



# EU ECODESIGN REGULATIONS - TIER 2

## FOR TRANSFORMER LOSSES

The EU Eco Design regulation for transformer losses Tier 2 will take effect from 1st July 2021 replacing Tier 1 regulation. Tier 2 specifications for transformer losses aspire to reduce the energy waste by 10% compared to Tier 1 (2015) levels.

The European Commission estimates that 2.9% of all energy generated across EU27 and the UK is wasted through transformer losses. This amounts to 93TWh which is equivalent to the electricity consumed in Denmark over three years.

The regulation applies to all transformers placed in the market or put into service in the UK and the EU. Commission Regulation (EU) No 548/2014<sup>1</sup> and Amendment (EU) 2019/1783<sup>2</sup> lay out Tier 2 requirements for transformers with a minimum power rating of 1 kVA used in 50 Hz electricity transmission and distribution networks or for industrial applications.

The strict design regulation aims to reduce energy losses of distribution transformers to save on average 16TWh annually which equate to 3.7MtCO<sub>2</sub> from being emitted into the atmosphere.

## FREQUENTLY ASKED QUESTION

### WHEN CAN I LAST PLACE AN ORDER FOR CURRENT STANDARD TIER 1 TRANSFORMERS?

From the 1st July 2021, Wilson Power Solutions (and other manufacturers and importers) will not have the right to place in the market<sup>3</sup> (transfer the ownership of or deliver) Tier 1 transformers even if a contract has been signed before that date. If the delivery date is after 1st July 2021, the transformer has to follow Tier 2 losses. There are a few exceptions mentioned in detail in the following questions.

National surveillance authorities may decide to witness Factory Acceptance Tests (FATs) at any point to gather test results and to verifying compliance with the regulation.



**WHAT HAPPENS IF THERE ARE DELAYS IN THE PRODUCTION OF TIER 1 TRANSFORMERS?**

You can still install a Tier 1 transformer after 1st July 2021 if unpredictable production delays occur. The surveillance authority would be sympathetic to a degree<sup>4</sup> but Wilson Power Solutions has to exhibit the initial delivery plan and the causes of these delays.

**WHAT HAPPENS TO TIER 1 TRANSFORMERS AVAILABLE IN STOCK AFTER JULY 2021?**

If the Tier 1 transformer is already with a distributor or available in stock with the manufacturer (who is considered a distributor in this instant), Tier 1 transformers can be made available<sup>3</sup> (sold to end-users or other distributors).

Wilson Power Solutions can sell Tier 1 after 1st July 2021 if these transformers are available in stock. There should be no further work needed to be done on these transformers, including packaging. We will follow the National Measurement Office instruction to move these transformers out of the production area to a holding area for completed products.

Wilson Power Solutions does not intend to stockpile Tier 1 transformers as this causes a conflict with the aim and spirit of the regulation. All stockists should use the data available to them to manage the depletion of Tier 1 stock as far as possible prior to 1st July 2021. However, if Tier 1 stock is available, we will have the right to sell these transformers.

**ARE THERE CASES WHERE REGULATORY CONCESSIONS ARE GRANTED?**

Yes, there are situations where medium<sup>5</sup> power transformers are being installed in existing urban substation locations with space and weight constraints that affect the maximum size and weight of the replacement transformer to be used. In this case, the regulation allows for a concession to Tier 1.

Similarly, concessions can be granted to transformers with voltage regulating functions integrating distributed generation from renewable energy sources.

The regulation gives another exemption in the case of a new-build or a replacement of large<sup>6</sup> power transformers related to disproportionate costs associated with their transportation and/or installation.

In the case of a concession, the exemption must be written in the technical documentation with details providing the reason for the exemption. A letter shall be sent from Wilson Power Solutions to the National Measurement and Regulation Office or the national market surveillance authority in that country to notify them about the technical or economic justification of any disproportionate costs. If the transformer is provided through a tendering process, analysis of the bid and the award decision shall be provided too by the manufacturer, importer or an authorised representative.

**WILL WILSON POWER SOLUTIONS PROVIDE TIER 2 COMPLIANT TRANSFORMERS?**

Yes, Wilson Power Solutions will provide Tier 2 compliant transformers for both its Power and Distribution Transformers. Wilson Power Solutions manufactures two Tier 2 compliant distribution transformers:



**WILSON T2 ECOTRANS TRANSFORMER**

Standard Tier 2 compliant distribution transformer made with CRGO metal core material.



**WILSON E3 AMORPHOUS ULTRA LOW LOSS TRANSFORMER**

Far exceeds Tier 2 requirements distribution transformer made with amorphous metal core material. Wilson e3 sets the bar for Tier 3 losses and allows for further carbon and energy savings.

**WHAT IMPACT WILL THE NEW LEGISLATION HAVE ON TRANSFORMER PRICES?**

Improving the efficiency of transformers is achieved by using materials with superior energetic properties and/or increasing the cross-section of key components. In either case, the cost of manufacture is likely to be increased and this would be reflected in higher product prices across our standard product range.

The Commission carried out a study that analysed the environmental and financial benefit of the new regulations. Tier 2 transformers will create additional energy, carbon and financial savings where used in comparison to Tier 1 (2015) or older transformers. 1000kVA Tier 2 transformer operating at 70% load factor will save annually 13,122kWh of electricity and reduce the carbon emissions by 3tCO<sub>2</sub> annually when compared to its Tier 1 counterpart.

The savings become more significant in the case of a transformer replacement. Replacing a 1000kVA transformer installed in the 1970s with a Tier 2 transformer operating at 70% load factor will save annually 41,601kWh of electricity and 9.6tCO<sub>2</sub> of emissions. Life cycle cost analysis shows that any additional Tier 2 investments are offset by the energy and carbon savings benefiting users and the environment.



### ARE THERE ANY CHANGES REGARDING REFURBISHED TRANSFORMERS?

Refurbished and repaired transformers requiring a replacement of a damaged component without a drastic change to the transformer's performance, type or purpose are not considered new products and thus, do not have to comply with Tier 2 requirements. These transformers have been placed in the market prior to the regulation and can be hired or sold out.

Medium or large power transformers that undergo a replacement of the magnetic core (or part of it) or a replacement of one or more of the complete windings require a reassessment for conformity and must comply with Tier 2 regulation<sup>4</sup>.

### DO HIRE-TRANSFORMERS NEED TO COMPLY WITH TIER 2 REQUIREMENTS?

No, transformers used temporarily to provide a power supply in the case of an emergency, power failure, station refurbishment or any other technical interruption do not need to follow Tier 2 loss requirements.

### DO TRANSFORMER LOSSES REQUIREMENTS CHANGE IF THE VOLTAGE RATIO CHANGES?

Load and no-load losses are corrected in some combinations of winding voltages as follows:

- One winding with  $U_m \leq 24kV$  and the other with  $U_m > 1100V$ : both load and no-load losses can be increased by 10%
- One winding with  $U_m = 36kV$  and the other with  $U_m \leq 1100V$ : load losses can be increased by 10% and no-load losses can be increased by 15%
- One winding with  $U_m = 36kV$  and the other with  $U_m > 1100V$ : load losses can be increased by 15% and no-load losses can be increased by 20%

### WHEN WILL EU ECO DESIGN TIER 3 COME INTO FORCE?

The EU Commission will review the current regulation to present results of the evaluation and a draft proposal to the Consultation forum by 1st July 2023 to introduce Tier 3 requirements.

### HOW CAN I FURTHER REDUCE THE ENERGY AND CARBON WASTE OF MY SITE?

National Regulating Authorities are strongly advised by the EU Commission to allow for the installation of more energy-efficient transformers than the regulation requires where the lifecycle analysis economically justifies that.

Wilson Power Solutions launched Wilson e3 Ultra Low Loss amorphous transformer back in 2018. Wilson e3 meets and exceeds Tier 2 losses resulting in a further 15% reduction in energy waste. This payback calculator helps you realise the additional energy, carbon and financial losses from installing a Wilson e3 transformer.

[wilsonpowersolutions.co.uk/payback-calculator/](https://wilsonpowersolutions.co.uk/payback-calculator/)

#### Notes:

1. 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
2. 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
3. 'Blue Guide' on the implementation of EU product rules
4. T&D Europe guide to implement regulation 2019/1783 amending the frame of EU Commission regulation N°548/2014
5. "Medium power transformer" is a power transformer with all windings having rated power lower than or equal to 3 150kVA, and highest voltage for equipment greater than 1,1kV and lower than or equal to 36kV
6. "Large power transformer" is a power transformer with at least one winding having either rated power greater than 3 150kVA or highest voltage for equipment greater than 36kV

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**FOR ANY REGULATORY QUESTIONS, PLEASE CONTACT OUR ENERGY POLICY MANAGER, AYAH ALFAWARIS, ON: [AYAH@WILSONPOWERSOLUTIONS.CO.UK](mailto:AYAH@WILSONPOWERSOLUTIONS.CO.UK)**

