

CENELEC/TC or SC 14	Secretariat IT	Date 2021-12-10
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*Please ensure this form is annexed to the TC Report to the CENELEC Technical Board if it has been prepared during a meeting, or sent to CCMC promptly after its contents have been agreed by the Committee by correspondence.*

**TC or SC title:** Power transformers

## **A Background**

Technical Committee 14 was created long time ago and has met regularly to develop and maintain standards for power transformers. The Committee continually analyzes and incorporates in its standards, the trends and changes in European market demand for all types of power transformers manufactured or traded between countries.

Scope:

Standardization in the field of power transformers, tap-changers and reactors for use in power generation, transmission and distribution.

Generally these transformers have power ratings above 1 kVA single phase and 5 kVA polyphase with a higher voltage winding of 1000 V or more, however the scope includes lower voltage transformers and regulators used in power delivery applications.

Excluded:

- Instrument transformers
- Testing transformers
- Traction transformers mounted on rolling stock
- Welding transformers
- Transformers for applications covered by TC 96.

Specifically to prepare new European Standards to cover European needs, EC Directives and Regulations included, that are not of interest in IEC.

To follow the IEC activities in the light of European needs. More specifically to be able to write standards that can be adopted by IEC and so influence the world market trend. Single European countries do not have the pool of experts required to carry out these activities alone.

To face environmental and safety aspects taking into account the European Directives.

TC14 is working under the Mandate of the document 24/2011EN concerning the "Standardization mandate to CEN, CENELEC and ETSI under Directive 2009/125/EC relating to harmonized standards in the field of Ecodesign".

Participating (P) Members (27): AT, BE, HR, CY, CZ, DK, EE, FI, FR, DE, GR, HU, IE, IT, LU, MT, NL, NO, PL, PT, RO, SK, SI, ES, SE, GB

Observers (3): EC, Montenegro

Liaisons: Liaisons are established when there are specific issues of common interest with other TC's.

## **B Business Environment**

### **B.1 General**

Power transformers are widely used throughout electrical supply chain mainly for changing system voltages according to environmental, safety, economic and commercial needs, in production, transmission and distribution areas up to the final user.

Power transformers covered by the TC14 activity have rating power from above 1 kVA single phase and 5 kVA polyphase, with at least a winding with rated voltage greater than 1000 V, up to large power EHV

units.

The European power transformer industry is a mature industry, continually in evolution to meet the new demands of the market. According to recent publicly available documents in Europe:

- more than 6 million units under the scope of CLC TC14 are in use
- more than 300000 units under the scope of CLC TC 14 are installed per year
- the value of the market under the scope of CLC TC14 is around 4 billion euros per year (data referred to 2007).

Present standards have the consensus of the members for the present technology and materials, but changes are continuously requested by new EC regulations, technology progress, new materials and testing methods, with a clear orientation towards environmental and health aspects.

## **B.2 Market demand**

One of the most important aspect of market demand concerns the reduction of losses, the reduction of noise and the limitation of the environmental impacts taking into consideration costs and reliability. Special attention is also paid to the role of power transformers in smart grids, to the integration of renewables in the electrical grid (voltage regulating distribution transformers) and to the thermal problems in relation to the expected transformer life duration.

There is a need for new standards aimed at normalizing the more diverse transformer categories.

## **B.3 Trends in technology**

New technologies are related to amorphous magnetic material, insulating materials, diagnostic tools, transformers for renewable energy applications and smart grid transformers.

Technology developed and standardised internationally may not be suitable or applicable to European applications, so these standards may need to be modified for European use for example high temperature insulation.

Technologies developed in Europe may need standardisation before adoption internationally for example dry type and self protecting transformers.

## **B.4 Market trends**

The market for transformers within Europe, although closely linked to the fluctuations of the general economy, is expected to continue to be important into the future.

Since the power transformers industry is strongly connected with the general economy trends and raw material costs, the technical requirements of utilities and end users are very important for the market. It is to be considered that starting from the last years the price of all the main materials have dramatically and unpredictably increased and the availability of some material become also unpredictable.

## **B.5 Ecological environment**

TC 14 endeavours to give due consideration to the effects that any standard published or maintained may have on the environment and sustainability.

Particular decisions have been taken in the definition of loss and sound classes (not fully existing at IEC level) but other ecological aspects are continuously taken into consideration.

Considering the maturity of the sector any modification is quite difficult to be introduced also because of impact on other fields than the environmental one or because of monopoly or economic risks. For these reasons the need of good European standards in this sector and with reference with environmental aspects is very high.

In recent years, loss reduction has taken an increased priority despite increases in the cost of copper and steel.

Under Directive 2009/125/EC relating to harmonized standards in the field of Ecodesign TC 14 is currently working on losses and sound level reduction for medium power transformers (WG21) and standardisation

of larger power transformers (WG29).

## **B.6 Involvement of societal stakeholders**

TC 14 is composed of representatives of manufacturers, utilities and academic institutions

Other stakeholders including the public and industrial users are considered.

Since the power transformers are not of direct interest of final consumers, these ones are not directly involved in TC 14 standards management.

## **B.7 Involvement of SMEs**

As well as large international companies, European power transformer manufacturers are often SMEs. They are also involved in production of special units in small industrial scale. SMEs need simple standards, easy for consultation.

Involvement of SMEs is usually managed by way of category association.

NCs are requested to encourage SMEs to be involved at national level in developing standards.

## **C System approach aspects**

In general, power transformers are part of or interact with any type of electrical system and incorporate a variety of electrical components and devices covered by the following TCs/SRs:

CLC/TC 8X-System aspects of electrical energy supply

CLC 9-Electrical equipment and systems for railways

CLC 15-Solid electrical insulating materials

CLC/TC 22X-Power electronics

CLC 28-Insulation co-ordination

CLC 36-Insulators

CLC 38-Instrument transformers

CLC 42-High-voltage testing techniques

CLC 68-Magnetic alloys and steels

CLC 89-Fire hazard testing

CLC/TC 99X-Power installations exceeding 1 kV a.c. (1,5 kV d.c.)

CLC 111-Environmental standardization for electrical and electronic products and systems

CLC/TC 210-Electromagnetic Compatibility (EMC)

CEN/CLC/JTC 10 - Ability to repair, reuse and upgrade energy related products (ErP)

Cooperation with these TC's is demonstrated through the exchange of documents and liaisons.

## **D Objectives and strategies (3 to 5 years)**

Consideration will be given to new technologies, user requirements and environmental or economic impacts. In an effort to improve the application and ease of use of the standards developed by the Committee, the structure of existing standards is subject to review.

The main objective in the coming year is related to the normalisation of MV and HV power transformer and their accessories with reference to energy performance and environmental aspects. Another upcoming topic to be considered in the coming years is related to standardize digitalization of the power transformer.

The horizontal scope is to guarantee at the same time better environmental performance and economic benefits to the European transformer industry.

## **E Action plan**

To achieve the objectives mentioned at paragraph D, the TC14 action plan consists in:

1. revising the documents of the series EN50708 (WG21, WG29, WG32)
2. preparing standards on other requirements of European power transformers (WG 21, WG29, WG32) requested by the EU Regulation 548/14 and their revisions
3. preparing new standards as required to incorporate smart grid, renewable energy, use of ester fluids,

other than energy performances transformer environmental impact (e.g. sustainability, circular economy), better functional standardization to cater for different and new technologies, Transformers for EV Charging Stations and future network needs for transformers (WGs to be set up)  
4. extending and improving normalisation of European power transformer accessories and components.

## **F Useful links to CENELEC web site**

TC home page giving access to Membership, TC/SC Officers, Scope, Publications, Work programme [password-protected area].

TC home page giving access to Membership, TC/SC Officers, Scope, Liaisons, WG/MT/PT structure, Publications issued along with their Stability Dates, Work Programme (password-protected area)

Angelo Baggini [Name or signature of the chairman]