



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 KSB φ 124X43.2mm series as the right table					
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Representative Test P/N : KSB1212ME-03G6A	
Equipment: 1.Oven: E24-T0161	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 ≐ 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%).

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)
70	40	8.00	54	2.303	1,541	1,541.0	210,050	30,007

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2020/9/7 9:00 AM	2020/12/21 11:37 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	1541.0

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	22.63	594,113	84,873
30	16.00	420,101	60,014
40	8.00	210,050	30,007
50	4.00	105,025	15,004
60	2.00	52,513	7,502
70	1.00	26,256	3,751

- 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
DG20FNL082	994.00	2020/12/22	Loly.Wang	Tim.Yi

BGN (dBA) : 16.0

Temp (°C) : 25.0



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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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)				
1,541	2020/9/7 9:00 AM	2020/12/21 11:37 PM	54	0	1541.0				
Representative Test P/N : KSB1212ME-03G6A			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				On/Off Cycles: Every 500 hours					
Test Data Between Initial Test and Final Test									
Sample No.	Initial Test Current Spec. (A) 0.26 Max.	Final Test Current Spec. (A) 0.26 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 1550-2050	Final Test Speed Spec. (RPM) 1550-2050	Deviation (%)	Initial Test Noise Spec. (dB A) 40.2 Max	Final Test Noise Spec. (dB A) 40.2 Max	Deviation 3 dBMax.
1	0.20	0.20	-0.5	1851	1824	-1.5	34.6	34.5	-0.1
2	0.21	0.20	-3.8	1798	1830	1.8	34.5	34.3	-0.2
3	0.21	0.20	-1.0	1841	1793	-2.6	34.7	34.6	-0.1
4	0.21	0.20	-4.8	1798	1806	0.4	34.4	34.5	0.1
5	0.20	0.20	-1.0	1860	1802	-3.1	34.9	34.6	-0.3
6	0.20	0.20	-1.5	1814	1822	0.4	34.8	34.7	-0.1
7	0.21	0.20	-2.0	1808	1767	-2.3	34.8	34.9	0.1
8	0.20	0.20	-1.0	1860	1824	-1.9	34.6	34.9	0.3
9	0.20	0.20	-1.5	1848	1823	-1.4	35.0	34.4	-0.6
10	0.20	0.20	-2.0	1860	1780	-4.3	34.9	34.8	-0.1
11	0.21	0.20	-2.4	1811	1782	-1.6	35.1	35.2	0.1
12	0.21	0.20	-3.8	1795	1830	1.9	34.6	34.7	0.1
13	0.20	0.20	0.5	1849	1797	-2.8	34.5	34.6	0.1
14	0.21	0.20	-3.9	1838	1812	-1.4	35.0	34.5	-0.5
15	0.21	0.20	-2.0	1814	1825	0.6	35.0	35.0	0.0
16	0.21	0.20	-2.4	1834	1788	-2.5	34.9	34.7	-0.2
17	0.21	0.20	-2.4	1807	1786	-1.2	35.1	35.0	-0.1
18	0.21	0.20	-2.9	1838	1774	-3.5	34.8	34.5	-0.3
19	0.20	0.20	-1.5	1819	1831	0.7	34.7	34.8	0.1
20	0.21	0.20	-2.4	1843	1779	-3.5	35.0	34.9	-0.1
21	0.20	0.20	-2.5	1819	1811	-0.4	34.9	34.6	-0.3
22	0.20	0.20	-3.0	1847	1810	-2.0	34.3	34.3	0.0
23	0.20	0.20	-1.0	1824	1764	-3.3	34.2	34.5	0.3
24	0.20	0.20	-2.9	1841	1802	-2.1	35.0	34.8	-0.2
25	0.20	0.20	-2.5	1820	1780	-2.2	34.5	34.9	0.4
26	0.21	0.20	-2.4	1802	1798	-0.2	34.6	34.7	0.1
27	0.20	0.20	-1.5	1849	1799	-2.7	34.7	34.8	0.1
28	0.20	0.20	-2.9	1802	1804	0.1	35.0	34.9	-0.1
29	0.20	0.20	-1.0	1849	1783	-3.6	34.9	35.0	0.1
30	0.21	0.20	-4.8	1798	1804	0.3	35.0	34.9	-0.1
31	0.21	0.20	-3.4	1834	1779	-3.0	34.6	34.8	0.2
32	0.21	0.20	-3.9	1804	1791	-0.7	34.8	34.7	-0.1
QE File No.	Time-out for function test or others (hours)		Issued Date		Reported By		Approved By		
DG20FNL082	994.00		2020/12/22		Loly.Wang		Tim.Yi		



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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)
1,541	2020/9/7 9:00 AM	2020/12/21 11:37 PM	54	0	1541.0
Representative Test P/N : KSB1212ME-03G6A			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				On/Off Cycles: Every 500 hours	

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 0.26 Max.	Final Test Current Spec. (A) 0.26 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 1550-2050	Final Test Speed Spec. (RPM) 1550-2050	Deviation (%)	Initial Test Noise Spec. (dB A) 40.2 Max	Final Test Noise Spec. (dB A) 40.2 Max	Deviation 3 dBMax.
33	0.21	0.20	-5.3	1822	1783	-2.1	34.7	35.0	0.3
34	0.21	0.20	-3.4	1809	1767	-2.3	34.6	34.7	0.1
35	0.21	0.20	-4.4	1828	1807	-1.1	34.7	34.8	0.1
36	0.21	0.20	-2.0	1796	1780	-0.9	34.3	34.6	0.3
37	0.21	0.20	-3.9	1831	1806	-1.4	34.6	34.7	0.1
38	0.20	0.20	-1.5	1820	1804	-0.9	34.5	34.3	-0.2
39	0.20	0.20	-1.0	1849	1765	-4.5	34.6	34.7	0.1
40	0.20	0.20	-1.0	1824	1773	-2.8	34.5	34.5	0.0
41	0.21	0.20	-3.9	1838	1807	-1.7	34.4	34.0	-0.4
42	0.21	0.20	-2.4	1810	1767	-2.4	34.7	34.6	-0.1
43	0.20	0.20	-2.9	1838	1806	-1.7	34.6	34.4	-0.2
44	0.20	0.20	-1.5	1817	1801	-0.9	34.3	34.3	0.0
45	0.21	0.20	-2.9	1832	1761	-3.9	34.5	34.6	0.1
46	0.20	0.20	-1.0	1815	1767	-2.6	34.4	34.7	0.3
47	0.20	0.20	-2.0	1841	1815	-1.4	34.7	35.1	0.4
48	0.20	0.20	0.0	1815	1763	-2.9	34.7	34.5	-0.2
49	0.20	0.20	-3.0	1843	1809	-1.8	34.6	34.3	-0.3
50	0.20	0.20	-1.0	1809	1767	-2.3	34.8	34.2	-0.6
51	0.20	0.20	-2.9	1836	1810	-1.4	34.3	36.0	1.7
52	0.21	0.20	-2.9	1797	1807	0.6	34.7	34.6	-0.1
53	0.20	0.20	-2.0	1845	1769	-4.1	34.2	34.2	0.0
54	0.20	0.20	-1.0	1812	1767	-2.5	34.7	34.8	0.1
X-Bar	0.20	0.20	-	1825.96	1794.46	-	34.68	34.68	-
σ	0.00	0.00	-	18.81	20.45	-	0.24	0.31	-

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