



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 20X20X5mm series as the right table	BSB0205HP-00EFG			
Representative Test P/N :BSB0205HP-00EBJ		(I:4023108100; F:4023108100:SLEEVE:3430411800)		
Equipment: 1.Oven: E24-W520				

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

According to the equation for **Weibull distribution**, **MTTF ≈ 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 MTF 40 °C (hours)	Verified L ₁₀ 40 °C (hours)
70	40	8.00	56	2.303	1,490	1,491.0	210,074	30,011

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2018/7/16 10:00 AM	2018/9/17 11:28 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	1491.0

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 MTF are greater than the warrant. (MTF : means Mean Time To Failures, it should be used in a non-repairable system setting. Now we show the MTF 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 MTF Estimation (°C)	Acceleration Factor A _F	Estimated MTF (hours)	Estimated L ₁₀ (hours)
25	22.63	594,178	84,883
30	16.00	420,147	60,021
40	8.00	210,074	30,011
50	4.00	105,037	15,005
60	2.00	52,518	7,503
70	1.00	26,259	3,751

Fan permission criteria for the measurement after test :

- Speed can not drop of ≥ 15% below the original measured rpm.
- Current cannot increase > 15% of original measure current.
- 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
WJQEFML-2018152VD	23.00	2018/9/17 12:00 PM	XIULING.QI	VIVIEN.ZHAO



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 20X20X5mm series as the right table				BSB0205HP-00EFG					
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)				
1,490	2018/7/16 10:00 AM	2018/9/17 11:28 AM	56	0	1491.0				
Representative Test P/N :BSB0205HP-00EBJ			Current Test Status		<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)	
	150MAX.	150MAX.	15% MAX.	12000REF	12000REF	15% MAX.	44.9MAX.	44.9MAX.	3 dB MAX.
1	90	88	-2.4	11230	11320	0.9	31.1	31.9	0.8
2	85	89	5.2	11305	11221	-0.8	32.1	31.3	-0.8
3	92	88	-4.8	11299	11321	0.2	31.6	31.7	0.1
4	87	89	2.5	11304	11232	-0.7	33.2	31.4	-1.8
5	83	87	5.3	11300	11137	-1.6	31.5	32.0	0.5
6	87	88	1.3	11301	11268	-0.3	32.1	31.7	-0.4
7	86	88	2.6	11295	11321	0.3	31.5	31.7	0.2
8	86	87	1.3	11299	11243	-0.5	34.5	32.9	-1.6
9	88	89	1.3	11304	11253	-0.5	32.8	32.3	-0.5
11	95	89	-6.9	11275	11254	-0.2	32.3	31.4	-0.9
11	89	88	-1.2	11295	11203	-0.9	31.1	31.0	-0.1
12	85	87	2.6	11297	11393	0.9	31.5	32.4	0.9
13	89	90	1.2	11321	11372	0.5	31.6	31.9	0.3
14	87	87	0.0	11291	11182	-1.1	30.5	32.2	1.7
15	91	86	-6.0	11311	11231	-0.8	32.8	32.2	-0.6
16	87	88	1.3	11295	11159	-1.3	31.4	31.7	0.3
17	88	88	0.0	11296	11226	-0.7	33.6	32.0	-1.6
18	90	89	-1.2	11299	11230	-0.7	32.3	32.6	0.3
19	86	88	2.6	11243	11230	-0.1	32.2	31.7	-0.5
20	87	88	1.3	11299	11228	-0.7	32.1	31.6	-0.5
21	87	87	0.0	11306	11231	-0.7	30.3	32.3	2.0
22	89	90	1.2	11293	11301	0.1	32.1	32.9	0.8
23	90	88	-2.4	11299	11232	-0.7	31.9	32.0	0.1
24	90	87	-3.7	11293	11231	-0.6	32.1	32.2	0.1
25	93	89	-4.7	11321	11302	-0.2	32.1	32.7	0.6
26	82	87	6.7	11299	11259	-0.4	32.2	32.5	0.3
27	90	89	-1.2	11296	11222	-0.7	31.5	32.1	0.6
28	90	86	-4.9	11234	11241	0.1	31.4	32.4	1.0
29	91	86	-6.0	11321	11232	-0.9	31.9	33.1	1.2
30	87	88	1.3	11307	11185	-1.2	32.4	32.0	-0.4



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 20X20X5mm series as the right table				BSB0205HP-00EFG					
Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)				
1,490	2018/7/16 10:00 AM	2018/9/17 11:28 AM	56	0	1491.0				
Representative Test P/N :BSB0205HP-00EBJ			Current Test Status		<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)	
	150MAX.	150MAX.	15% MAX.	12000REF	12000REF	15% MAX.	44.9MAX.	44.9MAX.	3 dB MAX.
31	82	87	6.7	11241	11132	-1.1	31.5	32.0	0.5
32	83	86	4.0	11300	11234	-0.6	32.3	31.8	-0.5
33	87	88	1.3	11298	11232	-0.6	32.4	31.3	-1.1
34	91	87	-4.8	11296	11247	-0.5	31.8	32.2	0.4
35	89	87	-2.5	11300	11235	-0.6	32.8	32.4	-0.4
36	88	88	0.0	11293	11115	-1.7	32.1	32.3	0.2
37	93	88	-5.9	11294	11232	-0.6	31.3	32.0	0.7
38	83	88	6.6	11294	11193	-1.0	32.5	32.6	0.1
39	89	86	-3.7	11292	11235	-0.6	32.1	30.3	-1.8
40	89	88	-1.2	11303	11382	0.8	32.1	31.9	-0.2
41	85	84	-1.3	11234	11231	0.0	31.5	30.9	-0.6
42	94	86	-9.4	11298	11325	0.3	31.4	32.4	1.0
43	93	87	-7.1	11298	11342	0.4	32.4	32.0	-0.4
44	92	87	-6.0	11321	11211	-1.1	31.7	32.9	1.2
45	86	88	2.6	11295	11329	0.3	32.1	31.7	-0.4
46	87	88	1.3	11299	11266	-0.3	32.1	31.2	-0.9
47	89	88	-1.2	11231	11324	0.9	32.4	31.5	-0.9
48	87	87	0.0	11241	11235	-0.1	31.2	32.0	0.8
49	91	88	-3.6	11231	11235	0.0	32.3	31.6	-0.7
50	87	88	1.3	11300	11299	0.0	32.1	32.0	-0.1
51	89	87	-2.5	11298	11302	0.0	31.2	31.2	0.0
52	87	86	-1.3	11321	11301	-0.2	32.1	32.0	-0.1
53	90	87	-3.7	11295	11365	0.7	31.9	31.1	-0.8
54	86	89	3.8	11300	11235	-0.6	32.1	31.7	-0.4
55	84	89	6.5	11299	11213	-0.8	32.1	31.8	-0.3
56	89	88	-1.2	11303	11232	-0.7	31.6	31.5	-0.1
X-Bar	88.16	87.64	-	11291.13	11252.54	-	31.98	31.93	-
σ	2.971	1.119	-	24.352	60.136	-	0.679	0.545	-
QE File No.		Time-out for function test or others (hours)		Issued Date		Reported By		Approved By	
WJQEFML-2018152VD		23.00		2018/9/17 12:00 PM		XIULING.QI		VIVIEN.ZHAO	