

CIGRE Study committee A2

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

JWG A2/C3.79

NAME OF THE CONVENOR

DICKINSON Janine (UNITED KINGDOM)

TITLE

Power Transformers and Reactors Sound Levels On Site

THE WG APPLIES TO DISTRIBUTION NETWORKS: YES

ENERGY TRANSITION

0 / Not applied

POTENTIAL BENEFIT OF WG WORK

3 / likely to contribute to new or revised industry standards

7 / Addressing environmental requirements & sustainable dev. goals

STRATEGIC DIRECTION

3 / Focus of the environment and sustainability (in case the WG shows a direct contribution to at least one SDG)

SUSTAINABLE DEVELOPMENT GOAL

0 / Other SDGs or not applied

BACKGROUND :

International standards such as IEEE Std C57.12.90 "Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers", IEC 60076-10 "Power transformers – Part 10: Determination of sound levels" and CIGRE TB 940 "Power transformer audible sound requirements" define very well the measurement of audible sound emission and how to determine the sound power level of power transformers during factory acceptance testing.

Recently, CIGRE WG A2.54 "Power transformer audible sound requirements" studied and proposed ranges for reference sound power levels of transformers of different rated power, however this study considered sound power levels determined under factory acceptance conditions.

PURPOSE / OBJECTIVE / BENEFIT OF THIS WORK :

Once a transformer is installed on a substation site however, sound level measurements often do not match the sound level determined during factory acceptance testing. Measured on-site sound levels are often found to be higher instead. Although there are some hints given in IEC 60076-10-1 and CIGRE TB 940 there is no clear guidance within the industry as to why this is often the case. There is also no guidance on best practice methods for determining the sound power level of an operational transformer on site.

SCOPE :

- Units to be considered: liquid immersed distribution and power transformers with S = >10 MVA and liquid immersed shunt reactors, including variable shunt reactors with S = >10 MVA
- Outline variations in legislation and noise limits across the world with reference to CIGRE TB 940.
- Define differences between FAT sound measurements and on-site sound measurements and their effects.
- Outline restrictions and limitations of on-site sound measurements and indicate effects on measurements.
- Study and provide information on the key variables that cause differences in on site sound measurements and FAT sound measurement data (e.g. mechanical, electrical, human/environmental, measurement and design/assembly root causes).
- Provide an overview of the variability of methods used by operators for determining the sound level of a transformer once installed on a site and how this differs from FAT measurement methods.
- Provide guidance/best practice on how to define Type Test Requirements and Factory Acceptance Test requirements to enable a prediction of transformer sound power on site under a range of operating conditions.
- Determine whether the sound emitted by the sides of a Transformer can be used to estimate the sound from the tank cover (top surface) and provide guidance on any correction factors.
- Explore the benefits and feasibility of and recommendations for developing a method for determining the sound power of a transformer once installed on a site and provide worked examples where appropriate.
- Develop a troubleshooting guide to help the operator identify the cause of increased sound during site measurements and hence develop appropriate mitigation.
- Description of retrofit sound mitigation options not covered by TB 655 and TB 940 and their effects on the sound level.
- Provide initial high level thoughts on potential future work regarding standards, specification and measurement (e.g. NEMA vs. IEEE/IEC, sound intensity vs. sound pressure).

DELIVERABLES AND EVENTS

Deliverables Types

Electra report
Technical Brochure and Executive Summary in Electra
Tutorial
Work Schedule

Time schedule

Q2	2025	Recruit members (National Committees, WiE, NGN)
Q3	2025	Develop final work plan
Q3	2027	Draft Technical Brochure for Study Committee review
Q4	2027	Final draft Technical Brochure

APPROVAL BY TECHNICAL COUNCIL CHAIRMAN:

Rannveig S. J. Loken
May 08th, 2025