

Study on Breakdown Voltage Characteristics of Different Types of Oils with Contaminations

Authors : C. Jouhar, B. Rajesh Kamath, M. K. Veeraiah, M. Z. Kurian

Abstract : Since long time ago, petroleum-based mineral oils have been used for liquid insulation in high voltage equipments. Mineral oils are widely used as insulation for transmission and distribution power transformers, capacitors and other high voltage equipment. Petroleum-based insulating oils have excellent dielectric properties such as high electric field strength, low dielectric losses and good long-term performance. Due to environmental consideration, an attempt to search the alternate liquid insulation is required. The influence of particles on the voltage breakdown in insulating oil and other liquids has been recognized for many years. Particles influence both AC and DC voltage breakdown in insulating oil. Experiments are conducted under AC voltage. The breakdown process starts with a microscopic bubble, an area of large distance where ions or electrons initiate avalanches. Insulating liquids drive their dielectric strength from the much higher density compare to gases. Experiments are carried out under High Voltage AC (HVAC) in different types of oils namely castor oil, vegetable oil and mineral oil. The Breakdown Voltage (BDV) with presence of moisture and particle contamination in different types of oils is studied. The BDV of vegetable oil is better when compared to other oils without contamination. The BDV of mineral oil is better when compared to other types of oils in presence of contamination.

Keywords : breakdown voltage, high voltage AC, insulating oil, oil breakdown

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