CIGRE Study Committee D1

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

WG* N° D1.54	**Name of Convenor :** Boris Dardel (CH) **E-mail address**: Boris.Dardel@nexans.com
Technical Issues # [2]: 9	**Strategic Directions # [3]: 2**
The WG applies to distribution networks [4]: Yes	
Title of the Group: Basic principles and practical methods to measure the AC and DC resistance of conductors of power cables and overhead lines	

Scope, deliverables and proposed time schedule of the Group :

Background :

Conductors for insulated cables are classified according to their electrical resistance. Although most of the power lines are used in AC mode, IEC 60228 only defines classes based on DC values.
In AC mode and for large conductors for cables and overhead lines, skin-effect may lead to important load capacity reductions. These may be dependent on the conductor design (for example by using insulated wires). Qualification of AC conductor resistance becomes then an important aspect, e.g. of cable design, and the need for AC qualification is established. Though, the subject has been studied theoretically in great detail, and 3 methods for measurement of AC resistance have been proposed by SC B1 (see CIGRE TB 272), no specific set-up or method is presently prescribed in the IEC standards for conductor resistance measurements, even in DC.

Scope :

1. Review of the state of the art on AC and DC measurements and test equipment.
2. Literature review on basic principles for measurements of conductor resistance.
3. Define/develop a test procedure including suitable equipment for the measurement of AC and DC resistance.
4. Define and evaluate the factors of influence, e.g. frequency of current, current density and conductor temperature.
5. Determine precision and reliability of the test.

Experts from B1, B2 and other SCs concerned are most welcome in the WG.

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

Time Schedule : start : February 2013 **Final report** : 2016

Comments from Chairmen of SCs concerned : SC B1, B2

Approval by Technical Committee Chairman : M. Waldner
Date : 21/01/2013

(1) Joint Working Group (JWG) – (2) See attached table 1 – (3) See attached table 2 – (4) Delete as appropriate

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 within distribution level and to the upstream network.
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 (cf. 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