



## Rapport d'assurance qualité Quality assurance report

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### Medium Voltage Product Activity (MVP)

### MEAN OPERATING TIME TO FAILURE (MTTF) OF MEDIUM VOLTAGE SM6 FUNCTIONS

#### Terms

We consider the hypothesis that the failure rate is constant during all the useful life time of the equipment (exponential reliability law).  
According to this hypothesis and as the Mean Down Time (MDT) is negligible in comparison to the Mean Up Time (MUT), the Mean Operating Time Between Failures (MTBF) is similar to the MTTF.

#### Formula

**Failure rate** =  $\frac{\text{Nb of failures recorded on the equipment during the observation time \{1 year\}}}{(\text{Nb of equip. manufactured at the end of the monitor. time}) \times \text{Nb of hours in the monitor. time \{8760\}}}$

**Unit** = mean number of failures by hour

**MTTF** =  $\frac{1}{\text{failure rate} \times \text{Nb of hours in the monitor. time \{8760\}}}$

**Unit** = years

#### Result

According to the total number of installed SM6 functions since 1992 and, considering the major and critical defects :

- the operational failure rate is  $4.6 \times 10^{-9}$  failures by hour
- the corresponding MTTF is about 24,614 years.

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- Merlin Gerin
- Modicon
- Square D
- Telemecanique