

CIGRE Study committee D1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG D1.84

NAME OF THE CONVENOR

Baer Christiane (GERMANY)

TITLE

Revised test method for the tracking and erosion resistance under DC voltage stress

THE WG APPLIES TO DISTRIBUTION NETWORKS: NO

ENERGY TRANSITION

4 / Sustainability and Climate Change

5 / Grids and Flexibility

POTENTIAL BENEFIT OF WG WORK

3 / likely to contribute to new or revised industry standards

5 / Guide or survey on techniques, or updates on past work or brochures

STRATEGIC DIRECTION

1 / The electrical power system of the future reinforcing the End-to-End nature of CIGRE: respond to speed of changes in the industry by preparing and disseminating state-of-the-art technological advances

SUSTAINABLE DEVELOPMENT GOAL

9 / Industry, innovation and infrastructure

BACKGROUND :

An important property of polymeric materials for outdoor insulation is their resistance to surface discharges and surface arcing. This may occur at insulators as dry band arcing and result in tracking and erosion of the polymeric material. Standards for testing this material property (IEC 60587) in the so-called inclined plane test and minimum requirements (IEC/TR 62039) are only available for AC. For the use of DC components, no equivalent test methods are available but are needed by vertical product standards. Previous investigations in the inclined plane test with modified test setups have shown a higher degradation of materials as well as a changed material ranking at DC stress [1,2,3]. The work of CIGRE WG D1.27 and recent WG D1.72 has shown that further investigations and significant changes in the inclined plane test setup are needed [3]. Latest results from Cigre WG D1.72 [4] with further modifications of test parameters show that the so far used method of a constant DC voltage application does not result in an improvement of the repeatability and reproducibility of test results. Orientational tests indicate an improvement of the repeatability and reproducibility of test results if a step test method is applied [4].

[1] Bär, C.; Cervinka, R.; Bärsch, et. al., Evaluation of the Retention 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

[4] Cigre WG D1.72, TB XXX - Feasibility Study for a DC Tracking and Erosion Test - Part 2, to be published in 2026

PURPOSE / OBJECTIVE / BENEFIT OF THIS WORK :

The IEC TC 112 WG 5 as the customer of the results of the work of this working groups needs these results to set up a proper standard or answer for the material test under DC as requested from different vertical standard committees.

SCOPE :

1. Literature and Expertise survey for defining promising test parameters in the inclined plane test for conducting step tests
2. Setting up a common test setup and a test procedure
3. Organise and provide a worldwide Round Robin Test to check the reproducibility and repeatability
4. Extract requirements for material resistivity against surface arcing under DC
5. Summarize the work including test specification and Round Robin Test results in a brochure and provide a tutorial and Electra article

DELIVERABLES AND EVENTS

Deliverables Types

Annual progress and activity report to Study Committee
Technical Brochure and Executive Summary in Electra
Tutorial

Time schedule

- | | | |
|----|------|-------------------------------------------------|
| Q2 | 2026 | Recruit members (National Committees, WiE, NGN) |
| Q3 | 2026 | Develop final work plan |
| Q4 | 2028 | Draft TB for Study Committee Review |
| Q2 | 2029 | Final TB |
| Q2 | 2029 | Tutorial |
| Q3 | 2029 | Webinar |

APPROVAL BY TECHNICAL COUNCIL CHAIRMAN:

Rannveig S. J. Loken
March 10th, 2026