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New Dry Outdoor Terminations for HV extruded cables

PM Dejean; A Fustier; J Mansur; D Quaggia; B Parmigiani, Pirelli

Traditionally the self-standing Outdoor Terminations for extruded HV cables are designed with a porcelain insulator filled with an insulating fluid (oil or SF₆ gas).

Even if this design has a very long and positive service record, a certain number of drawbacks can be noted.

First of all the presence of a fluid inside the insulator requires the sealing carefully made for avoiding oil or gas leakage in service. To reduce the risk of out of service for the HV cable connection, these Outdoor Terminations are sometimes provided with a monitoring and alarm system that allows to maintain under control the fluid pressure during service.

Secondarily also the porcelain insulators have some disadvantages. They are fragile, heavy and in case of internal failure or external damage due to vandalism, the porcelain could explode. Furthermore for installation in seismic areas some special precautions are necessary to make the Porcelain Terminations "earthquake resistant".

To overcome the disadvantages of the traditional Fluid Filled Porcelain Termination a new type of Self-standing DRY Outdoor Termination for extruded cables up to 420 kV has been developed.

The new design is based on a Polymeric Insulator filled with an innovative Injected Resin that after a quick chemical reaction becomes a solid but elastic gel. So the new termination design is totally dry.

The main characteristics of the new Dry Outdoor Termination are:

- Trouble-free and maintenance-free because "dry".
- The combination of the gel filler with the polymeric insulator makes this solution an "intrinsically safe design". In case of failure there is not the projection of dangerous pieces far away from the termination, as it could happen in case of porcelain explosion.
- Light and easy to be installed.
- Able to withstand to earthquakes.

In this paper all the steps of the HV dry termination development are presented.

Short term and long duration tests according to IEC and French Standards have been performed on 225 kV and 420 kV terminations.

The resistance to a short circuit internally simulated in the termination has been verified.

To verify the tracking and erosion resistance of the Polymeric Insulator Silicone Housing a weather aging test has been also carried out.