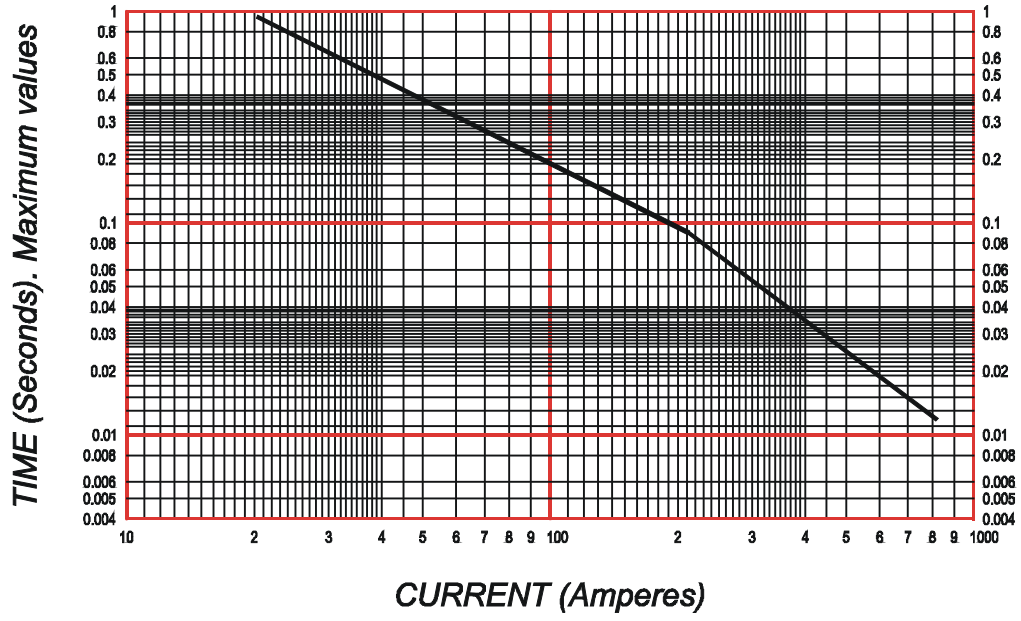
MEDIUM-VOLTAGE ZnO OVERVOLTAGE SURGE ARRESTERS WITH SILICON CASING

Lately, for overvoltage protection in medium-voltage power transmission networks have been more and more used ZnO overvoltage surge arresters with silicon casing.
Such arresters are composed of highly nonlinear resistor blocks. Nonlinearity is related to the current through the arrester dependence of the voltage. The arrester resistance is inversely proportional to the voltage applied. In this way, during the shock wave, arisen in a protected line due to a lightning stroke or switching manipulations in the system, the arrester resistance is reduced, and the shock wave can flow through the arrester into the earthing system. When overvoltage condition is terminated, the arrester will re-establish its high resistance condition. The ZnO varistors ensure stable electrical characteristics.

The ZnO blocks are tied together into a whole by strips, ensuring high mechanical strength. The casings of such arresters are made of silicon rubber that has excellent both mechanical and electrical properties. Main advantages of the arresters with these casings, compared to the ceramic casing arresters are:

- small dimensions,
- small mass,
- transportation and installation advantages,
- no risk of the casing explosion, as with the porcelain types,
- the hydrophobic surface prevents water from gathering over the entire surface during rainfalls – water on the surface is formed (gathered) into droplets.



Additionally, such arresters may have a "disconnecting device" built-on. Such a disconnecting device operates, i.e. performs its function, only when the arrester is damaged to such an extent, that its original resistance cannot be returned to the 'pre-overvoltage' condition (the arrester has lost its original nonlinear characteristic). In such a case, a constant discharge current would have flowed through the arrester. The consequence could be earth protection operation, und undesired disconnection of that part of the network. A constant discharge current heats up the disconnecting

device, and the latter physically disconnects earth contact – and earth terminal is thus separated from the arrester.
Consequently, there are two advantages of the surge arrester with disconnecting device:

- visible indication that the arrester is damaged (simple search for damaged arresters);
- interruption of the earth contact, and thereby prevention of undesired earth protection disconnection.

Figure 1 shows the operation of the disconnecting device ETI for overvoltage arrester.

Figure 2
Overvoltage Arrester

Figure 3
Supporting Bracket

Figure 4
Disconnecting Device

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