Abstracts

This paper deals with experimental investigations on the performance of polluted insulators exposed to superimposed electrical AC and DC field stress. For this purpose, based on simplified specimen geometries, the pollution flashover voltage under hybrid AC/DC stresses is determined. Superimposed field stress is achieved by simultaneous application of 50 Hz AC and DC test voltage on each electrode of the specimen resulting in hybrid AC/DC test voltage. Several constellations of superimposed stress on the specimen surfaces are investigated by varying the ratio of the AC and DC voltage component. The pollution flashover voltage is determined by means of flow-on method and modified up-and-down method. Variation in insulator specimen's material as well as shape and positioning are considered. Homogenous pollution layers varying in Equivalent Salt Deposit Density are applied. The results show an increase in peak flashover voltage when applying hybrid AC/DC stress compared to uniform DC stress. Depending on the test voltage constellation (ratio of DC to AC peak), the peak flashover voltage can also exceed the pure AC peak flashover voltage. A theoretical approach is developed considering an increase of pre-arc recovery voltage due to the combination of DC offset and 50 Hz oscillation as the origin of the observed effect. The extension of maximum pre-arc extinguishment time is assumed as the major factor.