

## DUTY FACTOR

All solenoids supplied by Wandfluh in standard version as well as Ex-proof version, are as a standard feature designed for continuous duty (100 % DF) in accordance with definition 1.1. Therefore the steady state temperature of the solenoid can be reached. In under continuous duty conditions, this occurs after approx. 1,5 to 2 hours. With high ambient temperatures, resp., reference temperatures or a high temperature of the fluid and as well with overvoltage, we can offer solenoids with reduced power (M29 see data sheet 1.1-420) or power reducing plug (P03 see data sheet 1.1-320).

### 1.0 TIME DEFINITION

#### 1.1 CONTINUOUS DUTY (CD)

The time of operation during which solenoid is excited is so long, that the steady-state temperature is practically reached. (VDE 0580)

#### 1.2 INTERMITTENT OPERATION (IO)

The type of operation, in which activated time and currentless breaks alternate in a regular or irregular sequence, whereby the breaks are so short, that the solenoid does not cool down to the reference temperature.

##### 1.2.1 RELATIVE DUTY FACTOR (% DF)

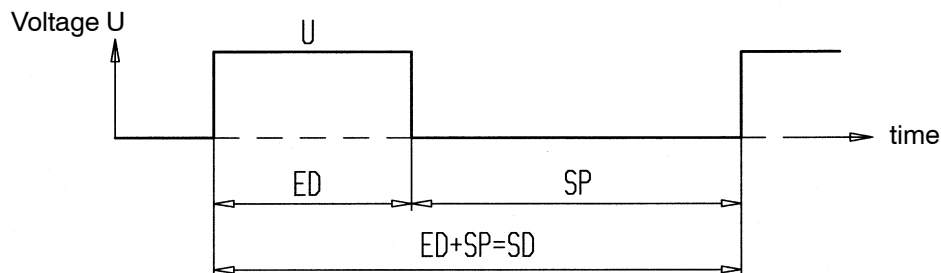
(Determined intermittent operation)

Ratio of duty factor to cycle time expressed in percent.

$$\% DF = \frac{DF}{DF + NCB} \times 100$$

Applicable as preferred values for the relative duty factor (in % of CT) are: 5, 15, 25, 40 %. 100 % CT corresponds to continuous operation.

Applicable as preferred values for the maximum cycle time are: 2, 5, 10, 30 min. Therefore the additional designation for solenoids with a relative operating time is, e.g.: 40 % CT / 5 min.



##### 1.2.1.1 DUTY FACTOR (DF)

The time between the switching on and switching off of the actuating current.

##### 1.2.1.2 NO-CURRENT BREAK (NCB)

The time between the switching off and switching on again of the actuating current.

##### 1.2.1.3 CYCLE TIME (CT)

The sum of activated time and no-current break.

## 2.0 TEMPERATURE DEFINITIONS

### 2.1 AMBIENT TEMPERATURE

Average temperature of the surroundings of the solenoid.

### 2.2 REFERENCE TEMPERATURE

Steady state temperature in a no current condition, when utilized as foreseen. The reference temperature in most cases has a different value than the ambient temperature, since it is additionally affected by the temperature of the fluid (cooling or heating).

### 2.3 STEADY STATE TEMPERATURE

The temperature of the solenoid when heat produced by coil and dissipated heat are in balance.

### 2.4 TEMPERATURE OF THE FLUID

Temperature of the fluid inside the solenoid (valve).