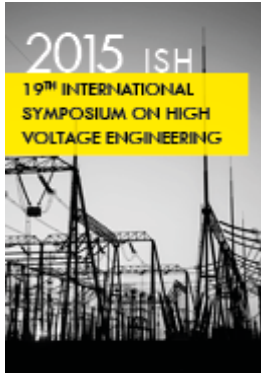

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Title:

Breakdown behaviour of new insulation liquids under AC and DC stress and gap distances over 10 mm

Abstracts

Insulation liquids are well known and therefore used in many high voltage applications. Due to their high breakdown voltages, breakdown tests are usually done with gap distances of 2,5 mm according to IEC standards to allow compact test arrangements. However, in high voltage equipment oil insulated gaps can reach multiple centimetres. But because of the volume effect, the breakdown voltage does not increase linear with the gap distance. Additionally for newer insulation liquids and for the more and more important high voltage DC applications, less experience exists, because tests are usually done at frequencies of 50 or 60 Hz. In this experimental study a test vessel is constructed to allow breakdown test at longer gap distances and with voltages of up to 300 kV AC and 400 kV DC. The test vessel is double walled in order to allow indirect heating of the insulation liquid up 90 °C, which is a typical high operating temperature for transformers. As electrode configuration a sphere-sphere electrode made out of brass with tungsten alloy inlets is used to reduce the erosion from the arc. With this test vessel the breakdown strength of different insulation liquids was tested at various gap distances of 10 mm and above, for AC and DC stresses and at different temperatures from room temperature up to 90 °C. The investigated liquids are a new insulation oil produced from natural gas by the Gas-to-Liquid (GtL) process, a synthetic ester and typical mineral oils. The results show that the GtL insulation oil has dielectric properties comparable to mineral oil and shows in some cases an even better performance.

More Informations :

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