

**PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)**

<b>WG* N° D1.45</b>	<b>Name of Convenor :</b> Jens Seifert (DE) <b>E-mail address:</b> JSeifert@lappinsulators.de
<b>Technical Issues # (2):</b> TI3	<b>Strategic Directions # (3):</b> 2, 3
<b>Title of the Group:</b> Testing of insulator performance under heavy rain	
<p><b>Scope, deliverables and proposed time schedule of the Group :</b></p> <p><b>Background :</b></p> <p>There are strong indications from service experience that the standardized test methods for evaluating the power frequency dielectric strength of external insulation may not be sufficient to cater for heavy rain conditions. For example:</p> <ul style="list-style-type: none"> <li>• in Brazil there have been a number of instances where flashovers occurred on AC energized station insulators during tropical (heavy) rain.</li> <li>• collected service experience on HVDC systems indicates that the majority of flashovers on bushings and vertical insulators occurred during rain.</li> </ul> <p>Of particular concern is the question if the presently-used test parameters and methods for rain tests are adequate to address all types of environment, with emphasis on the rate of precipitation, uniformity of the precipitation – especially at UHV – and the resistivity of the water used. In addition, there are now significant research results available which indicate that the combined stress of pollution and rain should be considered when dimensioning insulators, notably when considering ones with hydrophobic surfaces. Consequently, several organizations have either devised non-standard wetting tests, or investigated the effect of combined pollution and rain conditions, to either qualify proposed insulation solutions or to investigate their performance or to study the behaviour under these conditions.</p> <p><b>Scope :</b></p> <p>On the request from IEC TC 36 a CIGRE working group shall consider methods and past experiences of the evaluation of insulator performance under heavy rain conditions. The work will comprise the following activities:</p> <ol style="list-style-type: none"> <li>1. To collect and analyse field experience regarding the flashover performance of insulators during rain and pollution or a combination thereof.</li> <li>2. To perform an in-depth analysis of the available laboratory results from artificial rain or heavy wetting tests, with special emphasis on the following parameters: rain intensity, rain resistivity and insulator condition and type (clean, contaminated, type of material: hydrophobic, hydrophilic).</li> <li>3. To evaluate the representativeness of the standardised rain test</li> <li>4. To evaluate the repeatability of rain tests</li> <li>5. To determine the feasibility of rain tests in the UHV range</li> <li>6. Finally, guidelines should be provided on an alternative and/or a complement to standard rain tests. These guidelines could then help IEC in setting up a specification for the selection of insulators under typical wet conditions similarly to what has been done for pollution (IEC 60815). These guidelines should indicate, among others, the critical insulator parameters affecting performance under rain, giving also indications about the expected reduction of the strength under representative rain conditions with respect to the reference dry value.</li> </ol>	

A preliminary study by WG C4.303 has shown that the information available on the dielectric strength of external insulation under rain from the past laboratory experience is relatively sparse. It is therefore believed that the preparation of the guidelines will require a substantial effort to collect and analyze the available data to improve the knowledge of the influence of the various parameters such as wetting conditions, degree of contamination, insulator profile, diameter, and degree of hydrophobicity.

The work shall be performed in the following steps

- Preparation of report on “Laboratory and field experience about insulator performance under rain”.
- Preparation of Cigre Technical Brochure “Guide for the selection of insulators under rain”.

**Deliverables** : Report to be published in Electra or technical brochure with summary in Electra

**Time Schedule** : start : March 2012

**Final report** : 2015

**Comments from Chairmen of SCs concerned** : Other SCs concerned by the work: A3, C4

**Approval by Technical Committee Chairman** : Klaus Fröhlich

**Date** :24/10/2011

(1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2

**Table 1: Technical Issues of the TC project “Network of the Future” (cf. Electra 256 June 2011)**

<b>1</b>	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
<b>2</b>	The application of advanced metering and resulting massive need for exchange of information.
<b>3</b>	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
<b>4</b>	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
<b>5</b>	New concepts for system operation and control to take account of active customer interactions and different generation types.
<b>6</b>	New concepts for protection to respond to the developing grid and different characteristics of generation.
<b>7</b>	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
<b>8</b>	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
<b>9</b>	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
<b>10</b>	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

**Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)**

<b>1</b>	The electrical power system of the future
<b>2</b>	Making the best use of the existing system
<b>3</b>	Focus on the environment and sustainability
<b>4</b>	Interactive communication with the public and with political decision maker