

## XLPE cables with aluminium laminated sheath

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XLPE power cables with aluminium laminated sheath was developed to improve the long term wet ageing performance of power cables and has been in use for nearly 25 years. These cables are even common in indoor installations (no humid environment). Operational experiences on single core cables have not been as good as expected since several faults (insulation breakdown) have occurred. The problems have been related to overheating due to large heat development by capacitive and induced currents in the aluminium laminate/copper screen. The main reason of the fault is due to poor performance of the contact between the laminate and copper screen. The faults occur close to cable joints and at the end terminations, but may also occur close to cable straps where the cable is compressed and the copper screen may be in contact with the laminate. Essential information why and how to carry out the screen terminations may not always be sufficiently emphasized.

Preliminary theoretical studies and laboratory tests have been carried out in order to give basis for determining the currents and generated heat in the aluminium laminate and copper screen. This is carried out on alternative configurations (trefoil, flat formation) and cross sections of cable conductor and aluminium laminate/ copper screen and cover normal operation and fault conditions (short circuit, ground fault). In existing cable installations decision analyses are required whether replacement of the cable installation is required or repair is recommended. Regarding planned installations it should be evaluated if the watertight design with aluminium laminated sheath is needed. Alternative solutions by use of three core cables may in some cases be more reliable if watertight cables are required. In case of repair it should be evaluated if surge arresters for protection against atmospheric and switching over voltages should be used, especially if single point grounding screens are used.