

ABSTRAK

Martin R. Parhusip. NIM. 5181230006: Analisis Tegangan Tembus Minyak Jarak Dengan Variasi Zat Aditif Fenol Sebagai Alternatif Isolasi Cair Transformator. Skripsi. Fakultas Teknik Universitas Negeri Medan. 2024

Minyak isolasi memiliki peran penting dalam transformator karena berfungsi sebagai isolasi dan pendingin. Saat ini minyak bumi masih pilihan utama sebagai isolator cair, sementara persediaan minyak bumi semakin terbatas seiring waktu karena sifatnya yang tidak dapat diperbaharui. Pada penelitian ini dilakukan analisis tegangan tembus minyak jarak dengan penambahan variasi zat aditif fenol sebesar 2,5%, 5%, 7,5% dan 10% sebagai alternatif bahan isolator cair transformator. Metode pengujian tegangan tembus berdasarkan standar IEC 60156 menggunakan elektroda jenis bola-bola dengan jarak sela elektroda 2,5 mm. Berdasarkan hasil pengujian diperoleh tegangan tembus minyak jarak tertinggi pada konsentrasi fenol 5% (10 gram) sebesar 25,21 kV meningkat dari tegangan sebelumnya tanpa penambahan fenol yaitu 22,85 kV. Namun nilai tegangan tembus minyak jarak ketika konsentrasi fenol lebih besar dari 5% cenderung menurun karena campuran telah mencapai titik jenuh. Berdasarkan SPLN 49-1-1982 minyak jarak dengan penambahan fenol ini masih belum layak digunakan sebagai alternatif isolator cair transformator dimana belum memenuhi standar tegangan tembus minyak isolasi baru yaitu 30 kV/2,5 mm.

Kata kunci: *Minyak Jarak, Fenol, Tegangan Tembus*



ABSTRACT

Martin R. Parhusip. NIM. 5181230006: Analysis of Breakdown Voltage of Castor Oil with Variations in Phenol Additives as an Alternative to Transformer Liquid Insulation. Thesis. Medan State University Faculty of Engineering. 2024

Insulating oil has an important role in transformers because it functions as insulation and cooling. Currently, petroleum is still the main choice as a liquid insulator, while petroleum supplies are increasingly limited over time because of its non-renewable nature. In this research, an analysis of the breakdown voltage of castor oil was carried out with the addition of a variety of phenol additives of 2.5%, 5%, 7.5% and 10% as an alternative transformer liquid insulator material. The breakdown voltage testing method is based on the IEC 60156 standard using ball-type electrodes with a distance between the electrodes of 2.5 mm. Based on the test results, it was found that the highest breakdown voltage of castor oil at a phenol concentration of 5% (10 grams) was 25.21 kV, an increase from the previous voltage without the addition of phenol, namely 22.85 kV. However, the breakdown voltage value of castor oil when the phenol concentration is greater than 5% tends to decrease because the mixture has reached the saturation point. Based on SPLN 49-1-1982, castor oil with the addition of phenol is still not suitable for use as an alternative liquid transformer insulator which does not meet the new insulating oil breakdown voltage standard, namely 30 kV/2.5 mm.

Keywords: *Castor Oil, Phenol, Breakdown Voltage*

