

## CIGRE Study Committee B1

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

<b>WG 1<sup>N</sup> B1.91</b>	<b>Name of Convenor:</b> Frederic Lesur (FRANCE) <b>E-mail address:</b> frederic.lesur@nexans.com	
<b>Strategic Directions #<sup>2</sup>:</b> 1,2		<b>Sustainable Development Goal #<sup>3</sup>:</b> 9,13
<b>The WG applies to distribution networks:</b> <input type="checkbox"/> Yes / <input checked="" type="checkbox"/> No		
<b>Potential Benefit of WG work #<sup>4</sup> :</b> 3		
<b>Title of the Group:</b> Transient Thermal Modelling of Power Cables (update to IEC 60853)		
<p><b>Scope, deliverables and proposed time schedule of the WG:</b></p> <p><b>Background:</b></p> <p>The SC B1 meeting held as part of the virtual Paris Session 2020 requested the formation of a Task Force (B1.84) to review the methods and derivations in IEC 60853. It was noted that the standard has not been significantly updated in many years and is often difficult to read and challenging to apply successfully. The original technical background is not clear to the majority of users, and work on future updates will become more difficult as time passes by.</p> <p>The work completed by TF B1.84 has identified that there are no current plans within IEC for a major update of this standard, although some minor changes may be made after 2023. Consultation with users from the countries represented by the TF has concluded that the existing standard does not sufficiently meet the needs of many users. However, it is clear that a “standardizable” method for computing transient temperatures and ratings of power cables is still essential for the industry as a whole.</p> <p><b>Scope:</b></p> <ol style="list-style-type: none"> <li>1. To review the technical background to the existing IEC 60853 standard, including limitations of applicability as a result of the methodology used.</li> <li>2. To engage with users of transient current rating calculations across the industry, identifying what they would need from a new methodology.</li> <li>3. Review the technical literature published in recent years and identify if recently published methods could be adopted to solve the gaps identified in the existing IEC 60853 standard.</li> <li>4. Provide guidance on the input data for transient rating calculations.</li> <li>5. Assess the following topics related to Step Response calculations:       <ol style="list-style-type: none"> <li>a. Losses that vary with temperature</li> <li>b. Alignment between step response and emergency rating calculations</li> <li>c. Alignment between long term step response and steady state calculations</li> <li>d. Representation of the soil during long transients</li> </ol> </li> <li>6. Cyclic rating factor (review of technical basis ref: 2 loop network, 6hr limitation, loss factor).</li> </ol>		

7. Provide recommendations on the handling of variable loading scenarios.
8. Assess if it is possible to model multiple circuits which thermally interact with each other.
9. Provide an overall, self-contained recommendation for an analytical method of temperature calculations for cables subject to varying loads. This should include advice to users on how to implement the methods. Any limitations of the modelling technique should be clearly recorded.
10. Example (verified) calculation.

**Remarks:**

This Proposal has been developed by TF B1.84. The TF has also created a short technical report so summarise the work undertaken, and the inputs received from the B1 community that led to the creation of this Proposal. It is important to note that the TF B1.84 scope also included the assessment of IEC TR 62095 on finite element modelling of cable ratings. The opinion of the TF B1.84 members and members of SC B1 concluded that it is not desirable to combine all of the work into one WG due to the size of the scope. Therefore, the section on Finite Element Modelling was started in Q4 2021 by WG B1.87.

**Deliverables:**

- Annual Progress and Activity Report to Study Committee
- Technical Brochure and Executive Summary in Electra
- Electra Report
- Future Connections
- CIGRE Science & Engineering (CSE) Journal
- Tutorial
- Webinar

**Time Schedule:** start: Q4 2022

**Final Report:** Q4 2025

**Approval by Technical Council Chairman:**

**Date:** November 25<sup>th</sup>, 2022



**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 and CIGRE reference Paper: Sustainability – at the heart of CIGRE's work.

<sup>4</sup> See attached Table 3

WG Membership: refer Comments at end of document

**Table 1: Strategic directions of the Technical Council**

<b>1</b>	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
<b>2</b>	Making the best use of the existing systems
<b>3</b>	Focus on the environment and sustainability (in case the WG shows a direct contribution to at least one SDG)
<b>4</b>	Preparation of material readable for non-technical audience

**Table 2: Environmental requirements and sustainable development goals**

	CIGRE selected the 7 SDGs that are the most relevant to CIGRE. In case the WG work refers to other SDGs or do not address any specific SDG, it will be quoted 0.
<b>0</b>	Other SDGs or not applied
<b>7</b>	<b>SDG 7: Affordable and clean energy</b> Increase share of renewable energy; e.g. expand infrastructure for supplying sustainable energy services; ensure universal access to affordable, reliable, and modern energy services; energy efficiency; facilitate access to clean energy research and technology
<b>9</b>	<b>SDG 9: Industry, innovation and infrastructure</b> Facilitate sustainable infrastructure development; facilitate technological and technical support
<b>11</b>	<b>SDG 11: Sustainable cities and communities</b> Increase attention on sustainable and resilient buildings utilizing local (raw) materials, power for electric vehicles, strengthening long-line transmission and distribution systems to import necessary power to cities, developing micro-grids to reinforce the sustainable nature of cities; protect and safeguard the world's cultural and natural heritage; reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and waste management
<b>12</b>	<b>SDG 12: Responsible consumption and production</b> E.g. Promote public procurement practices that are sustainable; address reducing use of SF6 and promote alternatives, encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle, address inefficient fossil-fuel subsidies that encourage wasteful consumption
<b>13</b>	<b>SDG 13: Climate action</b> E.g. Increase share of renewable or other CO <sub>2</sub> -free energy; energy efficiency; expand infrastructure for supplying sustainable energy; strengthen resilience and adaptive capacity to climate-related hazards and natural disasters; integrate climate change measures into national policies, strategies and planning; improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
<b>14</b>	<b>SDG 14: Life below water</b> E.g. Effects of offshore windfarms; effects of submarine cables on sea-life
<b>15</b>	<b>SDG 15: Life on land</b> E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape

**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.

**Comments:**

**1) CIGRE Official Study Committee Rules: WG Membership**

<https://www.cigre.org/GB/about/official-documents>

- a. Only one member per country (by exception of SC Chair)
- b. WG nominees must first be supported by their National Committee (or local SC Member) as an appropriate representative of their country.
- c. Acceptance of the nomination is granted by the SC Chair and advised to the WG Convener

**2) Collaboration Space**

<https://www.cigre.org/article/GB/collaborative-tools-2>

CIGRE will provision the WG with a dedicated Knowledge Management System Space.

The WG will use the KMS for drafting collaboration, capture and retention of discussion and meeting records.

Official country WG Members will be sent registration instructions by the Convener.

Official country WG Members may request the WG Convener to allow additional access for an extra national subject matter specialist to aid in the work at the national level, including NGN members.