CIGRE Study Committee D1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP[1]

WG N° D1.72	**Name of Convenor:** J. Lambrecht (DE)
Strategic Directions #[2]: 1	**Technical Issues #[3]: 3,**
The WG applies to distribution networks[4]: Yes	
Potential Benefit of WG work #[6]: 3, 5	
Title of the Group: Test of material resistance against surface arcing under DC	

Scope, deliverables and proposed time schedule of the Group:

Background:

An important property of materials for outdoor insulation is their resistance to surface discharges and surface arcing, which may occur at insulators as dry band arcing. Standards for testing this material property (IEC 60587; IEC 61621) and minimum requirements (IEC/TR 62039) are only available for AC. For DC components no equivalent tests are available but are needed by vertical product standards. Previous investigations with modified test arrangements showed a higher degradation of materials as well as a changed material ranking at DC stress caused by differences in the discharge mobility and electrolytic corrosion [1,2,3]. The work of CIGRE D1.27 has shown that further investigations and significant changes in the test arrangements are needed [3].

IEC TC 112 WG 5, as the customer of the results of the work of this working group, needs these results to establish proper standard or guidance for the material test under DC as requested from different vertical standard committees.

[1] Bär, C.; Cervinka, R.; Bärsch, et. al., Evaluation of the Retension of the Hydrophobicity and the Tracking Resistance of Silicone Elastomers under AC and DC Stresses, paper E-028, in 17th ISH, Hannover, 2011
[2] G. P. Bruce, Ageing of Outdoor Polymeric Insulation under HVDC, Dissertation, University Manchester, 2009
[3] Cigre WG D1.27, TB 611 - Feasibility Study for a DC Tracking and Erosion Test, 2015

Scope:

1. Literature and Expertise survey with national and internal test procedures
2. Extract requirements for material resistivity against surface arcing under DC
3. Indicate alternative test methods for future use (replacing traditional tests)
4. Set up a common test arrangement and a test procedure
5. Organise and provide a worldwide Round Robin Test to check reproducibility and repeatability
6. Summarize the work including test specification and Round Robin Test results in a brochure and provide a tutorial and Electra article

Deliverables:

☒ Technical Brochure and Executive summary in Electra

☒ Electra report

☒ Tutorial[5]

Time Schedule: start: June 2018 **Final Report**: 2021

Approval by Technical Committee Chairman:

Date: 17/04/2018

Notes: [1] or Joint Working Group (JWG), [2] See attached Table 2, [3]See attached Table 1, [4] Delete as appropriate, [5] Presentation of the work done by the WG, [6] See attached table 3

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

1	Active Distribution Networks resulting in bidirectional flows
2	The application of advanced metering and resulting massive need for exchange of information.
3	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.
4	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.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	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.
10	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 (ref. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience

Table 3: Potential benefit of work

1	Commercial, business or economic benefit for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical direction
5	Guide or survey related to existing techniques. Or an update on past work or previous Technical Brochures
6	Work likely to have a safety or environmental benefit