

CIGRE Study committee B1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG B1.102

NAME OF THE CONVENOR

Trolli Alessandro (ITALY)

TITLE

Specific tests and characteristics of cable systems with conductor cross sections larger than 2500mm²

THE WG APPLIES TO DISTRIBUTION NETWORKS: NO

ENERGY TRANSITION

5 / Grids and Flexibility

POTENTIAL BENEFIT OF WG WORK

- 1 / commercial, business, social, economic benefits
- 2 / potential interest from a wide range of stakeholders
- 3 / likely to contribute to new or revised industry standards

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

- 7 / Affordable and clean energy
- 9 / Industry, innovation and infrastructure

BACKGROUND :

Most of existing cable standards are limited to maximum 2500 mm² cross section. Recently new large cross sections of conductors, above 2500mm²: 3200mm² & 3500mm² have been included in the fourth edition of IEC 60229 "CONDUCTORS OF INSULATED CABLES". Some possible applications are currently considered including even larger cross sections. Moreover, in addition to Milliken conductor, that are used in HVAC, large round stranded conductors are manufactured to be used in HVDC.

This opens a new area for engineers to dimension the cable system.

There is missing available data on e.g.

- *Skin and proximity effect coefficients k_s , k_p ,*
- *Pulling forces and handling capability during installation,*
- *Thermomechanical parameters (thrust, expansion coefficient)*
- *Thermal behaviour for emergency current rating.*
- *out of scopes: e.g. enamelled/oxidised strands*

The cable system qualification scope of tests may need an update, e.g.

- *Connector qualification,*
- *Rigid and flexible installation sections during PQ and EQ tests*

PURPOSE / OBJECTIVE / BENEFIT OF THIS WORK :

This work aims at extending the application range of CIGRE Technical brochures and IEC standards cable systems

with cross section larger than 2500mm².

This is highly desired by IEC TC20

SCOPE :

The WG will consider all large cross sections cable systems, HVAC and HVDC, with Milliken and round stranded conductors, copper and aluminium. Also to consider implications of other designs (eg. enamelled/oxidised strands).

Available data in CIGRE Technical Brochures and in International Standards will be complemented:

The electric characteristics of conductors will complement TB 272 "LARGE CROSS-SECTIONS AND COMPOSITE SCREENS DESIGN", which is currently limited to 2500mm². The new table of ks and kp coefficients will replace the one in TB272 chapter 10.

The characteristics of pulling forces and handling capabilities will complement TB889 "INSTALLATION OF UNDERGROUND HV CABLE SYSTEMS", especially chapter 3

The thermomechanical parameters will complement TB669 "MECHANICAL FORCES IN LARGE CROSS SECTION CABLES SYSTEMS" and TB 889

The thermal behaviour for emergency current rating will complement IEC 60853 "CALCULATION OF THE CYCLIC AND EMERGENCY CURRENT RATING OF CABLES" and present CIGRE WG B1.72.

The scope of test for cable system qualification will be reviewed.

Connector qualification as per CIGRE TB758 "TEST REGIMES FOR HV AND EHV CABLE CONNECTORS"

Cable system qualification as per IEC 62067, IEC 60840 for HVAC, CIGRE ; TB852 for HVDC.

The WG may also refer to TB894-Practical methods to measure AC and DC resistance of conductors.

Remarks:

Characteristics and operation feedback from cable systems with large cross section already in use should be gathered.

DELIVERABLES AND EVENTS

Deliverables Types

Annual progress and activity report to Study Committee

Technical Brochure and Executive Summary in Electra

Tutorial

Webinar

Work Schedule

Time schedule

Q1 2026 Recruit members

Q1 2026 Develop workplan

Q2 2028 Draft TB for SC review

Q1 2029 Final TB for publication

Q1 2029 Approved Tutorial

APPROVAL BY TECHNICAL COUNCIL CHAIRMAN:

Rannveig Loken

February 11th, 2026