CIGRE Study Committee B1

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

WG* N° B1.46	**Name of Convenor :** Milan Uzelac (United States) **E-mail address**: muzelac@gwelec.com
Technical Issues # (2): 9	**Strategic Directions # (3): 2**
The WG applies to distribution networks (4): Yes	
Title of the Group: Conductor Connectors: Mechanical and Electrical Tests	

Scope, deliverables and proposed time schedule of the Group :

Background :

Current IEC 61238-1 standard applies to connectors for medium voltage cables. There is no IEC standard for connectors for HV cables. The procedures from IEC 61238-1 along with manufacturer and user specifications have been used to type test HV cable connectors. The thermal, mechanical and resistance stability tests specified in current standard are applicable to HV but some requirements are specific to high voltage applications. These include dimensional and functional requirements of connectors within HV cable accessories, typically larger cable sizes, versatility of the conductor constructions as well as different circuit load patterns, short circuit levels and mechanical stresses due to tensile and thrust loads.
The IEC WG16 of the TC20 commenced work on revision of current IEC61238-1 standard. During this work, some members of WG16, expressed interest that the scope of this standard is extended to high voltage cable application. The TF in charge of the revision believes this work needs to be done by a dedicated group of high voltage experts.
At the Study Committee B1 meeting held in Paris on August 28 and 29 2012 it was agreed that a task force be established to consider if further guidance was needed on the testing of connectors for HV cable accessories. It was also decided during the meeting that the topics should be expended to cover mechanical loads, (not only thermal), to include all connectors (mechanical and other types) and to include termination and joints connectors.

Scope :

1 To review
- The range and types of connectors currently available.
- Existing international standards and the extent to which they cover the testing of connectors.
- Any work been done by CIGRE, CIRED, JICABLE…
- Extent of service experience so far for different connector types.
- Customer needs.

2 To analyse
- Operation on high loaded systems where conductors are approaching or temporarily exceeding maximum conductor operating temperature.
- Thermo-mechanical performance of connectors under cycling loads.
- Performance of connectors in short circuit conditions, taking into account thermal and dynamic forces and actual network ratings.
- Performance of connectors installed in cable joints and terminations

3 To propose thermal and mechanical test regimes for connectors for HV and EHV cables with special attention be given to connectors for large size cables.

- Type, routine and sample tests including mechanical, cycling and resistance stability tests.
- Consider practicality of the short circuit test for large-size conductors and test loop arrangement.
- WG should be free to consider mechanical tests (e.g. tensile, thrust forces…) in order to evaluate mechanical strength of connection and physical properties of connector itself.
- WG should be free to consider separate or integral test sequences combining mechanical, cycling, short-circuit and resistance stability (assessment) acting on the same samples.
- Extent of connector type test experience so far (for different connector types).
- Evaluate necessity of performing type tests on connectors that already successfully passed qualification tests per IEC 60840.
- WG should consider range of type test approval

4 The WG should consider the tests that reflect mutual impact between connectors, cable conductors and accessories.

5 The conductor connectors for HV and EHV applications are to be considered. The WG will make recommendation to include or not connectors for MV applications.

Deliverables : Report to be published in Electra or Technical Brochure with summary in Electra. Tutorial

Time Schedule : start : January 2014 **Final report** : 2017

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman :
Date : 24/04/2014

(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