

Study Committee A2 Update Sep 2025

Presented by Thomas Herskind OLESEN

General Assembly – Danish National committee

24/09/2025



cigre

For power system expertise

SC A2 Contributions to CIGRE Strategic Plan

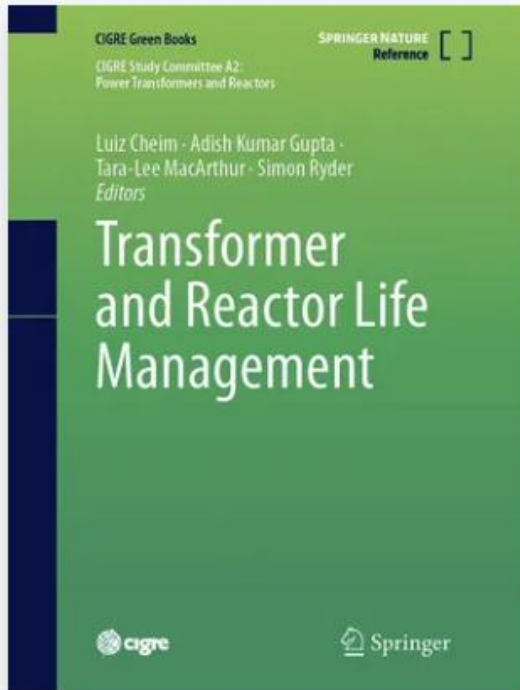
Themes	A2 Current or Possible Contributions
Hydrogen	No specific issues related to transformers have been identified
Storage	No specific issues related to transformers have been identified
Wind & Solar => IMPACT	<ul style="list-style-type: none">• Innovative transformer design for Wind and Solar applications• Impact of harmonics on transformers• Impact of frequent switching on transformers• Impact of highly cycling loading on transformers• Reliability survey of transformers used in wind and solar farms
Grids and Microgrid integration => NEW TECH	<ul style="list-style-type: none">• New transformer technologies to facilitate microgrid integration• Requirements/Specifications for transformers used in microgrid integration
Consumer, Prosumers and EV	<ul style="list-style-type: none">• Solid State Transformers for charging stations.
Climate Change => NEW APPROACH	<ul style="list-style-type: none">• Impact of severe weather on transformers• Resilience to climate changes• Circular economy• Life extension, End of Life• Life Cycle Assessment
Sector integration	<ul style="list-style-type: none">• Innovative transformer designs to support sector integration
Digitalization => INDUSTRY 5.0	<ul style="list-style-type: none">• Digital twins• Big data, Analytics• Transformer Common Information Model

List of active A2 Working Groups

WG	Title	Convenor
A2.56	Power Transformer Efficiency	Zarko JANIC (HR)
A2.58	Installation and Pre-Commissioning of Transformers and Shunt Reactors	Ross WILLOUGHBY (AU)
A2.60	Dynamic Thermal Behaviour of Power Transformers	Tim GRADNIK (SI)
A2.63	Transformer impulse testing	Ebrahim RAHIMPOUR (DE)
A2/D2.65	Transformer Digital Twin	Patrick PICHER (CA)
A2/D1.66	Transformer Breathing Systems	Daniel KOCH (DE)
A2/D1.67	Guideline for online dissolved gas analysis monitoring	Tara-lee McARTHUR (AU) Khayakazi DIOKA (ZA)
A2.68	Failure survey of lower voltage generator step up transformers installed in wind farms and photovoltaic parks	Peter WERLE (DE)
A2/C3.70	Life Cycle Assessment (LCA) of Transformers	Myles MARGOT (DE)
A2/D1.71	Modern insulating liquids qualification for OLTC, bushings and other accessories	Lars LIDEN (SE)
A2/D1.72	Retrofill of Mineral Oil in Transformers – Motivations, Considerations and Guidance	Roberto ASANO (BR)
A2.73	Enhancing the exchange of Transformer information through digitalisation	Carl WOLMARANS (ZA)
A2/D1.74	Online moisture monitoring of transformers for ageing assessment	Senja LEIVO (FI)
A2.75	Tap Changer Specification, Condition Assessment, Testing and Maintenance Guidelines	Sidwell MTETWA (ZA)
A2.76	Power transformer passive protection against internal arcing faults	Jean-Bernard DASTOUS (CA)
A2/C4/D1.77	Design of transformers for very fast transient overvoltages	Bruno JURISIC (HR)
A2.78	Bushing Diagnostics Off-Line Testing and On-Line Monitoring Systems	Poorvi PATEL (US)

List of active Joint Working Groups and Task Forces

WG	Title	Convenor
D1/A2.77	Liquid Tests for Electrical Equipment	Fabio SCATIGGIO (IT)
D1/A2.79	Improved Understanding of Dynamic Behaviour of Winding Insulating Materials in Liquid Insulated Power Transformers	Orlando GIRLANDA (SE)
D1/A2.80	Functional Properties of Non-Metallic Solid Materials for Liquid-Filled Transformers and Reactors and Their Compatibility	Dejan VUKOVIC (DE)
B3/A2/A3/C3/D1.66	Guidelines for Life Cycle Assessment in Substations Considering the Carbon Footprint Evaluation	Akshaya PRABAKAR (NL)
Task Force	Silver Corrosion in Transformers	Jelena LUKIC (HS)
Task Force	Reference paper on The Short-Circuit Performance of Power Transformers	Khayakazi DIOKA (ZA)
Task Force	Explore how Differences in Regulation, Society Expectations and Government Policies Impact the Replacement Age of Power Transformers	Dan MARTIN (AU)



GREEN BOOKS

Transformer and Reactor Life Management

Ref GB 17 • 2024

New A2 Brochures recently published on e-cigre

TB937: [Condition of Cellulose Insulation in Oil After Factory Acceptance Test](#)

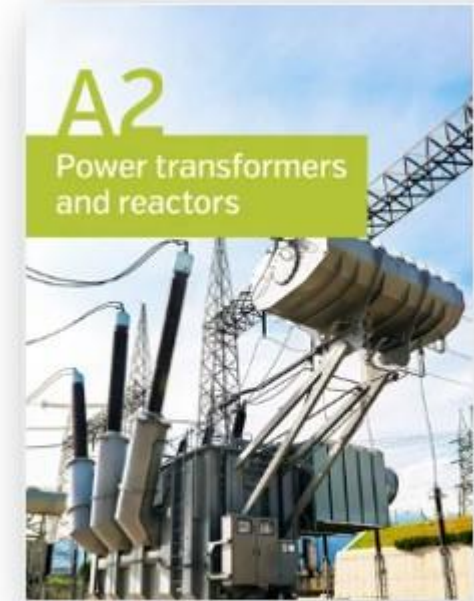
The purpose of this brochure is to provide the industry with a guide for checking material properties of cellulose insulation at the point when the transformer leaves the factory. The report covers the selection of relevant acceptance parameters, simulations of the relative influence of these parameters and suggested acceptance criteria. It also covers how to measure these parameters. Focus has been to define parameters that have a direct effect on the transformer insulation lifetime, that are measurable and where achievable limits can be defined and set.

TB939 : [Analysis of AC Transformer Reliability](#)

The reliability of the world's power transformer fleet has been reviewed. Of the more than 425,000 transformer years of operation collected, there were 1,204 major failures and 1,916 retirements from 66 utilities in 27 different countries. In addition to retirements and major failures, the age distribution was also analysed. As a result of increased emphasis on improving reliability over the life cycle, the failure rate has now fallen by more than half since the last Working Group. For all major failures, the hazard curve was fairly random with a slow increase with age.

TB940 : [Power Transformer Audible Sound Requirements](#)

The brochure covers all aspects of audible sound relevant for new power transformer purchases > 3 MVA to be considered in the process from specification until installation. Strict distinction is made between the individual sound level components 'no-load sound level', 'load sound level' and 'cooling system sound level' but the combination of the components is also explained. Key results are provided in easy-to-use graphs. The brochure is also intended to serve as educational document for transformer acoustics.





A2

Power transformers & reactors



PS1: Major challenges to the Power transformer industry

- › Impact of ageing fleet, new operating requirements and climate changes on the design, maintenance and reliability.
- › Strategies to mitigate supply chain disruptions and skilled labor shortages.
- › Sustainability (with C3) and Life Management: Transformer economics, Life Cycle Costing, Asset management practices, Eco-design. Life Cycle Assessment, circular economy.

PS2: Power Transformer Digitalisation Journey

- › User experiences, challenges and solutions with transformer data management: data collection, processing, exchange with different stakeholders/systems, confidentiality, and security.
- › Innovative digital solutions for monitoring, diagnostics, modeling, designing, manufacturing, testing, maintenance and operation of transformers.

PS3: Failure prevention, detection and investigation

- › Detailed case histories of failures including examples such as component issues, short-circuits, moisture, dielectric breakdowns, paper degradation, material compatibility problems, etc.
- › Guidelines for conducting investigations: Root Cause Analysis (RCA) including testing and troubleshooting procedures.
- › Predictive maintenance: Best practices for monitoring, diagnostics, and prognostics.

Thank you

