



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 TCA 176.5X69mm series as the right table	TCA1748BT-00FOW			
	TCA1748BT-00FJL			
	TCA1748BT-00EYR			
Representative Test P/N :TCA1748BT-01EBE				
Equipment: 1.Oven: E24-T0161			On/Off Cycles: Every 500 hours	

◎ **L₁₀ Expectancy:** **70,000** hours minimum @ fan rated voltage and the temperature of **40°C**
 According to the equation for **Weibull distribution**, **MTTF ≈ 7×L₁₀ = 490,000** 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)
75	40	11.31	28	2.303	4,621	7,360.0	780,458	111,494

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2018/7/9 11:00 AM	2019/5/10 4:52 AM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	7360.0

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	32.00	2,207,468	315,353
30	22.63	1,560,915	222,988
40	11.31	780,458	111,494
50	5.66	390,229	55,747
60	2.83	195,114	27,873
70	1.41	97,557	13,937
75	1.00	68,983	9,855

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
DG18FNL073	4461.00	2019/11/14	Loly.Wang	Tim.Yi

BGN (dBA) : 15.9

Temp (°C) : 23.5



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

Available for these models with lower speed and same physical structure. All model may be followed byRxx orFxx series suffixes. This test report applies to TCA § 176.5X69mm series as the right table	TCA1748BT-00FOW			
	TCA1748BT-00FJL			
	TCA1748BT-00EYR			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,621	2018/7/9 11:00 AM	2019/5/10 4:52 AM	28	0	7360.0

Representative Test P/N :TCA1748BT-01EBE	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) 4.38 Max.	Final Test Current Spec. (A) 4.38 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 5050-6210	Final Test Speed Spec. (RPM) 5050-6210	Deviation (%)	Initial Test Noise Spec. (dB A) 82.0 Max	Final Test Noise Spec. (dB A) 82.0 Max	Deviation 3 dBMax.
1	2.55	2.85	11.4	5208	5207	0.0	78.6	79.0	0.4
2	2.57	2.79	8.8	5184	5205	0.4	78.6	79.2	0.6
3	2.58	2.86	10.7	5220	5208	-0.2	78.4	78.9	0.5
4	2.57	2.93	14.3	5213	5164	-0.9	78.7	79.4	0.7
5	2.58	2.87	11.2	5204	5198	-0.1	78.6	78.9	0.3
6	2.57	2.93	14.0	5220	5186	-0.7	78.6	78.7	0.1
7	2.53	2.89	14.3	5206	5192	-0.3	78.5	79.2	0.7
8	2.56	2.93	14.2	5211	5197	-0.3	78.4	79.0	0.6
9	2.55	2.87	12.5	5204	5202	0.0	78.5	79.1	0.6
10	2.61	2.97	13.5	5201	5203	0.0	78.5	79.1	0.6
11	2.56	2.91	13.9	5200	5197	-0.1	78.5	78.7	0.2
12	2.57	2.86	11.1	5213	5163	-1.0	78.7	79.2	0.5
13	2.59	2.97	14.7	5209	5174	-0.7	78.4	79.0	0.6
14	2.57	2.86	11.4	5211	5208	-0.1	78.4	78.7	0.3
15	2.58	2.91	13.2	5207	5202	-0.1	78.5	79.0	0.5
16	2.55	2.90	13.7	5217	5191	-0.5	78.7	78.9	0.2
17	2.50	2.81	12.7	5201	5202	0.0	78.6	79.1	0.5
18	2.57	2.94	14.6	5214	5206	-0.2	78.3	78.8	0.5
19	2.52	2.82	11.8	5201	5201	0.0	78.6	78.9	0.3
20	2.58	2.91	12.8	5217	5151	-1.3	78.5	78.9	0.4
21	2.54	2.74	8.0	5201	5160	-0.8	78.6	78.8	0.2
22	2.53	2.88	13.5	5201	5161	-0.8	78.4	78.7	0.3
23	2.53	2.89	14.1	5204	5180	-0.5	78.7	78.8	0.1
24	2.58	2.84	10.2	5208	5192	-0.3	78.4	78.9	0.5
25	2.54	2.88	13.6	5207	5194	-0.2	78.4	78.9	0.5
26	2.54	2.81	10.7	5202	5201	0.0	78.5	79.0	0.5
27	2.58	2.86	11.2	5212	5174	-0.7	78.6	78.7	0.1
28	2.55	2.83	11.4	5192	5209	0.3	78.4	79.1	0.7
X-Bar	2.56	2.88	-	5206.71	5190.29	-	78.52	78.95	-
σ	0.02	0.05	-	8.06	17.01	-	0.11	0.18	-

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG18FNL073	4461.00	2019/11/14	Loly.Wang	Tim.Yi