

Abstract

The work presented in this report details the background to surge arresters and surge protective device components, viz., spark gaps, gas discharge tubes and metal oxide varistors. Current surge protective device technologies are detailed for several of the larger surge protective device manufacturers worldwide. Tests were performed using both 8/20 μs and 10/350 μs current impulses to verify the voltage and current response of gas discharge tubes with or without series MOVs and triggering circuits. Measurements obtained from the test setup were compared against each other, sharing a total impulse current of 35.8 kA peak using an 8/20 μs waveform and 10.2 kA peak using a 10/350 μs current impulse waveform. In the work presented, it is shown that series varistors dampened any voltage and current oscillatory behaviour superimposed from the current impulse generator due to their voltage clamping properties, which similarly do not allow any follow current to flow after a surge has subsided. No effect was seen by using a single varistor or a many parallel mounted varistors in series with a gas discharge tube. By using three electrode gas discharge tubes with a triggering circuit, the clamping voltage was reduced, as the gas tubes reacted faster than an equivalent circuit without a triggering module, which has the advantage of reducing the protection level for the protected equipment.