

The Use of PD and Tan δ Characteristics as Diagnostic Technique for the Insulation Integrity of XLPE Insulated Cable Joints

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Abstract : Partial Discharge (PD) measurements are widely used for diagnostic purposes in electrical equipment used in power systems. The main cause of these measurements is to prevent large power failures as cables are prone to aging, which usually results in embrittlement, cracking and eventual failure of the insulating and sheathing materials, exposing the conductor and risking a potential short circuit, a likely cause of the electrical fire. Many distribution networks rely heavily on medium voltage (MV) power cables. The presence of joints in these networks is a vital part of serving the consumer demand for electricity continuously. Such measurements become even more important when the extent of dependence increases. Moreover, it is known that the partial discharge in joints and termination are difficult to track and are the most crucial point of failures in large power systems. This paper discusses the diagnostic techniques of four samples of XLPE insulated cable joints, each included with a different type of defect. Experiments were carried out by measuring PD and tan δ at very low frequency applied high voltage. The results show the importance of combining PD and tan δ for effective cable assessment.

Keywords : partial discharge, tan delta, very low frequency, XLPE cable

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