

## Robust characterization of the DC-conductivity of HVDC insulation materials at high electric fields

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Testing techniques should be easy to implement, give meaningful and robust results with a high reproducibility that makes it easy to analyze and compare results. When developing and comparing different materials for use as electrical insulation for DC applications, the use of relevant small scale test equipment and methods are of most importance.

DC-conductivity, measured at high electric fields with controlled thermal conditions, is an important and critical measurement when investigating different insulation materials. The thickness of the samples might need to be increased when the conductivity is measured on materials containing substances that can diffuse out of the sample. At the same time the electric field should be at the same level as can be foreseen for cable applications. With the equipment used in the present study, reliable measurements can be made up to 50kV on samples having 1 mm thickness.

In this paper we present a comparison between measurements performed on plaques at three different test facilities. The test setups consist of a three-terminal cell made of brass with identical dimensions and with similar test procedure. All measurements were done on non-degassed samples and effort has been made to reduce the leakage of peroxide byproducts during the testing cycle. Concentrations of peroxide decomposition products were measured before and after the tests in order to estimate the amount that was diffused from the samples during testing.

The results show that by careful sample preparation and having right test procedures and equipment, it is possible to achieve robust measurement results with a high reproducibility.