

MTTF_D Values for Hydraulic Valves

1 General Information

The MTTF_D value (mean time to dangerous failure) of a component is used to calculate the probability of a potentially dangerous failure of a machine or system. For hydraulic components (e.g., valves), a MTTF_D value of 150 years can be presumed according to ISO 13849-1:2016 if the fundamental and proven safety principles according to ISO 13849-2:2012 are adhered to as shown in table C.1 & C.2. The value is based on the assumption that the annual number of switching cycles is greater than 1 million.

Requirements for hydraulic valves employed in safety-related parts of control systems include:

- reliable maintenance of the basic settings, i.e., protection against unexpected power-up, e.g., when the power supply is switched on
- automatic reset to basic settings in case of a power failure
- sufficient overlap of spool valves in the basic setting

Hydraulic valves, which do not completely fulfill the safety principles, are not suitable for application in safety-related parts of control systems.

2 MTTF_D Values of Bucher Hydraulics AG Frutigen

Bucher Hydraulics AG Frutigen marks the MTTF_D values in the corresponding data sheets of the valves. This confirms compliance with the fundamental and proven safety principles of ISO 13849-2:2012, according to table C.1 & C.2. These values can only be used for calculation if the operating conditions and installation instructions mentioned in the data sheet are complied. This includes, among other things:

- hydraulic fluids used and their cleanliness over the entire service life
- temperature range of the pressure fluid and the environment
- regularly switch or actuate the system at reasonable intervals because spool seizures may occur after a prolonged period in which the switching spool valves are not used

The customer bears the responsibility for the implementation and operations of the valves according to EN ISO 13849-1:2016. The latter is responsible for machine safety, including the correct design and evaluation of hydraulic valves used in safety-related parts of control systems. As a result, the customer is responsible for ensuring compliance with normative and statutory requirements in the countries concerned.

3 Exceptions

The MTTF_D value can be estimated higher if the average number of annual operations (nop) is less than 1 million switching cycles - (ISO 13849-1:2016 table C.1).

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