

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 BSB35*35*5.5mm series as the right table					
Representative Test P/N : BSB0305HP-00 (I:4023120800;F:4023119500;SLEEVE:3430438900)					
Equipment: 1.Oven: E24-W520			On/Off Cycles: Every 500 hours		

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

According to the equation for **Weibull distribution**, $MTTF \cong 7 \times L_{10} = 210,000$ 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,

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

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 (℃) (Actual Test Temperature)	Unstress Temperature T _u (℃)	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 ℃ (hours)	Verified L ₁₀ 40 ℃ (hours)
70	40	8.00	56	2.303	1,490	1,490.0	209,933	29,990

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2023/5/31 10:00 AM	2023/8/2 10:28 AM	☐ In process	☒ In process (exceed requested)	☐ Termination	1490.0

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 (℃)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	593,779	84,826
30	16.00	419,865	59,981
40	8.00	209,933	29,990
50	4.00	104,966	14,995
60	2.00	52,483	7,498
70	1.00	26,242	3,749

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-2023070VD	22.00	2023/8/2 10:00 AM	ZN.ZHANG	YUHONG.SUN

BGN(dBA): 18.0

Temp(℃): 22.3

P(cmHg): 76.4



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)			
1,490	2023/5/31 10:00 AM	2023/8/2 10:28 AM		56	0	1490.0			
Representative Test P/N : BSB0305HP-00				Current Test Status	☐ In process	☒ In process (exceed requested)	☐ Termination		
Equipment: 1.Oven: E24-W520				On/Off Cycles: Every 500 hours					
Large Fan 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)	
	500MAX.	500MAX.	15% MAX.	10000±8%	10000±8%	15% MAX.	57.0MAX.	57.0MAX.	3 dB MAX.
1	268	259	-3.5	10445	10430	-0.1	53.9	53.7	-0.2
2	263	261	-0.8	10324	10407	0.8	53.9	53.5	-0.4
3	256	258	0.8	10429	10383	-0.4	54.1	53.6	-0.5
4	260	261	0.4	10430	10582	1.4	54.1	53.7	-0.4
5	258	262	1.5	10357	10725	3.4	53.5	54.2	0.7
6	254	265	4.2	10630	10706	0.7	54.2	53.7	-0.5
7	260	254	-2.4	10399	10501	1.0	54.3	53.9	-0.4
8	259	264	1.9	10557	10471	-0.8	54.1	53.9	-0.2
9	261	256	-2.0	10480	10509	0.3	54.4	54.4	0.0
10	257	258	0.4	10530	10483	-0.4	54.4	54.4	0.0
11	261	261	0.0	10371	10321	-0.5	53.7	52.9	-0.8
12	261	259	-0.8	10166	10284	1.1	53.8	53.9	0.1
13	264	264	0.0	10369	10498	1.2	53.9	53.5	-0.4
14	254	259	1.9	10683	10561	-1.2	54.2	54.4	0.2
15	255	252	-1.2	10499	10555	0.5	53.7	53.7	0.0
16	253	260	2.7	10535	10539	0.0	53.6	53.8	0.2
17	256	265	3.4	10398	10552	1.5	54.1	53.7	-0.4
18	253	266	4.9	10504	10651	1.4	54.2	54.2	0.0
19	261	263	0.8	10243	10372	1.2	53.9	54.1	0.2
20	256	260	1.5	10185	10230	0.4	53.8	53.7	-0.1
21	263	256	-2.7	10414	10501	0.8	54.2	53.7	-0.5
22	266	259	-2.7	10345	10470	1.2	54.2	54.0	-0.2
23	262	258	-1.6	10478	10421	-0.5	54.3	54.0	-0.3
24	260	248	-4.8	10376	10481	1.0	53.7	54.1	0.4
25	255	258	1.2	10450	10312	-1.3	53.8	53.9	0.1
26	258	256	-0.8	10379	10390	0.1	54.0	53.5	-0.5
27	261	263	0.8	10366	10415	0.5	53.1	54.0	0.9
28	263	251	-4.8	10579	10569	-0.1	54.4	53.8	-0.6
29	256	262	2.3	10228	10759	4.9	54.1	54.0	-0.1
30	256	259	1.2	10489	10339	-1.5	54.3	54.0	-0.3



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)
1,490	2023/5/31 10:00 AM	2023/8/2 10:28 AM	56	0	1490.0

Representative Test P/N : BSB0305HP-00

Current Test Status

☐ In process
☒ In process (exceed requested)
☐ Termination

Equipment: 1.Oven: E24-W520

On/Off Cycles: Every 500 hours

Large Fan 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)	
	500MAX.	500MAX.		10000±8%	10000±8%		57.0MAX.	57.0MAX.	
31	255	263	3.0	10394	10132	-2.6	54.1	53.5	-0.6
32	254	260	2.3	10495	10463	-0.3	54.0	54.2	0.2
33	266	254	-4.7	10308	10239	-0.7	54.2	54.3	0.1
34	265	255	-3.9	10247	10531	2.7	54.0	54.3	0.3
35	260	258	-0.8	10279	10459	1.7	54.2	54.0	-0.2
36	259	255	-1.6	10086	10423	3.2	54.0	53.9	-0.1
37	261	256	-2.0	10408	10470	0.6	54.1	54.2	0.1
38	258	267	3.4	10247	10418	1.6	53.6	54.1	0.5
39	267	259	-3.1	10206	10473	2.5	54.3	53.8	-0.5
40	259	260	0.4	10392	10583	1.8	53.8	53.9	0.1
41	254	257	1.2	10470	10608	1.3	54.2	54.4	0.2
42	262	255	-2.7	10554	10347	-2.0	54.3	54.1	-0.2
43	266	258	-3.1	10434	10390	-0.4	53.5	54.2	0.7
44	260	257	-1.2	10587	10670	0.8	54.1	54.0	-0.1
45	251	254	1.2	10410	10467	0.5	53.9	53.3	-0.6
46	257	251	-2.4	10463	10552	0.8	53.6	54.2	0.6
47	257	265	3.0	10265	10308	0.4	53.5	54.1	0.6
48	258	262	1.5	10479	10592	1.1	54.1	53.3	-0.8
49	264	264	0.0	10689	10613	-0.7	53.7	54.4	0.7
50	260	265	1.9	10397	10598	1.9	54.0	54.3	0.3
51	249	261	4.6	10402	10559	1.5	53.9	53.3	-0.6
52	262	256	-2.3	10602	10520	-0.8	54.1	54.2	0.1
53	264	256	-3.1	10633	10595	-0.4	54.1	53.8	-0.3
54	258	262	1.5	10665	10472	-1.8	53.6	54.1	0.5
55	260	263	1.1	10237	10472	2.2	54.2	53.8	-0.4
56	266	266	0.0	10510	10190	-3.1	54.0	53.9	-0.1
X-Bar	259.32	259.21	-	10419.59	10474.30	-	53.98	53.92	-
σ	4.260	4.237	-	135.967	130.720	-	0.275	0.324	-

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQEFML-2023070VD	22.00	2023/8/2 10:00 AM	ZN.ZHANG	YUHONG.SUN