



Brussels, **XXX**
[...] (2014) **XXX** draft

COMMISSION REGULATION (EU) No .../..

of **XXX**

**on implementing Directive 2009/125/EC of the European Parliament and of the Council
with regard to small, medium and large power transformers**

COMMISSION REGULATION (EU) No .../..

of **XXX**

on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products ⁽¹⁾ and in particular Article 15(1) thereof,

After consulting the Ecodesign Consultation Forum,

Whereas:

- (1) The Commission has carried out a preparatory study that analysed the environmental and economic aspects of transformers. The study was developed together with stakeholders and interested parties from the Community and the results have been made publicly available. Transformers are considered as energy related products within the meaning of Article 2 (1) of Directive 2009/125/EC.
- (2) The study showed that energy in the use phase is the most significant environmental aspect that can be addressed through product design. Significant amounts of raw materials (copper, iron, resin, aluminium) are used in the manufacturing of transformers, but market mechanisms seem to be ensuring an adequate end-of-life treatment, and therefore it is not necessary to establish related ecodesign requirements.
- (3) Ecodesign requirements set out in Annex I apply to products placed on the market or put into service wherever they are installed. Therefore such requirements cannot be made dependant on the application in which the product is used.
- (4) Transformers are usually purchased under framework agreements. In this context, purchase refers to the act of contracting with the manufacturer for the delivery of a given volume of transformers. The contract is deemed to have come into force on the date of signature by the parties.
- (5) Certain categories of transformers should not be covered by this Regulation, due to their specific function,. The energy consumption and saving potential of such transformers is negligible compared to other transformers.
- (6) Regulatory concessions are granted because of the weight limitations for mounting transformers on utility poles. In order to avoid misuse of transformers specifically manufactured for pole-mounted operation, they should include a visible display “For pole-mounted operation only”, so as to facilitate the work of national market surveillance authorities.
- (7) Regulatory concessions are granted to transformers equipped with equipment capable of performing voltage regulation functions to integrate distributed generation from

¹ OJ L 285 31.10.2009 p.10

renewable sources into the distribution grid. Such concessions should gradually be phased out as this emerging technology matures and measurement standards become available to separate the losses associated to the core transformer from those associated to the equipment performing additional functions.

- (8) Ecodesign requirements for the energy performance/efficiency of medium power transformers and for the energy efficiency of large power transformers should be set with a view to harmonising ecodesign requirements for these devices throughout the Community. Such requirements would also contribute to the efficient functioning of the internal market and to improving Member States' environmental performance.
- (9) Establishment of ecodesign requirements for medium and large power transformers is also necessary to increase the market penetration of technologies and design options improving their energy performance or efficiency. Total losses of the transformers fleet in the EU27 in 2008 amounted to 93.4 TWh per year. The cost-effective improvement potential through more efficient design has been estimated in about 16.2 TWh per year in 2025, which corresponds to 3.7 Mt of CO₂ emissions.
- (10) It is necessary to provide for a staged entry into force of the ecodesign requirements in order to provide an appropriate timeframe for manufacturers to redesign their products. Time limits for the implementation of those requirements should be set taking into account impacts on the costs for manufacturers, in particular small and medium size enterprises, while ensuring timely achievement of the policy objectives.
- (11) To allow an effective implementation of the regulation, National Regulating Authorities are strongly advised to take account of the effect of minimum efficiency requirements on the initial cost of the transformer and to allow for the installation of more efficient transformers than the regulation requires, whenever these are economically justified on a whole life cycle basis, including an adequate evaluation of losses reduction.
- (12) To facilitate compliance checks, manufacturers should be asked to provide information in the technical documentation referred to in Annexes IV and V to Directive 2009/125/EC.
- (13) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC.

HAS ADOPTED THIS REGULATION:

Article 1

Subject matter and scope

1. This Regulation establishes ecodesign requirements for placing on the market or putting into service power transformers with a minimum power rating of 1 kVA used in 50Hz electricity transmission and distribution networks or for industrial applications. The Regulation is only applicable to transformers purchased after the entry into force of the Regulation.

2. This Regulation shall not apply to transformers specifically designed and used for the following applications:

- instrument transformers, specifically designed to supply measuring instruments, meters, relays and other similar apparatus;
- transformers with low-voltage windings specifically designed for use with rectifiers to provide a DC supply;

- transformers specifically designed to be directly connected to a furnace;
- transformers specifically designed for offshore applications and floating offshore applications;
- transformers specially designed for emergency installations;
- transformers and auto-transformers specifically designed for railway feeding systems;
- earthing or grounding transformers, this is, three-phase transformers intended to provide a neutral point for system grounding purposes;
- traction transformers mounted on rolling stock, this is, transformers connected to an AC or DC contact line, directly or through a converter, used in fixed installations of railway applications;
- starting transformers, specifically designed for starting three-phase induction motors so as to eliminate supply voltage dips;
- testing transformers, specifically designed to be used in a circuit to produce a specific voltage or current for the purpose of testing electrical equipment;
- welding transformers, specifically designed for use in arc welding equipment or resistance welding equipment;
- transformers specifically designed for explosion-proof and underground mining applications²;
- transformers specifically designed for deep water (submerged) applications;
- medium Voltage (MV) to Medium Voltage (MV) interface transformers up to 5 MVA;
- large power transformers where it is demonstrated that for a particular application, technically feasible alternatives are not available to meet the minimum efficiency requirements set out by this Regulation;
- large power transformers which are like for like replacements in the same physical location/installation for existing large power transformers, where this replacement cannot be achieved without entailing disproportionate costs associated to their transportation and/or installation;

except as regards the product information requirements and technical documentation set out in Annex I, points 3 and 4.

Article 2

Definitions

For the purpose of this Regulation and its annexes the following definitions shall apply.

- (1) “Power transformer” means a static piece of apparatus with two or more windings which, by electromagnetic induction, transforms a system of alternating voltage and current into another system of alternating voltage and current usually of different values and at the same frequency for the purpose of transmitting electrical power.

² Equipment intended for use in potentially explosive atmospheres is covered by Directive 94/9/EC of 19.04.94 (O.J. L 100/1, 19.04.94)

- (2) “Small power transformer” means a power transformer with a highest voltage for equipment not exceeding 1.1 kV.
- (3) “Medium power transformer” means a power transformer with a highest voltage for equipment higher than 1.1 kV, but not exceeding 36 kV and a rated power equal to or higher than 5 kVA but lower than 40 MVA.
- (4) “Large power transformer” means a power transformer with a highest voltage for equipment exceeding 36 kV and a rated power equal or higher than 5 kVA, or a rated power equal to or higher than 40 MVA regardless of the highest voltage for equipment.
- (5) “Liquid-immersed transformer” means a power transformer in which the magnetic circuit and windings are immersed in liquid.
- (6) “Dry-type transformer” means a power transformer in which the magnetic circuit and windings are not immersed in an insulating liquid.
- (7) “Medium power pole mounted transformer” means a power transformer with a rated power of up to 315 KVA suitable for outdoor service and designed to be mounted on the support structures of overhead power lines.
- (8) “Voltage Regulation Distribution Transformer” means a medium power transformer equipped with additional components, inside or outside of the transformer tank, to automatically control the input or output voltage of the transformer for on-load voltage regulation purposes.
- (9) “Winding” refers to the assembly of turns forming an electrical circuit associated with one of the voltages assigned to the transformer.
- (10) “Rated voltage of a winding” (U_r) is the voltage assigned to be applied, or developed at no-load, between the terminals of an untapped winding, or of a tapped winding connected on the principal tapping.
- (11) “High-voltage winding” refers to the winding having the highest rated voltage.
- (12) “Highest voltage for equipment” (U_m) applicable to a transformer winding is the highest r.m.s phase-to-phase voltage in a three-phase system for which a transformer winding is designed in respect of its insulation.
- (13) “Rated power” (S_r) is a conventional value of apparent power assigned to a winding which, together with the rated voltage of the winding, determines its rated current.
- (14) “Load loss” (P_k) means the absorbed active power at rated frequency and reference temperature associated with a pair of windings when the rated current (tapping current) is flowing through the line terminal(s) of one of the windings and the terminals of the other windings are in short-circuit with any winding fitted with tapplings connected to its principal tapping, while further windings, if existing, are open-circuited.
- (15) “No load loss” (P_o) means the active power absorbed at rated frequency when the transformer is energised and the secondary circuit is open. The applied voltage is the rated voltage, and if the energized winding is fitted with a tapping, it is connected to its principal tapping.
- (16) “Peak Efficiency Index” (PEI) means the maximum value of the ratio of the transmitted apparent power of a transformer minus the electrical losses to the transmitted apparent power of the transformer.

Article 3

Eco-design requirements

Small power transformers, medium power transformers and large power transformer shall meet the ecodesign requirements set out in Annex I.

Article 4

Conformity Assessment

Conformity assessment shall be carried out applying the internal design control procedure set out in Annex IV to Directive 2009/125/EC or the management system procedure set out in Annex V to that Directive.

Article 5

Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Directive 2009/125/EC, Article 3(2), Member State authorities shall apply the verification procedure set out in Annex III to this Regulation.

Article 6

Indicative Benchmarks

The indicative benchmarks for the best-performing transformers technologically possible at the time of adoption of this Regulation are identified in Annex IV.

Article 7

Review

No later than three years after the entry into force, the Commission shall review this Regulation in the light of technological progress and present the results of this review to the Consultation Forum. Specifically, the review will assess, at least, the following issues:

- The possibility to set out minimum values of the Peak Efficiency Index for all medium power transformers, including those with a rated power below 3150 kVA;
- The possibility to separate the losses associated to the core transformer from those associated with other components performing voltage regulation functions, where this is the case;
- The appropriateness of establishing minimum performance requirements for single-phase power transformers, as well as for small power transformers;
- Whether concessions made for pole-mounted transformers and for special combinations of winding voltages for medium power transformers are still appropriate;
- The possibility of covering environmental impacts other than energy in the use phase;

Article 8

Entry into force

The Regulation shall enter into force on the 20th day following its publication in the Official Journal of the European Union.

This Regulation shall be binding in its entirety and directly applicable in all Member States.
Done at Brussels,

For the Commission
The President