



EUROPEAN  
COMMISSION

Brussels, **XXX**  
[...] (2018) **XXX** draft

**COMMISSION REGULATION (EU) .../...**

**of XXX**

**amending 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**

(Text with EEA relevance)

*This draft has not been adopted or endorsed by the European Commission. Any views expressed are the preliminary views of the Commission services and may not in any circumstances be regarded as stating an official position of the Commission.*

# COMMISSION REGULATION (EU) .../...

of **XXX**

## **amending 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**

(Text with EEA relevance)

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 setting out a framework for the setting of ecodesign requirements for energy-related products<sup>1</sup> and in particular Article 15(1) thereof,

Whereas:

- (1) Article 7 of Commission Regulation (EU) No 548/2014<sup>2</sup> requires the Commission to review that Regulation in the light of technological progress and present the results of this review to the Consultation Forum in 2017.
- (2) The Commission has carried out a review study that analysed the specific aspects set out in Article 7 of Regulation (EU) No 548/2014. The study was undertaken together with stakeholders and interested parties from the Union and the results have been made publicly available.
- (3) The study confirmed that the impact of energy consumption during the use phase on the Global Warming Potential remains dominant. The analysis made did not provide sufficient evidence to support proposing environmental requirements other than a minimum energy performance.
- (4) The study confirmed that Regulation (EU) No 548/2014 has had a positive effect on the efficiency of power transformers being placed on the market, and found that available transformer models can fulfil minimum requirements set in Tier 1 (July 2015) without difficulties.
- (5) It is generally recognised that the most appropriate method to optimise transformer designs in order to minimise electricity losses continues to be the valuation and capitalisation of future losses using proper capitalisation factors for load and no load losses in the tendering process. However, for the purposes of product regulation only the use of prescribed values for minimum efficiency or maximum losses is feasible.

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<sup>1</sup> OJ L 285, 31.10.2009, p. 10.

<sup>2</sup> 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 (OJ L 152, 22.5.2014, p. 1).

- (6) An enquiry among transformer manufacturers concluded that there are no major technical barriers to manufacturing transformers compliant with the minimum requirements set out in Tier 2 for entry into force in July 2021.
- (7) The study analysed the economic viability of transformers compliant with minimum requirements set out in Tier 2 applicable as of July 2021 and found that lifecycle costs for Tier 2 compliant medium and large power transformers are always lower than Tier 1 compliant models, when these are being put into service in new installation sites. However, in specific situations where medium power transformers are being installed in existing urban substation locations, there can be space and weight constraints that affect the maximum size and weight of the replacement transformer to be used. Therefore, when the replacement of an existing transformer is technically infeasible or entails disproportionate costs, a regulatory relief should be justified.
- (8) An existing regulatory exemption for the replacement of large power transformers related to disproportionate costs associated with their transportation and/or installation should be complemented by an exemption for new installations, where such cost constraints are also applicable.
- (9) The existence of a market for the upgrade, repair, refurbishment and retrofitting of transformers makes it necessary to provide guidance on the circumstances under which a transformer that has undergone some or all of those operations can be considered a new product. Where a transformer has undergone upgrade or retrofitting activities such that it can be considered a new product, it must comply with the minimum energy performance requirements set out in Annex I of the to this Regulation, as well as with any other applicable Union product legislation, when it is placed on the market or put into service.
- (10) Experience gained in implementing Regulation (EU) No 548/2014 has revealed the existence of national deviations in standard voltages in electricity distribution grids in certain Member States. These deviations justify different threshold voltage levels in the categorisation of transformers, and they inform what minimum energy performance requirements should be applicable.
- (11) 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*

Regulation (EU) No 548/2014 is amended as follows:

- (1) Article 1 is replaced by the following:

*"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 and used for the following applications:

- (a) all three-phase medium power transformers with a power rating below 5 kVA;
- (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. These are three-phase transformers 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<sup>3</sup> 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. These are 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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<sup>3</sup> Directive 94/9/EC of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (OJ L 100, 19.4.1994, p.1).

- (o) medium and large power transformers specifically designed and qualified to ensure the safety of nuclear installations, as defined in Article 3 of Council Directive 2009/71/Euratom<sup>4</sup>,

except as regards the product information requirements and technical documentation set out in points 3 and 4 of Annex I to this Regulation.

3. Medium and large power transformers, regardless of when they were first placed on the market, shall be considered as new products if they are subject to upgrade or retrofit activities. This is without prejudice to the legal obligations under other Union's harmonisation legislation that these products could be subject to.

An 'upgrade' means an overhaul activity that improves significantly the energy efficiency of a transformer without extending its life expectancy. Examples of upgrade activities include:

- replacing the core (or part of it) using a material with lower specific loss than the original one;
- replacing one or more windings with new ones providing lower load loss.

'Retrofit' means an overhaul activity that both improves significantly the energy efficiency and extends the life expectancy of a transformer. Examples of retrofit activities include:

- replacing a complete active part with a new one providing increased energy performance;
- replacement of the tap changer, of the bushings and of the complete insulation resulting in a significant change in efficiency.

Power transformers on which routine repair or refurbishment operations are performed shall not necessarily be considered as new products.

'Repair' means an activity that neither increases significantly the energy performance nor extends the life expectancy of a transformer. Routine repair operations include, in particular, the following:

- replacing major components (tap changer, motor drive unit, bushings) without changing the overall efficiency significantly;
- replacing all coils on a specific leg in a three-phase transformer;
- replacing one or more windings, or parts of them, without changing the load losses;
- replacing fans or pumps;
- fixing/replacing a limited number of core sheets, involving no more than 20 % of the core weight;
- drying and pressing the active part of the transformer;
- repairing leakages and/or applying corrosion protection.

'Refurbishment' means an overhaul activity that increases the life expectancy of a transformer without increasing its energy performance. Refurbishment operations include, in particular, the following:

- increasing the level of outer cooling (fans or pumps) to lower the relative thermal ageing rate;

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<sup>4</sup> Council Directive 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations. (OJ L 172, 2.7.2009, p. 18).

- replacing insulating liquid;
- replacing all windings with new ones of the same design and material, replacing the tap changer, replacing the bushings and the complete insulation.”

(2) Article 2 is amended as follows:

(a) points (3) and (4) are replaced by the following:

“(3) ‘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;”;

(b) point (7) is replaced by the following:

“(7) ‘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.”;

(c) the following points (17) to (26) are added in Article 2:

“(17) ‘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, provided that these are not more favourable for the manufacturer or importer than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof;

(18) ‘Winding’ means an assembly of turns forming an electrical circuit associated with one of the voltages assigned to the transformer;

(19) ‘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 two different voltage values simultaneously;

(20) ‘Test house’ means a governmental or non-governmental third-party organisation independent from the manufacturer, possessing the necessary competence and responsibility to carry out product verification in accordance with this Regulation;

(21) ‘Witnessed testing’ means conducting a product verification test by examining all product and testing documentation, and actively observing the physical testing of the product under investigation by another party, to independently draw up conclusions on the validity of the parameters being tested. This may include conclusions on the compliance of testing and calculations methods used with applicable standards and legislation;

(22) ‘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 at the premises of the manufacturers, before they are accepted or put into service in their final destination;

(23) ‘Upgrade’ means an overhaul activity that improves significantly the energy efficiency of a transformer without extending its life expectancy, including the replacement of the core or part of it using a material with lower specific loss

and the replacement of one or more windings with new ones providing lower load loss;

(24) “Retrofit” means an overhaul activity that both improves significantly the energy efficiency and extends the life expectancy of a transformer. Examples of retrofit activities, including the replacement of a complete active part with a new one providing increased energy performance, replacement of the tap changer, of the bushings and of the complete insulation resulting in a significant change in efficiency;

(25) “Repair” means an activity that does neither increase significantly the energy performance nor extend the life expectancy of a transformer, in particular by:

- (a) replacing major components (tap changer, motor drive unit, bushings) without changing the overall efficiency significantly,
- (b) replacing all coils on a specific leg in a three-phase transformer,
- (c) replacing one or more windings, or parts of them, without changing the load losses,
- (d) replacing fans or pumps,
- (e) fixing/replacing limited number of core sheets, involving no more than 20% of the core weight,
- (f) drying and pressing the active part,
- (g) repairing leakages and/or applying corrosion protection;

(26) 'Refurbishment' means an overhaul activity, which increases the life expectancy of a transformer without increasing its energy performance, in particular by:

- (a) increasing the outer cooling (fans or pumps) to lower the relative thermal ageing rate,
- (b) replacing insulating liquid,
- (c) replacing all windings with new ones of the same design and material, replacing the tap changer, replacing the bushings and the complete insulation.";

(3) Article 3 is amended as follows:

(a) the following new paragraph is added:

“If voltages in electricity distribution networks deviate from the standard ones across the Union<sup>5</sup>, Member States shall notify the Commission accordingly, so that a public notification can be made for the correct interpretation of Tables 1.1, 1.2, 1.3, 1.4, 1.5, 1.7 and 1.8 in Annex 1.”

(4) Article 7 is replaced by the following:

*“Article 7*

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<sup>5</sup> CENELEC EN 60038 includes in Annex 2B a national deviation in the Czech Republic according to which the standard voltage for the highest voltage for equipment in AC three-phase systems are 38.5kV instead of 36kV and 25kV instead of 24kV.

## *Review*

The Commission shall review this Regulation and present the results of the review to the Consultation Forum no later than 1 July 2023, in the light of technological progress. The review shall in particular address the following issues:

- the extent to which requirements set out for Tier 2 have been cost-effective and whether it is necessary to consider changes therein and/or introduce stricter Tier 3 requirements;
- the possibility to adopt a completely technology-neutral approach to the minimum requirements set out for liquid-immersed, dry-type and, possibly, electronic transformers;
- the appropriateness of setting minimum performance requirements for small power transformers;
- whether the exemptions made for transformers in offshore applications continue to be justified;
- 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, including noise.”

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(5) the Annexes are amended as set out in the Annex to this Regulation.

## *Article 2*

This Regulation shall enter into force on the twentieth day following that of 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*  
*Jean-Claude JUNCKER*