

Electrical Treeing Diagnostics – An Approach Combining Optical Measurements and Partial Discharge Statistics

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ABSTRACT

Many post-mortems on failed polymeric insulation have revealed electrical treeing as one of the final causes of electrical breakdown. This paper combines the laboratory constrained optical measurement techniques of electrical tree growth with the statistical analysis of associated captured partial discharge analysis, providing a consolidated approach to further study electrical treeing and improve in-situ diagnostics. A critical review of the available and commonly employed optical measurement techniques is outlined. This review is accompanied by a theoretical survey of statistical distributions potentially applicable to model partial discharge activity. The methodology to amalgamate these two diagnostic methods is presented, thereby describing the software development automating enhanced electrical tree growth measurements using image-processing techniques while correlating statistical partial discharge analysis.

Keywords: Partial discharges, electrical treeing, Weibull distribution, image processing, software development.