

Polarization and Depolarization Current (PDC) tests on biodegradable and mineral transformer oils at different moisture levels using test cell

Introduction

PDC measurement started being used in the 1990s. It is one of the dielectric diagnostic techniques based on time domain measurement. The dielectric properties of an insulating material change with moisture, ageing and contamination. The conductivity of both oil and paper in a transformer can change over a wide range during the operation of the transformer depending upon the operating conditions.

PDC measurement technique has gained immense popularity due to its ability to assess the condition of oil and paper separately without opening the transformer tank[1]. PDC measurement can provide information about the oil conductivity within the initial periods (seconds) after a DC step voltage application and about the barrier conductivity over a long period of time. It can be used to distinguish different materials at different times [18, 121-123]. PDC involves step response measurement and contains all information gathered from the Return Voltage Measurement (RVM) and Frequency Domain Spectroscopy (FDS) techniques. From the PDC results, frequency domain quantities for FDS can be derived at low field strength with linear behaviour of the material. Other than that, from the PDC response, the recovery voltage can also be measured directly [2].