MEZ/ERB
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**Joint application of members of the ZVEI Association to the EU Commission regarding the addition of an exemption for cadmium contacts to the appendix of the EU Directive 2002/95/EC (RoHS)**

Despite intensive efforts to fully meet the requirements of RoHS and following intensive, internal examinations our member companies have ascertained, that they are unable to do without cadmium in the switch contacts in every case for safety reasons, especially regarding compliance with the international safety standards EN 61058 and UL 1054.

The majority of the concerned switches is used in the whole range of appliances affected by 'RoHS/WEEE'. The range of performance of the AC voltage (up to 400 V) fulfils a qualitatively unique feature for silver-cadmium-oxide contacts (AgCdO) at rated currents from 8 A and brief current peaks up to the range around 180 A.

This means ultimately, that contacts made of AgCdO offer an ideal working environment for the mentioned area of application of the AC voltage regarding the permissible heating in use and the low tendency to "weld". This result cannot generally be achieved by an alternative material composition such as silver-nickel (AgNi) or silver-stannic-oxide (AgSnO2).

The tendency to "weld" describes the safety risk, which implicates, that the switch contacts are subjected to very high thermal stressing during closing and at high currents. Thereby these switch contacts are bonding irresolvable, so that opening of the switch is prevented. This should be avoided at all cost when using switches with safety functions to protect the user.

Heating during use means in accordance with EN 61058 that, at rated current and at a specified number of switching cycles, the maximum permissible heating may not exceed 55°K. Since our switches are sold worldwide and are installed in appliances in world-wide use, additional approvals by the Underwriters Laboratories Inc. (UL1054) are essential. In this case, the maximum permissible heating is 30°K only.

Unlike applications with narrowly defined operating conditions (e.g. contactors), the functioning of the appliance switches and snap action switches must be guaranteed for general use in miniature sizes. Smaller switch sizes lead to smaller contact forces and reduced contact weights. According to the latest state-of-the-art, it is in many cases impossible to do without AgCdO in contacts due to its tolerant behaviour in order to satisfy the functional safety requirements specified in EN 61058 and UL 1054. This problem is aggravated additionally by a very wide range of applications of inductive, resistive and capacitive loads which occur in the different electrical and electronic appliances concerned.

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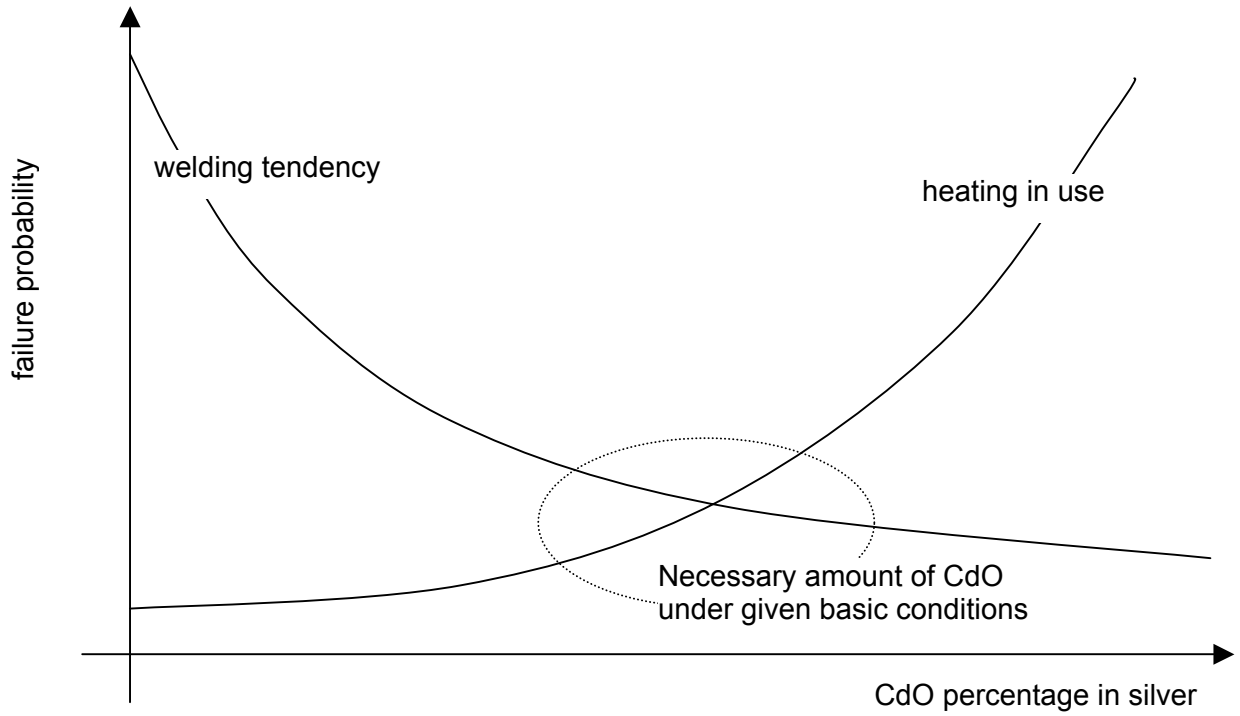
With a general prohibition of cadmium even in switching contacts the failure probability will increase and therewith the risk for the end consumer of switch applications (see figure 1). In addition to that, the manufacturers are facing challenges to even further miniaturise their products in the relevant application field. Therefore the total weight of the switches generally needs to be less than 10 grams. The weights used per contact are less than 0.3 g and the cadmium-oxide percentage is typically 10 % and at maximum 20 %.

**For the reasons mentioned above, we therefore apply for general exemption from the requirements of article 4 paragraph 1 of the EU directive 2002/95/EC regarding cadmium used in switch products having switching contacts with less than 0.3 g contact weights per contact.**

**Basic technical conditions:**

| | |
|---|---|
| Voltage range: | AC (up to 400 V) |
| Rated currents: | ≥ 8 A |
| Peak currents: | ≤180 A |
| Implemented weights/contact: | < 0.3 g |
| Cadmium-oxide percentage/contact: | typical 10 % |

Fig.1:




Symbolic representation of the failure probability depending on the percentage of cadmium-oxide in contacts of switches