Commission Regulation (EU) No 548/2014 of 21 May 2014 on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers

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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 Union and the results have been have 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

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'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 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 Union. 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 CO_2 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:

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[F1 Article 1

Subject matter and scope

1 This Regulation sets out ecodesign requirements for placing on the market or putting into service power transformers with a minimum power rating of 1 kVA used in 50 Hz electricity transmission and distribution networks or for industrial applications.

This Regulation shall apply to transformers purchased after 11 June 2014.

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

a instrument transformers, specifically designed to transmit an information signal to measuring instruments, meters and protective or control devices or similar apparatus;

b transformers specifically designed and intended to provide a DC power supply to electronic or rectifier loads. This exemption does not include transformers that are intended to provide an AC supply from DC sources such as transformers for wind turbine and photovoltaic applications or transformers designed for DC transmission and distribution applications;

c transformers specifically designed to be directly connected to a furnace;

d transformers specifically designed to be installed on fixed or floating offshore platforms, offshore wind turbines or on board ships and all kinds of vessels;

e transformers specifically designed to provide for a situation limited in time when the normal power supply is interrupted due to either an unplanned occurrence (such as a power failure) or a station refurbishment, but not to permanently upgrade an existing substation;

f transformers (with separate or auto-connected windings) connected to an AC or DC contact line, directly or through a converter, used in fixed installations for railway applications;

g earthing or grounding transformers specifically designed to be connected in a power system to provide a neutral connection for earthing either directly or via an impedance;

h traction transformers specifically designed to be mounted on rolling stock, connected to an AC or DC contact line, directly or through a converter, for specific use in fixed installations for railway applications;

i starting transformers, specifically designed for starting three-phase induction motors so as to eliminate supply voltage dips and that remain de-energised during normal operation;

j testing transformers, specifically designed to be used in a circuit to produce a specific voltage or current for the purpose of testing electrical equipment;

k welding transformers, specifically designed for use in arc-welding equipment or resistance-welding equipment;

l transformers specifically designed for explosion-proof applications in accordance with Directive 94/9/EC of the European Parliament and of the Council[(2)] and underground mining applications;

m transformers specifically designed for deep water (submerged) applications;

n medium Voltage (MV) to Medium Voltage (MV) interface transformers up to 5 MVA used as interface transformers used in a network voltage conversion programme and placed at the junction between two voltage levels of two medium voltage networks and that need to be able to cope with emergency overloads;

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o medium and large power transformers specifically designed to contribute to the safety of nuclear installations, as defined in Article 3 of Council Directive 2009/71/Euratom[3];

p three-phase medium power transformers with a power rating below 5 kVA;

except as regards the requirements set out in point 4(a), (b) and (d).of Annex I to this Regulation.

3 Medium and large power transformers, regardless of when they were first placed on the market or put into service, shall be reassessed for conformity and comply with this Regulation, if they are subject to all of the following operations:

a replacement of the core or part thereof;

b replacement of one or more of the complete windings.

This is without prejudice to the legal obligations under other Union's harmonisation legislation that these products could be subject to.**]**

Textual Amendments

F1 Substituted by Commission Regulation (EU) 2019/1783 of 1 October 2019 amending Regulation (EU) No 548/2014 on implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to small, medium and large power transformers (Text with EEA relevance).

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) 'Small power transformer' means a power transformer with a highest voltage for equipment not exceeding 1,1 kV.

(3) **[**F1'medium power transformer' means a power transformer with all windings having rated power lower than or equal to 3 150 kVA, and highest voltage for equipment greater than 1,1 kV and lower than or equal to 36 kV.

(4) 'Large power transformer' means a power transformer with at least one winding having either rated power greater than 3 150 kVA or highest voltage for equipment greater than 36 kV.**]**

(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) **[**F1'Medium power pole-mounted transformer' means a power transformer with a rated power of up to 400 kVA suitable for outdoor service and specifically designed to be mounted on the support structures of overhead power lines.**]**

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(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 tappings 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.

(17) **[**[F2]'Declared value(s)' mean the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC, and where applicable, the values used to calculate these values.

(18) 'Dual voltage transformer' means a transformer with one or more windings with two voltages available in order to be able to operate and supply rated power at either of two different voltage values.

(19) 'Witnessed testing' means actively observing the physical testing of the product under investigation by another party, to draw conclusions on the validity of the test and the test results. This may include conclusions on the compliance of testing and calculations methods used with applicable standards and legislation.

(20) 'Factory acceptance test' means a test on an ordered product where the customer uses witnessed testing to verify the product's full accordance with contractual requirements, before they are accepted or put into service.

(21) 'Equivalent model' means a model which has the same technical characteristics relevant for the technical information to be provided, but which is placed on the market or put into service by the same manufacturer or importer as another model with a different model identifier.