

DC conductivity characterization of cables and correlation with lab measurements

Dimitri **CHARRIER** (1), Ludovic **BOYER** (2), Jean-Hugues **DOUMBE** (1), Arnaud **ALLAIS** (1)

1 Nexans Research Centre, Lyon, France

dimitri.charrier@nexans.com, jean-hugues.doumbe@nexans.com, arnaud.allais@nexans.com

2 Nexans France, Calais, France

ludovic.boyer@nexans.com

The DC conductivity and its variation with temperature and electric field and degassing stage are of key importance to assess the stability and the performance of an HVDC insulation system in rated condition and test condition according to CIGRE recommendations. However even after long practice of DC measurement one can realize that the state of materials are different in lab samples and full size cables systems for different reason. But the comparison can still point the main phenomena and careful use of lab sample results can lead to relevant conclusion on full size cable.

Typical DC measurement on plate and minicable are showing already some threshold at given electric field and temperature. The different disturbances of this measurement in the lab will be discussed and how to overcome them. The analysis of the result should take into account the predominance of interfaces behaviors and their impact depending on ratio surface/volume as well as the type of electrodes. Furthermore the need of conductivity measurements under the presence of crosslinking byproducts is an extra challenge and results are presented in this paper.

Measurement of conductivity in lab scale samples are transferred into a calculation model of full size cable and compared with leakage current measurements on full size cable.