

SOFASCO INC.

MTTF REPORT

MODEL NO: DF30160V12				
BEARING	VOLTAGE(V)	CURRENT(A)	SPEED(RPM)	TEST VOLTAGE(V)
BALL BEARING	12	0.16	3100	12
TESTED QTY/PCS	TEST HRS/EA		TOTAL HRS	TEST TEMPERATURE/ °C
60	1500		90000	70

1. According to the equation of product accumulation failure rate,

$$\odot 10\% = 1 - e^{-\lambda t} \quad \odot t \rightarrow L_{10} \quad \odot L_{10} = 0.10536/\lambda \quad \odot \text{MTTF} = 1/\lambda$$

$$\odot \text{MTTF}/L_{10} = (1/\lambda)/(0.10536/\lambda) \approx 9.5 \quad \text{So we get the result, } \text{MTTF} \approx 9.5 * L_{10}$$

2. According to the equation for **Arrhenius Model**

$$A_F = e^{(\Delta H/KT)} = e^{(\Delta H/K) \times [(1/T_u) - (1/T_s)]}$$

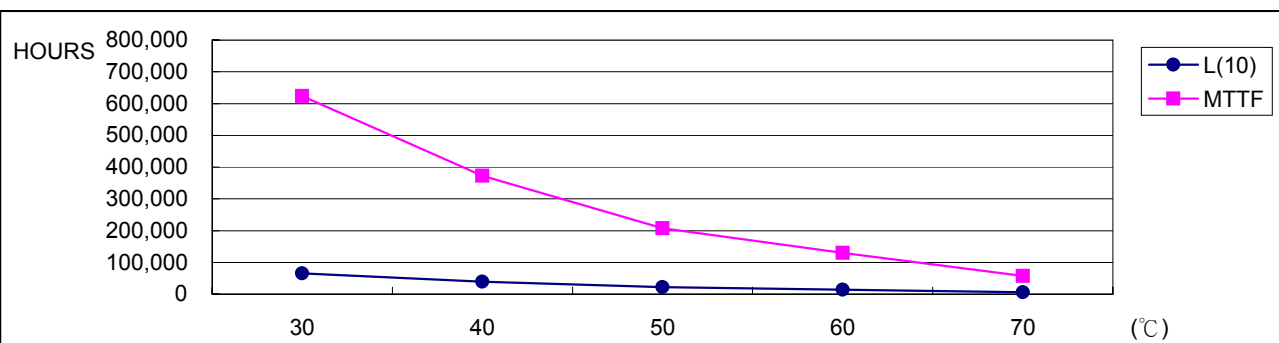
where, A_F is acceleration factor, e is natural logarithm (2.713), ΔH is activation energy,

K is Boltzmann's constant (8.623×10^{-5} eV/°K), T is absolute temperature (°K),

T_u is unstress temperature (°K), T_s is stress temperature (°K), and the confidence level is equal to 0.90 (90%)

Herewith, we could assume as right on the basis of above test result. Besides, if the actual test time exceeded 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. Basically, MTBF is equal to MTTF, they use same formula to work out a life data.)

Temperature For MTTF Estimation (°C)	Acceleration Factor A_F	Estimated MTTF(hours)	Estimated L_{10} (hours)
30	10.78	623,569	65,639
40	6.45	373,100	39,274
50	3.58	207,085	21,798
60	2.24	129,573	13,639
70	1	57,845	6,089



APPROVED BY	ISSUED DATE	CHECKED BY	PREPARED BY
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