CIGRE Study committe B1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG B1.100

NAME OF THE CONVENOR
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TITLE
Recommendations for qualification procedures of Metallic Return cable (HVDC systems)

THE WG APPLIES TO DISTRIBUTION NETWORKS: NO

ENERGY TRANSITION
4 / Sustainability and Climate Change
5 / Grids and Flexibility
6 / Solar PV and Wind

POTENTIAL BENEFIT OF WG WORK
3 / likely to contribute to new or revised industry standards

STRATEGIC DIRECTION
2 / Making the best use of the existing systems

SUSTAINABLE DEVELOPMENT GOAL
7 / Affordable and clean energy
9 / Industry, innovation and infrastructure

BACKGROUND :

Recently, a massive increase in the number of constructed and planned HVDC connections has been observed. For reliability purposes, the bipolar arrangement of converters with metallic return (MR) or dedicated metallic return (DMR) cable installed together with HVDC cables is often chosen.

According to international standards and guidelines, the qualification of MR is performed through a Type Test (TT). The goal of this qualification is to confirm the suitability of a given cable system for its intended application.

Based on the construction characteristics and operational regime of the MR cable, its qualification follows different testing procedures than those applied to HVDC cables intended for the same project. Currently, there are no standardized requirements for MR cable construction. Project-specific studies define the MR design to ensure required reliability, leading to variations in TT regimes proposed by different suppliers across projects. Guidelines from organizations such as CIGRE or IEC can be referenced.

When examining TT dedicated to MR testing, several gaps become evident—particularly in how the TT simulates the MR cable’s lifetime and accounts for all electrical stress factors. The TT structure needs optimization: unnecessary tests should be avoided, while ensuring the cable system is fit for purpose.

PURPOSE / OBJECTIVE / BENEFIT OF THIS WORK :

It is proposed to form a Working group comprising representatives from cable manufacturers, TSOs, and test institutes to develop more robust guidelines and qualification procedures for MR cable systems. Once these guidelines are established, standardized and representative TT procedures can be applied objectively to upcoming projects. This will:

- Ensure consistency and reliability in MR cable qualification.
- Reduce unnecessary testing while maintaining confidence in system performance.
- Provide clear, internationally recognized standards for future HVDC projects.

- This will be a valuable addition to the TB 852 and TB 853.

SCOPE :

- Identify the operational stress factors for DMR
- Determine the relevant construction characteristics of MR
- Increase the awareness of the MR cable system importance
- Define a representative and robust TT sequence

DELIVERABLES AND EVENTS

Deliverables Types

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

Time schedule

Q4	2025	Recruit members
Q1	2026	Develop workplan
Q4	2027	Draft TB for SC review
Q4	2028	Final TB for publication
Q4	2028	Approved Tutorial

APPROVAL BY TECHNICAL COUNCIL CHAIRMAN:

Rannveig S. J. Loken
November 25th, 2025