



## 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 175x131.8x69.0 mm series as the right table	TCA1748ATAGPEFM				
	KFB1748VHTC39				
	TCA1748ATAGPEPW				
	TCA1748ATAGPCJE				
<b>Representative Test P/N : TCA1748ATAGP</b>					
<b>Equipment: 1.Oven: E24-T0165</b>				On/Off Cycles: Every 500 hours	

◎ **L<sub>10</sub> Expectancy:** **70,000** hours minimum @ fan rated voltage and the temperature of 40℃

According to the equation for **Weibull distribution**, **MTTF**  $\approx 7 \times L_{10} =$  **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<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%).

Stress/Elevated Temperature T <sub>s</sub> (℃) (Actual Test Temperature)	Unstress Temperature T <sub>u</sub> (℃)	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r;c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 ℃ (hours)	Verified L <sub>10</sub> 40 ℃ (hours)
<b>70</b>	<b>40</b>	<b>8.00</b>	<b>12</b>	<b>2.303</b>	<b>14,129</b>	<b>18,360.0</b>	<b>636,752</b>	<b>90,965</b>

### Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
<b>2016/5/19 11:00 AM</b>	2018/2/19 5:14 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	<b>18360.0</b>

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' L<sub>10</sub> 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 <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
<b>25</b>	<b>22.63</b>	<b>1,801,007</b>	<b>257,287</b>
<b>30</b>	<b>16.00</b>	<b>1,273,504</b>	<b>181,929</b>
<b>40</b>	<b>8.00</b>	<b>636,752</b>	<b>90,965</b>
<b>50</b>	<b>4.00</b>	<b>318,376</b>	<b>45,482</b>
<b>60</b>	<b>2.00</b>	<b>159,188</b>	<b>22,741</b>
<b>70</b>	<b>1.00</b>	<b>79,594</b>	<b>11,371</b>

Fan permission criteria for the measurement after test:

1. Speed can not drop of  $\geq 15\%$  below the original measured rpm.
2. Current cannot increase  $> 15\%$  of original measure current.
3. Noise cannot  $> 3\text{dB}$  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
<b>DG16FNL054</b>	<b>20725.00</b>	<b>2020/11/3</b>	<b>Loly.Wang</b>	<b>Tim.Yi</b>

BGN (dBA) : 15.9

Temp (℃) : 25.0



## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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				KFB1748VHTC39					
				TCA1748ATAGPEPW					
				TCA1748ATAGPCJE					
<b>Required Test Time (hrs)</b>	<b>Date for Test Beginning</b>	<b>Date for Test Termination</b>	<b>Sample Size (pcs):</b>	<b>Failure (pcs):</b>	<b>Current Total Test Time (hrs)</b>				
14,129	2016/5/19 11:00 AM	2018/2/19 5:14 PM	12	0	18360.0				
Representative Test P/N : TCA1748ATAGP			<b>Current Test Status</b>	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination			
Equipment: 1.Oven: E24-T0165				On/Off Cycles: Every 500 hours					
<b>Test Data Between Initial Test and Final Test</b>									
Sample No.	Initial Test Current Spec. ( A ) 2.10Max.	Final Test Current Spec. ( A ) 2.10Max.	Deviation (%)	Initial Test Speed Spec. ( RPM ) 3600-4400	Final Test Speed Spec. ( RPM ) 3600-4400	Deviation (%)	Initial Test Noise Spec. ( dB A ) 70.8 Max	Final Test Noise Spec. ( dB A ) 70.8 Max	Deviation 3 dBMax.
1	1.08	1.00	-7.4	3983	4003	0.5	69.7	70.6	0.9
2	1.08	1.01	-6.9	3927	3921	-0.2	69.8	70.6	0.8
3	1.02	0.86	-15.2	3940	4091	3.8	69.7	70.2	0.5
4	1.08	1.01	-6.0	3939	4028	2.3	70.3	70.5	0.2
5	1.01	0.96	-5.0	3943	4071	3.2	69.9	70.6	0.7
6	1.09	1.00	-8.3	3940	3957	0.4	69.8	71.2	1.4
7	1.08	0.96	-11.0	3910	4080	4.3	69.8	70.6	0.8
8	1.09	1.00	-8.1	3921	4021	2.6	69.8	70.3	0.5
9	1.08	1.00	-7.7	3976	4027	1.3	69.9	71.0	1.1
10	1.07	0.91	-14.6	3901	4052	3.9	69.5	70.7	1.2
11	1.09	1.02	-6.3	3931	4030	2.5	69.8	71.7	1.9
12	1.03	1.00	-2.9	3925	3931	0.2	70.1	70.9	0.8
X-Bar	1.067	0.98		3936.33	4017.67		69.84	70.74	
$\sigma$	0.03	0.05		18.81	55.73		0.20	0.41	
<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>		
DG16FNL054	20725.00		2020/11/3		Loly.Wang		Tim.Yi		