2018 IEEE International Power Modulator and High Voltage Conference



Contribution ID: 6

Type: Oral Presentation

Type of supply waveform, partial discharge behavior and life of rotating machine insulation systems

Wednesday 6 June 2018 16:00 (15 minutes)

It has been ascertained already, without doubts, that feeding rotating machines by power electronics drives can cause accelerated degradation and premature breakdown of electrical insulation. This is due to various factors, but the predominant one is the inception of partial discharges, PD, which are not expected to occur in Type I (organic) insulation, or the abnormal growth of PD (in amplitude and/or repetition rate) in Type II (mixed organic/inorganic) insulation. IEC standards, specifically 60034-18 41 and 60034-18-42 describe the proper approach to perform design qualification and type tests on Type I and Type II insulation, respectively. One of the most delicate issue of these standards is that, for reasons of simplicity, cost and availability on the market of adequate voltage impulse generators, PD and life tests can be carried out by both voltage repetitive impulses and sinusoidal voltage supply, with the only care that the test peak to peak voltage is the same whatever the chosen waveform (thus, implicitly, the peak to peak voltage is considered the predominant aging factor).

This paper has the purpose to speculate about how the type of waveform can affect PD features and life performance, considering not only repetitive impulse and sinusoidal waveforms, but also the real waveforms applied to rotating machine terminals by two, three and five level inverters. The effect of number of inverter levels on life and on PD pattern will be highlighted, and the relevant standards discussed.

Authors: Prof. MONTANARI, Gian Carlo (University of Bologna, University of Texas); Dr SERI, Paolo (University of Bologna)

Presenters: Prof. MONTANARI, Gian Carlo (University of Bologna, University of Texas); Dr SERI, Paolo (University of Bologna)

Session Classification: Oral 11 - Partial Discharges & Plasmas

Track Classification: Dielectrics, Insulation, and Breakdown