,107
60	5.66	434,376	62,054
70	2.83	217,188	31,027
80	1.41	108,594	15,513
85	1.00	76,787	10,970

Fan permission criteria for the measurement after test :

1. Speed can not drop of \geq 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
 Accept
 Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQEFML-2010118VT90	268.00	2011/1/12 6:00 AM	YUHONG.SUN	TRACY.GONG



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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applies to ASB35x35x15mm series as the right table

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
527	2010/7/3 10:00 AM	2010/8/5 12:57 PM	56	0	4360.0
Representative Test P/N : ASB03512HB			Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination

Equipment: 1.Oven: E24-W1851 On/Off Cycles: Every 500 hours

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
	Current Spec. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Check. (dB A)	
	130MAX.	130MAX.	15% MAX.	11000REF	11000REF	15% MAX.	41.5MAX.	41.5MAX.	3 dB MAX.
1	116	118	1.7	10509	10856	3.3	34.1	33.9	-0.2
2	112	113	0.9	10698	10919	2.1	34.4	34.0	-0.4
3	112	111	-0.9	10841	10765	-0.7	33.9	34.1	0.2
4	119	119	0.0	10685	10929	2.3	33.7	33.8	0.1
5	113	114	0.9	10625	10857	2.2	35.1	33.6	-1.5
6	113	113	0.0	10907	10854	-0.5	33.5	34.2	0.7
7	126	117	-7.1	10764	10936	1.6	34.0	33.8	-0.2
8	117	114	-2.6	10597	10948	3.3	33.9	34.0	0.1
9	115	118	2.6	10824	10936	1.0	34.1	33.5	-0.6
10	119	109	-8.4	10673	10927	2.4	34.2	33.6	-0.6
11	114	113	-0.9	11004	10949	-0.5	34.6	34.2	-0.4
12	114	117	2.6	10815	10962	1.4	33.8	33.6	-0.2
13	113	113	0.0	10940	10946	0.1	34.5	33.4	-1.1
14	114	117	2.6	10999	10964	-0.3	34.2	33.5	-0.7
15	115	119	3.5	10616	10950	3.1	34.1	34.0	-0.1
16	114	117	2.6	10456	10940	4.6	33.5	33.9	0.4
17	112	118	5.4	10842	10948	1.0	34.4	34.1	-0.3
18	115	111	-3.5	10669	10648	-0.2	34.0	33.5	-0.5
19	113	115	1.8	10939	10907	-0.3	34.5	34.0	-0.5
20	117	117	0.0	10619	10966	3.3	34.0	33.8	-0.2
21	114	115	0.9	10875	10931	0.5	33.6	33.6	0.0
22	114	119	4.4	10781	10935	1.4	34.1	33.5	-0.6
23	114	114	0.0	10902	10648	-2.3	33.7	34.0	0.3
24	114	119	4.4	10830	10977	1.4	34.3	33.5	-0.8
25	114	114	0.0	10797	10966	1.6	34.1	34.1	0.0
26	117	116	-0.9	10801	10895	0.9	34.4	33.9	-0.5
27	114	115	0.9	10837	10959	1.1	33.9	34.2	0.3
28	115	118	2.6	10806	10684	-1.1	34.2	33.5	-0.7
29	116	112	-3.4	10697	10952	2.4	34.1	34.0	-0.1
30	115	118	2.6	10788	10923	1.3	33.7	33.8	0.1



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
527	2010/7/3 10:00 AM	2010/8/5 12:57 PM	56	0	4360.0

Representative Test P/N : ASB03512HB	Current Test Status	<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-W1851	On/Off Cycles: Every 500 hours
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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
	Current Spec. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Check. (dB A)	
	130MAX.	130MAX.	15% MAX.	11000REF	11000REF	15% MAX.	41.5MAX.	41.5MAX.	3 dB MAX.
31	111	113	1.8	10794	10921	1.2	34.4	34.2	-0.2
32	115	115	0.0	10694	10854	1.5	33.8	33.9	0.1
33	115	118	2.6	10801	10940	1.3	34.2	33.6	-0.6
34	117	112	-4.3	10842	10922	0.7	34.0	34.0	0.0
35	114	116	1.8	10577	10926	3.3	34.0	33.5	-0.5
36	117	115	-1.7	10731	10856	1.2	33.7	34.2	0.5
37	111	114	2.7	10922	10925	0.0	34.1	33.7	-0.4
38	110	111	0.9	10548	10724	1.7	34.0	33.2	-0.8
39	116	118	1.7	10764	10954	1.8	34.4	34.2	-0.2
40	113	112	-0.9	10465	10687	2.1	33.8	33.9	0.1
41	115	116	0.9	10695	10942	2.3	34.0	33.1	-0.9
42	113	113	0.0	11034	10908	-1.1	34.1	33.9	-0.2
43	113	110	-2.7	10966	10854	-1.0	34.5	33.5	-1.0
44	116	113	-2.6	11006	10971	-0.3	34.0	33.9	-0.1
45	110	112	1.8	10840	10972	1.2	33.7	34.0	0.3
46	117	119	1.7	10757	10930	1.6	33.9	34.1	0.2
47	112	115	2.7	10930	10950	0.2	34.1	33.9	-0.2
48	113	119	5.3	10834	10977	1.3	34.2	33.5	-0.7
49	114	117	2.6	10999	10996	0.0	34.3	33.7	-0.6
50	116	111	-4.3	10914	10899	-0.1	33.8	34.0	0.2
51	113	112	-0.9	10647	10762	1.1	33.9	33.8	-0.1
52	116	116	0.0	10665	10898	2.2	34.1	33.5	-0.6
53	115	116	0.9	10640	10929	2.7	34.3	34.0	-0.3
54	114	119	4.4	10678	10954	2.6	34.2	33.6	-0.6
55	113	118	4.4	10950	10754	-1.8	34.0	34.1	0.1
56	112	112	0.0	10899	10907	0.1	33.8	34.0	0.2
X-Bar	114.48	115.09	-	10780.86	10898.02	-	34.07	33.81	-
σ	2.515	2.778	-	143.222	86.434	-	0.296	0.273	-

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQEFML-2010118VT90	268.00	2011/1/12 6:00 AM	YUHONG.SUN	TRACY.GONG