



## WORKING GROUP FORM

### Study Committee: A2 and D1

<b>JWG A2/D1.46</b>	<b>Name of Convener: Ronny Mertens (BE)</b>
<b>Title: Field experience with transformer solid insulating ageing markers</b>	
<b>Terms of Reference</b>	
<b>Background:</b> <p>A significant number of transformers and shunt reactors in service are reaching or have already exceeded their expected end of life. Thus, transformer and shunt reactor users are dealing with an ageing population and have to plan a reinvestment program. Information on the condition of the solid insulation of these apparatus can be used as a key parameter for:</p> <ul style="list-style-type: none"><li>- Condition assessment of a transformer and shunt reactor fleet</li><li>- Selection of the best reinvestment option: repair/refurbish/replace</li></ul> <p>When transformers and shunt reactors have to be repaired, refurbished or scrapped/replaced, windings often have to be dismantled, which allows having access to critical parts of solid insulation that are usually not accessible. Thus, the correlation between paper condition and ageing markers (measured in the oil) can be evaluated. Moreover, in order to apply more accurately ageing markers and transformer and shunt reactor ageing models, there is a need to obtain design information e.g. quantities of oil and solid insulation (paper and board). Knowing that the quantity of insulating materials is directly linked to the design, the use of ageing markers models should be significantly improved by comparing their concentrations dissolved in oil with the quantity and the nature of the materials implied.</p>	
<b>Scope:</b> <p>This WG will compare the existing ageing markers with practical measurements of degree of polymerization (DP) on solid insulation samples taken on transformers and shunt reactor during repair, refurbishment or scrapping. Information on design will also be used.</p> <p>The main following activities will be covered by this WG:</p> <ul style="list-style-type: none"><li>• State-of-the-art on the available ageing markers/models</li><li>• Identify design information relevant to ageing markers models e.g. ratio of oil-paper-board, type of solid insulation, type of insulating liquid, type of cooling, type of preservation system, thermal characteristics, etc.</li><li>• Field case study to evaluate the correlation between existing chemical markers and paper DP, taking into account design information and, if applicable, operation and maintenance records</li><li>• Consideration of oil sampling temperature on the markers concentrations taking into account design</li><li>• Limitations of the markers and determination of their specific application (remaining life assessment and/or diagnostics)</li><li>• Recommendations on the end-of-life criteria of the insulation system based on ageing markers</li><li>• Comparison with other diagnostic techniques where applicable</li></ul> <p>This JWG will be in relation with WG A2.45 that will prepare a solid insulation sampling procedure.</p>	
<b>Deliverables and time schedule:</b> <p>End of 2015: Brochure and Workshop</p>	
<b>SCs / Target Groups concerned: WG A2.45</b>	
<b>Approval by TC Chairman: Klaus Fröhlich</b>	<b>Date : 21/06/2011</b>