

This work presents the behavior of partial discharges in commissioning tests of a new generator, since the first generator excitation, synchronism, generator unit operating range test, heating test and PD measurement after two months and two years of commercial operation. This variation of measurements throughout the commissioning tests reinforces the need to consider the various factors such as vibration, temperature, load cycle, among others that influence the PD measurements describes in IEC 60034-27-2.

The operational range test showed the strong relationship between the PD magnitude and the relative vibration measured in GGB and TGB. After starting the test, the maximum values of relative vibration were measurements between power values of 10 to 40% of the nominal power, the levels of PD measurements were higher than the measurements with the nominal power machine.

In the generator heating test at 100% of the load, the stator and the bearings temperature stabilized after 4.5 hours. The PDs positive and negative persistent amplitude levels remained constant in phases A, B and V, between 200 and 300mV, during the test for rated active power ( $P = 611\text{MW}$ ) and  $\text{pf} = 0.9$ , but the number of measured pulses increased with each measurement cycle and in the last measurement, it was possible to observe the configuration of PRPD pattern internal discharges in phase A, with a similar behavior in the other phases.

In the last PD measurement showed the lowest magnitude values, because after two years the level of PD magnitude decrease, probably decrease over this period due to curing process of the impregnating resins.

The PDs measurements were performed in the new generator commissioning test, i.e. when a new stator comes into operation. The main differences between PD measurements are due to various thermal and mechanical effects related to the machine operation, like vibration and temperature gradients between copper and iron core stators during the tests.

For predictive maintenance, these measurements will be part of the PD measurement history, they will be the fingerprint of this unit and for this monitoring variable where no significant variation in the PD trend curve was observed. These measurements were made under specific operating conditions and, after the stator curing process, these levels decreased until they stabilize with the machine operating close to the rated power.