



# 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 BSB 15X3X15mm series as the right table	BSBX103HK-00C7E			
	BSB01503HA3-00CEB			
	BSB01503HA3-00CGE			
<b>Representative Test P/N :BSBX103HK-00C32 (I:4023108100 ; F:4023108100 )</b>				
<b>Equipment: 1.Oven: E24-W520</b>				

◎ **L<sub>10</sub> 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<sub>r;c</sub>) 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 Ts (°C) ( Actual Test Temperature )	Unstress Temperature Tu (°C)	Acceleration Factor AF	Quantity of Test Devices n (pcs)	Poisson Distribution Factor Br;c	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 °C (hours)	Verified L <sub>10</sub> 40 °C (hours)
60	40	4.00	56	2.303	2,981	2,981.0	210,003	30,000

### Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2016/10/18 10:00 AM	2017/2/22 6:57 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	2981.0

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 <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	11.31	593,979	84,854
30	8.00	420,006	60,001
40	4.00	210,003	30,000
50	2.00	105,002	15,000
60	1.00	52,501	7,500
70	0.50	26,250	3,750
80	0.25	13,125	1,875

Fan permission criteria for the measurement after test :

- Speed can not drop of  $\geq$  15% below the original measured rpm.
- Current cannot increase > 15% of original measure current.
- 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-2016230VD	76.00	2017/2/22 7:00 PM	KAI.GONG	TAOE.LIANG

BGN(dBA) : 18.0

Temp(°C) : 22.3

P(cmHg) : 76.4



## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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<b>BSBX103HK-00C7E</b>			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
2,981	2016/10/18 10:00 AM	2017/2/22 6:57 PM	56	0	<b>2981.0</b>
Representative Test P/N :BSBX103HK-00C32			<b>Current Test Status</b>		<input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination

Equipment: 1.Oven: E24-W520

### 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)	
	<b>100MAX.</b>	<b>100MAX.</b>	<b>15% MAX.</b>	<b>13800REF</b>	<b>13800REF</b>	<b>15% MAX.</b>	<b>36.0MAX.</b>	<b>36.0MAX.</b>	<b>3 dB MAX.</b>
1	50	47	-6.0	13145	13656	3.9	24.8	23.0	-1.8
2	49	50	2.0	13699	14242	4.0	24.6	24.3	-0.3
3	48	53	10.4	14232	14088	-1.0	24.2	23.8	-0.4
4	47	52	10.6	14280	13826	-3.2	23.7	24.2	0.5
5	50	49	-2.0	13782	14640	6.2	24.6	23.5	-1.1
6	47	52	10.6	13576	14852	9.4	24.5	23.6	-0.9
7	47	53	12.8	14411	14554	1.0	24.4	24.1	-0.3
8	49	46	-6.1	12736	13751	8.0	24.7	23.3	-1.4
9	48	54	12.5	13633	14531	6.6	23.6	23.8	0.2
10	48	50	4.2	13954	14198	1.7	23.5	24.0	0.5
11	50	49	-2.0	12947	14750	13.9	23.9	23.8	-0.1
12	48	50	4.2	14209	13575	-4.5	24.4	23.7	-0.7
13	48	51	6.3	13967	13022	-6.8	23.8	23.8	0.0
14	50	47	-6.0	12817	13251	3.4	23.5	23.1	-0.4
15	49	52	6.1	13254	13744	3.7	24.8	24.0	-0.8
16	48	51	6.3	13854	13338	-3.7	24.7	24.1	-0.6
17	48	50	4.2	14073	13512	-4.0	24.5	23.3	-1.2
18	49	50	2.0	13986	13543	-3.2	23.7	23.2	-0.5
19	49	52	6.1	13087	13222	1.0	24.8	23.6	-1.2
20	49	48	-2.0	13313	13718	3.0	24.4	23.7	-0.7
21	48	49	2.1	13694	14592	6.6	23.9	24.1	0.2
22	48	51	6.3	14066	14136	0.5	24.4	23.6	-0.8
23	50	53	6.0	13768	12965	-5.8	24.5	23.2	-1.3
24	49	52	6.1	13858	13321	-3.9	23.7	22.7	-1.0
25	50	49	-2.0	13496	13871	2.8	24.4	24.2	-0.2
26	46	49	6.5	14384	12886	-10.4	24.5	24.1	-0.4
27	49	51	4.1	13889	13272	-4.4	23.5	23.7	0.2
28	51	50	-2.0	13250	13359	0.8	24.9	23.1	-1.8
29	49	50	2.0	13879	13990	0.8	24.0	23.6	-0.4
30	48	51	6.3	13961	14064	0.7	24.1	23.1	-1.0



## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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BSBX103HK-00C7E				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
2,981	2016/10/18 10:00 AM	2017/2/22 6:57 PM	56	0	<b>2981.0</b>

Representative Test P/N :BSBX103HK-00C32	<b>Current Test Status</b>	<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-W520

### 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)	
	<b>100MAX.</b>	<b>100MAX.</b>	<b>15% MAX.</b>	<b>13800REF</b>	<b>13800REF</b>	<b>15% MAX.</b>	<b>36.0MAX.</b>	<b>36.0MAX.</b>	<b>3 dB MAX.</b>
31	50	51	2.0	13278	14427	8.7	23.7	23.9	0.2
32	50	48	-4.0	12889	13486	4.6	24.6	23.7	-0.9
33	51	47	-7.8	12554	14201	13.1	23.5	22.5	-1.0
34	49	53	8.2	13706	13547	-1.2	24.7	23.7	-1.0
35	50	48	-4.0	12679	13155	3.8	24.3	24.0	-0.3
36	49	51	4.1	13609	14470	6.3	23.9	23.8	-0.1
37	49	50	2.0	13727	13600	-0.9	24.3	24.0	-0.3
38	50	53	6.0	13242	13844	4.5	23.4	24.0	0.6
39	48	52	8.3	13489	13361	-0.9	24.3	23.1	-1.2
40	50	51	2.0	14024	13467	-4.0	23.9	23.6	-0.3
41	52	51	-1.9	13986	13716	-1.9	24.1	24.4	0.3
42	50	52	4.0	13014	12988	-0.2	24.3	23.7	-0.6
43	49	49	0.0	13151	14290	8.7	24.9	23.4	-1.5
44	48	49	2.1	13974	14102	0.9	23.6	22.7	-0.9
45	47	50	6.4	14193	14063	-0.9	24.6	22.9	-1.7
46	52	53	1.9	14286	14390	0.7	24.5	22.8	-1.7
47	49	53	8.2	13600	13236	-2.7	24.8	24.4	-0.4
48	49	48	-2.0	13736	13669	-0.5	24.8	24.2	-0.6
49	49	49	0.0	14958	13457	-10.0	23.4	24.2	0.8
50	51	51	0.0	13357	13595	1.8	24.7	23.8	-0.9
51	51	48	-5.9	13858	13467	-2.8	23.7	23.9	0.2
52	49	50	2.0	14479	13794	-4.7	24.0	24.9	0.9
53	53	48	-9.4	13167	13923	5.7	23.7	23.6	-0.1
54	57	49	-14.0	14843	13938	-6.1	24.9	23.8	-1.1
55	52	52	0.0	13812	13702	-0.8	23.9	24.0	0.1
56	51	52	2.0	13526	13875	2.6	24.7	23.9	-0.8
X-Bar	49.36	50.34	-	13684.59	13789.86	-	24.22	23.68	-
σ	1.752	1.881	-	524.829	486.541	-	0.467	0.485	-

<b>QE File No.</b>	<b>Time-out for function test or others (hours)</b>	<b>Issued Date</b>	<b>Reported By</b>	<b>Approved By</b>
WJQEFML-2016230VD	76.00	2017/2/22 7:00 PM	KALGONG	TAOE.LIANG