THERMAL INTERRUPTION PERFORMANCE AND FLUCTUATIONS IN HIGH VOLTAGE GAS CIRCUIT BREAKERS

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We report on experiments conducted to investigate the thermal interruption capability of high voltage self-blast gas circuit breakers[1]. In parallel, the circuit breaker behavior is studied using computational fluid dynamics tools[2]. It is well-known that nozzle ablation leads to systematic performance degradation. The influence of nozzle ablation on various parameters is studied as a function of the number of interruptions. Overall thermal interruption features of a test series are presented along with an analysis of the synthetic circuit. In order to study fluctuation characteristics during thermal interruption, we apply spectral analysis to our measurements of pressure in the accessible volumes of the circuit breaker, e.g. in the heating volume. We have identified pressure turbulence at frequencies above 100 kHz during the high pressure phase. A search for systematical dependencies of the fluctuations on nozzle ablation is presented. Additionally, fluctuations in the current and voltage measurements are touched upon.

1. A. Steffens, C. M. Franck and M. Seeger, "Basic Investigation on Resistance at Current Zero of SF_6 Selfblast Circuit Breakers", 15th International Conference on Gas Discharges and their Applications, September 5-10, 2004, pp. 65-68.
2. C. M. Franck, M. Claessens, H. Nordborg, M. Seeger and A. Steffens, "Thermal Interruption Behaviour of High-Voltage Circuit Breakers", 15th International Conference on Gas Discharges and their Applications, September 5-10, 2004, pp. 1-4.