

**CIGRE Study Committee B1/B3**

**PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP**

<b>JWG 1<sup>N°</sup> B1-B3.74</b>	<b>Name of Convenor:</b> Pierre Mirebeau <b>E-mail address:</b> Pierre.Mirebeau@nexans.com
<b>Technical Issues #<sup>2</sup>:</b> 7	<b>Strategic Directions #<sup>3</sup>:</b> 3,4
<b>The WG applies to distribution networks<sup>4</sup>:</b> Yes	
<b>Potential Benefit of WG work #<sup>5</sup>:</b> 1,2,3,4,5,6,7	
<b>Title of the Group:</b> Recommendations for a performance standard of insulated busbars	
<p><b>Scope, deliverables and proposed time schedule of the WG:</b></p> <p><b>Background:</b></p> <p>Polymer Insulated Busbars (PIB) are not well known by most users or researchers, even they have no clear technical classification. There are no acknowledged requirements regarding their design and performances for manufacturers and costumers. Therefore, it is urgently needed to carry on systematic research on specification and test requirements to ensure its safe and secure operation in substation.</p> <p><b>Scope:</b></p> <p>The scope of the work will be as follows:</p> <ol style="list-style-type: none"> <li><b>1. Present use of polymer insulated busbars</b> <ul style="list-style-type: none"> <li>• Review of manufacturers, product types and applications worldwide           <ul style="list-style-type: none"> <li>○ Consider AC voltage only.</li> <li>○ Decide on the voltage range to cover (the need for addressing PIB &gt; 46kV)</li> <li>○ Focus on voltage ≥10kV</li> <li>○ Review of operation feedback (breakdowns and so on)</li> </ul> </li> <li>• Review manufacturers proprietary tests</li> <li>• Basic design description of the PIB</li> <li>• Definitions of the different PIB components.</li> </ul> </li> <li><b>2. Prestandardisation document structure and main contents</b> <ul style="list-style-type: none"> <li>• The main considerations of PIB pre-standardisation           <ul style="list-style-type: none"> <li>○ using a paragraph arrangement similar to IEC 60840, considering in addition the requirements of UL 1366 standard, Chinese standards CQ/GDW 11646-2017, T/CSEE 0029-2017 and DL/T 1956-2018, and international standards IEC 60502-2, IEC 60502-4 and IEC 60840.</li> <li>○ The PIB must be considered as a cable system (including accessories)</li> <li>○ Due to the large transmitted power, the sequence prequalification test – type test - routine test – sample test – after installation test is to be followed.</li> <li>○ Define material requirements depending on the material types.</li> <li>○ Special tests are worth to investigate depending on the technology               <ul style="list-style-type: none"> <li>▪ Temperature rise test</li> <li>▪ Short time withstand current test – peak current withstand test.</li> </ul> </li> </ul> </li> </ul> </li> </ol>	

- Thermal expansion test

- Define the sectionalisation requirements for accessories (AC and impulse)
  - Evaluate the relevance of DC test (withstand test, leakage current test, absorptance of the insulation layer test R60s/R15s)
  - Evaluate the (new) tests needed to qualify the current rating, and the short circuit rating
  - Depending on the design, tests of the screen capability in short circuit, and of the screen insulation.
  - Evaluate weather resistance test (UV protection, rain test...)
  - Clamps, Support Structure, Grounding/Bonding, Tap Boxes should be addressed.
  - Safety issues (arcing test)
- After installation tests
    - Provide guidance on after installation tests
  - Maintenance
    - Provide guidance on the maintenance of Polymer insulated busbars.

**Deliverables:**

- Technical Brochure and Executive Summary in Electra
- Electra Report
- Tutorial<sup>6</sup>
- Webinar<sup>6</sup>

**Time Schedule:** start: November 2019

**Final Report:** December 2022

**Approval by Technical Council Chairman:**

**Date:**

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

**Table 1: Technical Issues for creation of a new WG**

<b>1</b>	Active Distribution Networks resulting in bidirectional power and data flows within distribution levels up to higher voltage networks
<b>2</b>	Digitalization of the Electric Power Units (EPU): Real-time data acquisition includes advanced metering, processing large data sets (Big Data), emerging technologies such as Internet of Things (IoT), 3D, virtual and augmented reality, secure and efficient telecommunication network
<b>3</b>	The growth of direct current (DC) and power electronics (PE) at all voltage levels and its impact on power quality, system control, system operation, system security, and standardisation
<b>4</b>	The need for the development and significant installation of energy storage systems, and electric transportation, considering the impact they can have on the power system development, operation and performance
<b>5</b>	New concepts for system operation, control and planning to take account of active customer interactions, and different generation types, and new technology solutions for active and reactive power flow control
<b>6</b>	New concepts for protection to respond to the developing grid and different generation characteristics
<b>7</b>	New concepts in all aspects of power systems to take into account increasing environmental constraints and to address relevant sustainable development goals.
<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 through the use of overhead, underground and submarine infrastructure, and its consequence on the technical performance and reliability of the network
<b>10</b>	An increasing need for keeping Stakeholders and Regulators aware of the technical and commercial consequences and keeping them engaged during the development of their future network

**Table 2: Strategic directions of the Technical Council**

<b>1</b>	The electrical power system of the future: respond to speed of changes in the industry
<b>2</b>	Making the best use of the existing systems
<b>3</b>	Focus on the environment and sustainability
<b>4</b>	Preparation of material readable for non-technical audience

**Table 3: Potential benefit of work**

<b>1</b>	Commercial, business, social and economic benefits for industry or the community can be identified as a direct result of this work
<b>2</b>	Existing or future high interest in the work from a wide range of stakeholders
<b>3</b>	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
<b>4</b>	State-of-the-art or innovative solutions or new technical directions
<b>5</b>	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
<b>6</b>	Work likely to contribute to improved safety.
<b>7</b>	Work addressing environmental requirements and sustainable development goals.