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COMMISSION IMPLEMENTING REGULATION (EU) .../...

of **XXX**

laying down ecodesign requirements for kettles pursuant to Directive 2009/125/EC of the European Parliament and of the Council amending Commission Regulation (EC) No 1275/2008 and repealing Commission Regulation (EU) No 1016/2010

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to Article 114 of 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 products¹, and in particular Article 15(1) thereof,

After consulting the Committee established by Article 19(1) of Directive 2009/125/EC,

Whereas:

- (1) Pursuant to Directive 2009/125/EC, the Commission should set ecodesign requirements for energy-related products which account for significant volumes of sales and trade in the Union and which have a significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact, without entailing excessive costs.
- (2) The Communication from the Commission COM(2016)773² (Ecodesign Working Plan) established by the Commission in application of Article 16(1) of Directive 2009/125/EC sets out the working priorities under the ecodesign and energy labelling framework for the period 2016-2019. The ecodesign working plan identifies the energy-related product groups to be considered as priorities for the undertaking of preparatory studies and eventual adoption of implementing measures, including electric kettles.
- (3) Measures from the ecodesign working plan have an estimated potential to deliver a total in excess of 260 TWh of annual final energy savings in 2030, which is equivalent to reducing greenhouse gas emissions by approximately 100 million tonnes per year in 2030. Kettles is one of the product groups listed in the working plan, with estimated annual electricity savings of 1,17 TWh, leading to GHG emission reductions of 0,4 Mt CO₂ eq/year in 2030. (Include preliminary numbers)
- (4) It appears from the ecodesign preparatory study that there is a need to set ecodesign requirements for kettles, the requirements related to use of essential resources such as energy and water, the requirements impacting behaviour in incentivise consumers to heat the right amount of water at the right temperature and also to introduce requirements related to resource efficiency such as reparability and recyclability.

¹ OJ L 285, 31.10.2009, p. 10.

² Communication from the Commission. Ecodesign working plan 2016-2019, COM(2016) 773 final, 30.11.2016.

- (5) The environmental aspects of kettles, which have been identified as significant for the purposes of this Regulation, are the consumption of energy and water during the use phase, the generation of waste at the end of life and the emissions to air and water in the production phase (due to the extraction and processing of raw materials) and in the use phase (because of the consumption of electricity).
- (6) The annual energy consumption of products subject to this Regulation in the Union was estimated at 9,06 TWh in the Union in 2020, corresponding to 3,44 million tonnes of CO₂ equivalent. The projected energy consumption of kettles in a business as usual scenario is expected to increase to 9,77 TWh in 2030 and 10,54 TWh in 2040, mainly because of the increase in the total number of kettles in use. That increase in energy consumption may however be limited if the ecodesign requirements are implemented. Finally, the service lifetime of kettles is estimated to be 6 years, and could be extended with the measures proposed in this regulation.
- (7) The Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions COM(2015) 614 final³ (circular economy action plan) and the Communication on the ecodesign working plan underline the importance of using the ecodesign framework in order to support the move towards more resource efficient and circular economy. Directive 2012/19/EU of the European Parliament and of the Council⁴ refers to Directive 2009/125/EC and indicates that ecodesign requirements should facilitate the re-use, dismantling and recovery of waste electrical and electronic equipment (WEEE) by tackling the issues upstream. Therefore, this Regulation should lay down appropriate requirements contributing to circular economy objectives.
- (8) Non-household kettles have distinct characteristics and uses and should not be included in the scope of this Regulation. Provisions for household kettles should apply to kettles with the same technical characteristics, regardless of the setting they are used in. All household kettles should meet minimum requirements on boiling.
- (9) The relevant product parameters should be measured using reliable, accurate and reproducible methods. Those methods should take into account recognised state-of-the-art measurement methods including, where available, harmonised standards adopted by the European standardisation organisations, as listed in Annex I to Regulation (EU) No 1025/2012 of the European Parliament and of the Council⁵.
- (10) In accordance with Article 8 of Directive 2009/125/EC, this Regulation should specify the applicable conformity assessment procedures.
- (11) To facilitate compliance checks, manufacturers, importers or authorised representatives should provide information in the technical documentation referred to in Annexes IV

³ Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Closing the loop — An EU action plan for the circular economy (COM(2015) 614 final of 2.12.2015).

⁴ Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (OJ L 197, 24.7.2012, p. 38).

⁵ Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).

and V to Directive 2009/125/EC in so far as that information relates to the requirements laid down in this Regulation.

- (12) To improve the effectiveness and credibility of the product-specific Regulations and to protect consumers, products able to detect being tested and to automatically alter their performance in test conditions with the objective of reaching a more favourable level for any of the parameters specified in these Regulations or included in the technical documentation or included in any of the documentation provided should not be allowed to be placed on the market.
- (13) In addition to the requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to make information on the life-cycle environmental performance of products subject to this Regulation widely available and easily accessible, in accordance with Directive 2009/125/EC, Annex I, part 3, point (2).
- (14) This Regulation should be reviewed in order to assess the appropriateness and effectiveness of its provisions in achieving its goals. The timing of the review should be sufficient for all provisions to be implemented and show an effect on the market.
- (15) 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

This Regulation establishes ecodesign requirements for the placing on the market or the putting into service of electric mains-operated kettles with a rated volume up to 10 litres.

This Regulation shall not apply to:

1. kettles which are not stand-alone;
2. pressurized appliances.

Article 2

Definitions

For the purposes of this Regulation the following definitions shall apply:

- (1) 'electric mains' means the electricity supply from the grid of 230 (± 10 %) volts of alternating current at 50 Hz;
- (2) 'kettle' means a portable appliance for boiling water with means for pouring, either a lip or spout. Potentially it also includes the possibility to heat water below boiling temperature and/or a warm-keeping function after heating.
- (3) '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, importer or authorised representative as another model with a different model identifier;
- (4) 'model identifier' means the code, usually alphanumeric, which distinguishes a specific product model from other models with the same trade mark or the same manufacturer's, importer's or authorised representative's name;

- (5) ‘product database’ means a collection of data concerning products, which is arranged in a systematic manner and consists of a consumer-oriented public part, where information concerning individual product parameters is accessible by electronic means, an online portal for accessibility and a compliance part, with clearly specified accessibility and security requirements, as laid down in Regulation (EU) 2017/1369;

For the purposes of the annexes, additional definitions are set out in Annex I.

Article 3

Ecodesign requirements

The ecodesign requirements set out in Annex II shall apply.

Article 4

Conformity assessment

1. The conformity assessment procedure referred to in Article 8 of Directive 2009/125/EC shall be the internal design control system set out in Annex IV to that Directive or the management system set out in Annex V to that Directive.
2. For the purposes of the conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation shall contain a copy of the product information provided in accordance with point 4 of Annex II, and the results of the calculations undertaken in accordance with Annex III.
3. Where the information included in the technical documentation for a particular model has been obtained:
 - (a) from a model that has the same technical characteristics relevant for the technical information to be provided but is produced by a different manufacturer; or
 - (b) by calculation on the basis of design or extrapolation from another model of the same or a different manufacturer, or both;the technical documentation shall include the details of such calculation, the assessment undertaken by the manufacturer to verify the accuracy of the calculation and, where appropriate, the declaration of identity between the models of different manufacturers.
4. The technical documentation shall include a list of all equivalent models, including the model identifiers.

Article 5

Verification procedure for market surveillance purposes

Member States' authorities shall apply the verification procedure set out in Annex IV when performing the market surveillance checks referred to in Article 3, point 2 of Directive 2009/125/EC.

Article 6

Circumvention and software updates

The manufacturer, importer or authorised representative shall not place on the market products designed to be able to detect they are being tested (for example by recognising the test conditions or test cycle) and to react specifically by automatically altering their performance

during the test with the aim of reaching a more favourable level for any of the parameters in the technical documentation or included in any documentation provided.

The energy consumption of the product and any of the other declared parameters shall not deteriorate after a software or firmware update when measured with the same test standard originally used for the declaration of conformity, except with explicit consent of the end-user prior to the update. No performance change shall occur as a result of rejecting the update.

A software update shall never have the effect of changing the product's performance in a way that makes it non-compliant with the ecodesign requirements applicable for the declaration of conformity.

Article 7

Indicative benchmarks

The indicative benchmarks for the best-performing products and technologies available on the market at the time of adopting this Regulation are set out in Annex V.

Article 8

Review

The Commission shall review this Regulation in the light of technological progress and shall present the results of this review, including, if appropriate, a draft revision proposal, to the Consultation Forum by *[date - OP please add 6 years after entry into force]*.

The review shall in particular focus on the following:

- (a) the improvement potential with regard to energy and environmental performance of kettles.
- (b) the effectiveness of existing requirements on resource efficiency;
- (c) the appropriateness of the testing procedure;
- (d) the level of the verification tolerances;
- (e) the calculation of the standard energy consumption;
- (f) the appropriateness of setting additional resource efficiency requirements for products in accordance with the principles of the circular economy, including whether more spare parts should be included.

Article 9

Entry into force and application

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 3 shall apply from *[date – OP please insert date one year after entry into force]*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission
The President
[\[...\]](#)

Annex I

Definitions applicable for the Annexes

The following definitions shall apply:

- (1) 'Energy Efficiency Index' (EEI) means the ratio of the heat - theoretically needed to bring the rated capacity of water from 15°C to 95°C degrees - and the electricity consumed to boil the same amount of water until shut-off, the water has to be heated up to at least 95°C;
- (2) 'container' means the reservoir where the water is heated;
- (3) 'temperature setting' means a feature by which the target water temperature can be pre-set;
- (4) 'keep-warm' means a function, which keeps the water temperature in the range of a pre-set temperature.
- (5) 'keep-warm time' mean the duration during which the keep-warm function is active;
- (6) 'immersed heating element' means a heating element that is integrated in the container of a kettle, is partly surrounded and in direct contact with the liquid;
- (7) 'concealed heating element' means a concealed heating element separated from the liquid by a heat exchanging element;
- (8) 'Rcyc' means the recyclability rate;
- (9) 'Rpost' means the post-consumer materials content;
- (10) 'Post-consumer material' means material recovered from waste generated by households or by commercial, industrial and institutional facilities in their role as end-users of finished product
- (11) 'lift-off / switch-off' means a function, which switches off a kettle when the container is lifted from the base. The kettles remains "off" when it is placed back on the base;
- (12) 'base' means the component, which is directly linked with the power cord
- (13) 'cordless kettle' is a kettle, where the container can be removed from the base;
- (14) 'spare part' means a separate part that can replace a part with the same or similar function in a product;
- (15) 'professional repairer' means an operator or undertaking which provides services of repair and professional maintenance of kettles;
- (16) 'declared values' means the values provided by the manufacturer, importer or authorised representative for the stated, calculated or measured technical parameters in accordance with Article 4, for the verification of compliance by the Member State authorities;
- (17) 'guarantee' means any undertaking by the retailer or a manufacturer to the consumer to: reimburse the price paid; or replace, repair or handle kettles in any way if they do not meet the specifications set out in the guarantee statement or in the relevant advertising.

Annex II

Ecodesign requirements

1. ENERGY EFFICIENCY REQUIREMENTS

The energy efficiency index (EEI) of kettles, calculated pursuant to the methodology set out in Annex III, shall not be below 83 %.

2. FUNCTIONAL REQUIREMENTS

Kettles shall meet the following requirements:

- (1) Kettles with keep-warm function:
 - (a) Keep-warm function should be off by default when a user switches on the kettle;
 - (b) Keep-warm time shall be limited to a maximum of 30 minutes;
 - (c) Container shall be insulated, meaning that the temperature drop (T_{drop}) during cool-down test shall be lower than 20°C.
- (2) "lift-off / switch-off" function is mandatory for cordless kettles;
- (3) indication of the minimum volume of water to be filled:
- (4) mandatory dual water level indication on the appliance in litre and in cup (cup volume of 0.125 litre)

3. MATERIAL EFFICIENCY REQUIREMENTS

Kettles shall meet the following requirements:

3.1. Design for repair and reuse

- (1) availability of spare parts:
 - (a) manufacturers, importers or authorised representatives of kettles shall make available to professional repairers and end-users at least the following spare parts: motherboard, switches, heating elements, temperature sensors, base, lids and limescale filters for a minimum period of six years, after placing the last unit of the model on the market;
 - (b) manufacturers shall ensure that these spare parts can be replaced with the use of commonly available tools and without permanent damage to the appliance;
 - (c) the list of spare parts concerned by point (a) and the procedure for ordering them and the repair instructions shall be included in the user manual and made publicly available on the manufacturer's, the importer's or authorised representative's free access website, at the moment of the placing on the market of the first unit of a model and until the end of the period of availability of these spare parts.
 - (d) The price and shipping costs of the spare parts concerned by point (a), and their period of applicability shall be provided in the product information sheet defined in Annex VI.
- (2) access to repair and maintenance information:

after the placing on the market of the first unit of a model or of an equivalent model, and for a minimum period of six years, after placing the last unit of the model on the market, the manufacturer, importer or authorised representative shall provide access to the appliance repair and maintenance information to professional repairers in the following conditions:

- (a) the manufacturer's, importer's or authorised representative's website shall indicate the process for professional repairers to register for access to information; to accept such a request, manufacturers, importers or authorised representative may require the professional repairer to demonstrate that:
 - (1) the professional repairer has the technical competence to repair kettles and complies with the applicable regulations for repairers of electrical equipment in the Member States where it operates. Reference to an official registration system as professional repairer, where such system exists in the Member States concerned, shall be accepted as proof of compliance with this point;
 - (2) the professional repairer is covered by insurance covering liabilities resulting from its activity, regardless of whether this is required by the Member State;
- (b) the manufacturers, importers or authorised representatives shall accept or refuse the registration if the repairer does not fulfil the criteria listed under points (a)(1) and (a)(2) within 5 working days from the date of request by the professional repairer;
- (c) manufacturers, importers or authorised representatives shall provide free access to the repair and maintenance information or for receiving regular updates;
- (d) once registered, a professional repairer shall have access, within one working day after requesting it, to the requested repair and maintenance information. The available repair and maintenance information shall include:
 - the unequivocal appliance identification;
 - a disassembly map or exploded view;
 - list of necessary repair and test equipment;
 - component and diagnosis information (such as minimum and maximum theoretical values for measurements);
 - wiring and connection diagrams;
 - diagnostic fault and error codes (including manufacturer-specific codes, where applicable); and
 - data records of reported failure incidents stored on the kettle (where applicable).

- (3) maximum delivery time of spare parts:

Without prejudice to point (1), the manufacturer, importer or authorised representatives shall ensure the delivery of the spare parts within 15 working days after having received the order.

3.2. Recyclability requirements

The recyclability rate (in weight) R_{cyc} of a kettle shall be higher than 75%.

In addition:

- (1) Manufacturers, importers or their authorised representatives shall ensure that joining, fastening or sealing techniques do not prevent the removal, using commonly available tools, of the components indicated in point 1 of Annex VII of Directive 2012/19/EU on WEEE or in Article 11 of Directive 2006/66/EC of the European Parliament and of the Council (1) on batteries and accumulators and waste batteries and accumulators, when present.
- (2) Manufacturers, importers or their authorised representatives shall, without prejudice to point 1 of Article 15 of Directive 2012/19/EU, make available, on a free-access website, the dismantling information needed to access any of the products components referred to in point 1 of Annex VII of Directive 2012/19/EU.
- (3) This dismantling information shall include the sequence of dismantling steps, tools or technologies needed to access the targeted components.
- (4) The end of life information listed under points (1), (2) and (3) shall be available until at least 15 years after the placing on the market of the last unit of a product model.

3.3. Requirements on plastic components

- (1) Plastic components heavier than 25 g:
 - (a) shall be marked by specifying the type of polymer with the appropriate standard symbols or abbreviated terms set between the punctuation marks '>' and '<' as specified in available standards. The marking shall be legible.

Plastic components are exempt from marking requirements in the following circumstances:

 - the marking is not possible because of the shape or size; or
 - the marking would impact on the performance or functionality of the plastic component.

For the following plastic components no marking is required:

 - packaging, tape, labels and stretch wraps;
 - wiring, cables and connectors, rubber;
 - PCB assemblies, PMMA boards, optical components, electrostatic discharge components, electromagnetic interference components, speakers;
 - transparent parts where the marking would obstruct the function of the part in question.
 - (b) shall additionally be marked if they contain flame retardants with the abbreviated term of the polymer followed by hyphen, then the symbol 'FR' followed by the code number of the flame retardant in parentheses. The marking on the enclosure and stand components shall be clearly visible and readable.
- (2) Plastic parts intended to be touched in normal use (e.g. handles and controls) shall contain less than 10 mg/kg of polycyclic aromatic hydrocarbons (PAHs) and less than 1 mg/kg benzo[a]pyrene
- (3) For plastics used in the container and the base:

- (a) No substances may be added to the plastics as constituent parts, which are classified as:
- carcinogenic of category 1 or 2 according to Table 3.2 or category 1A or 1B according to Table 3.1 of Annex VI to Regulation (EC) No 1272/2008⁶
 - mutagenic of category 1 or 2 according to Table 3.2 or category 1A or 1B according to Table 3.1 of Annex VI to Regulation (EC) No 1272/2008
 - toxic to reproduction of category 1 or 2 according to Table 3.2 or category 1A or 1B according to Table 3.1 of Annex VI to Regulation (EC) No 1272/2008
 - being of very high concern for other reasons according to the criteria of Annex XIII to the REACH Regulation, provided that they have been included in the List (so-called “Candidate List⁹) set up in accordance with REACH, Article 59, paragraph 1.
- (b) Halogenated polymers shall not be permitted. Nor may halogenated organic compounds be added as flame retardants. Moreover, no flame retardants may be added that are classified pursuant to Table 3.1 or 3.2 in Annex VI to Regulation (EC) 1272/2008 as very toxic to aquatic organisms with long-term adverse effects and assigned the Hazard Statement H410 or Risk Statement R50/53.

The following shall be exempt from this rule:

- process-related, technically unavoidable impurities;
- fluoroorganic additives (as, for example, anti-dripping agents) used to improve the physical properties of plastics, provided that they do not exceed 0.5 weight percent;
- plastic parts, less than 25 grams in mass.

4. INFORMATION REQUIREMENTS

Kettles shall be accompanied by the information listed under Annex VI.

⁶ Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006, Annex VI Harmonized classification and labelling for certain hazardous substances, Part 3: Harmonized classification and labelling – Tables, Table 3.2, – List of harmonized classification and labelling of dangerous substances from Annex I to Directive 67/548/EEC.

Annex III

Measurements methods and calculations

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the Official Journal of the European Union or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, and in line with the following provisions.

1. DEFINITIONS

- V_{rated} [l]: rated water capacity of the kettle;
- V_{min} [l]: minimum water capacity of the kettle;
- E: electricity consumed until the kettle shuts off under the test condition;
- T_{boil} [°C]: boiling temperature. In the context of this test procedure, T_{boil} corresponds to a water temperature of 95°C at ambient pressure;
- Boiling: process of raising the water temperature in the vessel of the kettle from T_1 up to at least T_{boil} ;
- T_{kw} [°C]: average water temperature in keep-warm mode when the highest keep-warm temperature is selected;
- $E_{T_{\text{boil}}, V_{\text{rated}}}$ [Wh]: electricity consumed to heat the rated water capacity from T_1 to boiling temperature. It is measured until the kettle shuts off;
- $E_{T_{\text{boil}}, 1}$ [Wh]: electricity consumed to heat 1 litre of water from T_1 to boiling temperature. It is measured until the kettle shuts off;
- $E_{T_{\text{boil}}, V_{\text{min}}}$ [Wh]: electricity consumed to heat the minimum water capacity from T_1 to boiling temperature. It is measured until the kettle shuts off;
- $E_{70^{\circ}\text{C}, V_{\text{rated}}}$ [Wh]: electricity consumed to heat the rated water capacity from T_1 until shut-off, when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected. It is measured until the kettle shuts off;
- $E_{70^{\circ}\text{C}, V_{\text{min}}}$ [Wh]: electricity consumed to heat the minimum water capacity from T_1 until shut-off, when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected. It is measured until the kettle shuts off;
- P_{rated} [W]: rated input power
- $P_{\text{kw}, V_{\text{rated}}}$ [W]: average input power to keep warm the rated water capacity when the highest keep-warm temperature is selected;
- $p_{\text{kw}, V_{\text{rated}}}$ [W/l]: specific input power to keep warm the rated water capacity when the highest keep-warm temperature is selected;
- C: specific heat capacity of water;
- $t_{T_{\text{boil}}, V_{\text{min}}}$ [s]: time to boil the minimum water capacity. It is the time to raise the water temperature from T_1 until T_{boil} is reached and the kettle shuts off;

- $t_{T_{\text{boil}}, V_{\text{rated}}}$ [s]: time to boil the rated water capacity. It is the time to raise the temperature from T_1 until T_{boil} is reached and the kettle shuts off;
- $t_{T_{\text{boil}}, 1}$ [s]: time to boil 1 litre of water. It is the time to raise the temperature from T_1 until T_{boil} is reached and the kettle shuts off;
- $t_{70^{\circ}\text{C}, V_{\text{rated}}}$ [s]: time to heat the rated water capacity when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected. It is the time to raise the temperature from T_1 until the kettle shuts off;
- $t_{70^{\circ}\text{C}, V_{\text{min}}}$ [s]: time to heat the minimum water capacity when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected. It is the time to raise the temperature from T_1 until the kettle shuts off;
- t_{KWmax} [min]: maximum keep-warm time;
- keep-warm: function which keeps the water temperature in the range of a pre-set temperature.
- P_{standby} [W]: power consumption in stand-by mode
- $P_{\text{off-mode}}$ [W]: power consumption in off-mode
- T_{drop} [$^{\circ}\text{C}$]: water temperature drop measured during the cool-down test
- N_{cyc} [-]: number of cycles carried out successfully with the same kettle during the durability test
-

2. GENERAL CONDITIONS FOR MEASUREMENTS

In this document, in order to facilitate the testing, **the quantity of cold-water indicated in litre is assumed to be the same in kg.**⁷

Testing conditions:

- ambient temperature and appliance preconditioned at a temperature: $20 \pm 3^{\circ}\text{C}$;
- cold water temperature: $15 \pm 1^{\circ}\text{C}$;
- the water temperature is measured by a watertight thermocouple situated 10 mm above the bottom centre of the water container or the highest end of the electric heating element⁸;
- testing room: substantially draught free.

3. MEASURING METHODS

3.1. Definition of the energy efficiency

The energy efficiency is calculated as the ratio of the theoretical energy demand needed to bring a defined amount of cold water T_1 to the target temperature T_2 in relation to the measured electricity consumed until shut-off to heat the same amount of water under the same conditions:

$$\eta = \frac{C \cdot V \cdot (T_2 - T_1)}{E \cdot 3600}$$

Where:

⁷ accordingly, in the sense of this document, V_x and M_x correspond to the same quantity of water (x kg or x litre)

⁸ in case of kettles with immersed heating element

- C: specific heat capacity of water, 4186 J/(kg.K), at 15°C and 101 kPa
- V: volume of water in l
- T₁: initial water temperature, expressed in °C; T₁ = 15°C in all tests performed according to this standard
- T₂: final water temperature, expressed in °C;
- E: electricity consumed until shut-off, expressed in Wh.

3.2. Definition of the standardised energy consumption

The standardised energy consumption (SEC) [kWh] for heating 100 litres of water is calculated as follows:

$$SEC = \frac{100}{1000} \cdot \frac{(30\% \cdot E_{T_{boil},V_{min}} + 50\% \cdot E_{T_{boil},V_{rated}} + 20\% \cdot E_{70^{\circ}C,V_{rated}})}{30\% \cdot V_{min} + 70\% \cdot V_{rated}} + P_{standby} \cdot \frac{8760}{1000} \cdot \frac{1}{8}$$

Where,

- SEC: standardised energy consumption, expressed in kWh
- E_{T_{boil},V_{min}}: electricity consumed to heat the minimum water capacity from T₁ to boiling temperature, measured until the kettle shuts off, expressed in Wh
- E_{T_{boil},V_{rated}}: electricity consumed to heat the rated water capacity from T₁ until shut-off, when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected. It is measured until the kettle shuts off, expressed in Wh
- E_{70°C,V_{rated}}: electricity consumed to heat the rated water capacity from T₁ until shut-off, when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected. It is measured until the kettle shuts off, expressed in Wh;
- V_{min}: minimum water capacity of the kettle expressed in volume, expressed in litre;
- V_{rated}: rated water capacity of the kettle, expressed in litre;
- P_{standby}: power consumption in stand-by mode, expressed in W.

3.3. Tests procedures

Test 1: Energy consumption (E_{T_{boil},V_{rated}}) and time measurement (t_{T_{boil},V_{rated}}) for boiling until shut-off at rated water capacity to determine the energy efficiency (EEI)

Fill the kettle with cold water (15°C) to the rated water capacity level of the kettle. Start the boiling process and start timing (t=t_s). Measure the energy consumption E_{T_{boil},V_{rated}} until the kettle shuts-off (t=t_e). The water temperature has to be at least 95°C. The boiling time is measured as: t_{T_{boil},V_{rated}} = t_e – t_s at test conditions.

Calculate the energy efficiency index as follows:

$$EEI = \eta_{T_{boil},V_{rated}} = \frac{C \cdot V_{rated} \cdot (T_{boil} - T_1)}{E_{T_{boil},V_{rated}} \cdot 3600}$$

Where:

- η_{T_{boil},V_{rated}}: is the energy efficiency of the kettle at rated water capacity and boiling temperature.

- C: specific heat capacity of water, 4,186 J/(kg.K) at 15°C and 101 kPa
- V_{rated} : rated water capacity of a kettle, expressed in litre;
- T_1 : initial water temperature, expressed in °C; $T_1 = 15^\circ\text{C}$ in all tests performed according to this test procedure
- T_{boil} : boiling temperature, expressed in °C. In the context of this test procedure, T_{boil} corresponds to a water temperature of 95°C at ambient pressure;
- $E_{T_{\text{boil}}, V_{\text{rated}}}$: electricity consumed to heat the rated water capacity from T_1 to boiling temperature, measured until the kettle shuts off, expressed in Wh.

Figure 1 shows a typical measurement for boiling test to have as an example, in order to calculate the energy efficiency and the EEI of a kettle.

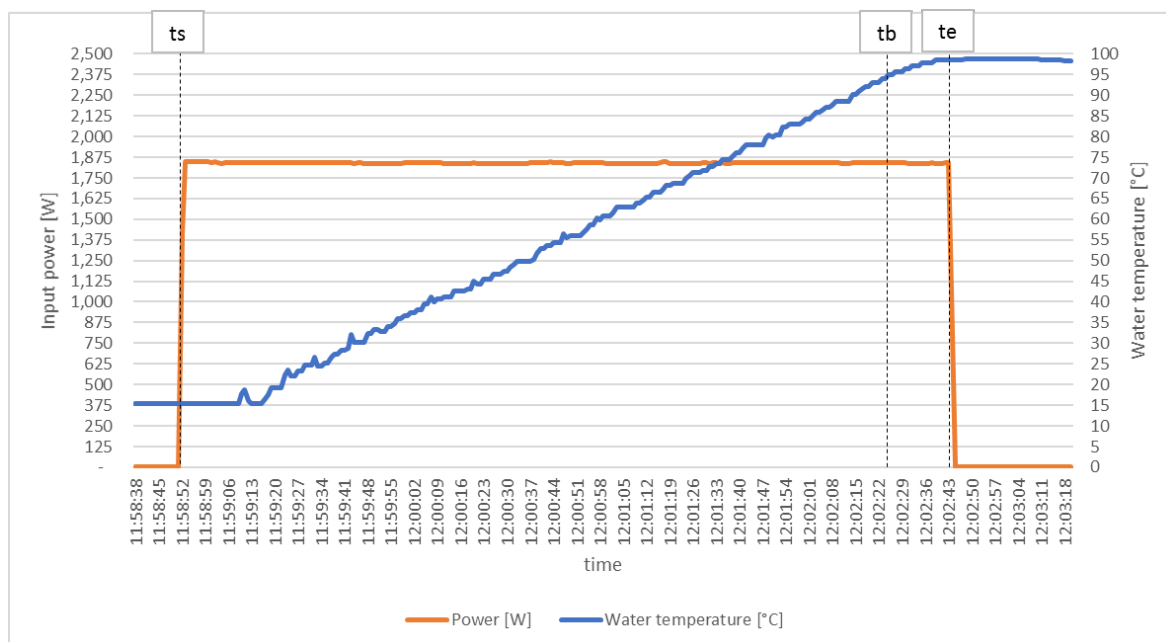


Figure 1. Example of boiling test result measurements

Test 2: Energy consumption and time measurement for boiling until shut-off at minimum water capacity

Fill the kettle with cold water (15°C) to the minimum water capacity level of the kettle. Start the boiling process and start timing ($t=t_s$). Measure the energy consumption $E_{T_{\text{boil}}, V_{\text{min}}}$ until the kettle shuts-off ($t=t_e$). The water temperature has to be at least 95°C . The boiling time is measured as: $t_{T_{\text{boil}}, V_{\text{min}}} = t_e - t_s$ at test conditions.

Test 3: Energy consumption and time measurement for boiling tests until shut-off at volume = 1 litre.⁹

Fill the kettle with cold water (15°C) to 1 litre of water. Start the boiling process and start timing ($t=t_s$). Measure the energy consumption $E_{T_{\text{boil}}, 1}$ until the kettle shuts-off ($t=t_e$). The water temperature has to be at least 95°C . The boiling time is measured as: $t_{T_{\text{boil}}, 1} = t_e - t_s$ at test conditions.

⁹ applicable if $V_{\text{rated}} > 1$ litre

Test 4: Energy consumption and time measurement for heating until shut-off at pre-set temperature of 70°C (or the nearest pre-set temperature above 70°C) at the rated water capacity

Fill the kettle with cold water (15°C) to the rated water capacity level of the kettle. Start the heating process ($t=t_s$). Measure the energy consumption $E_{70^\circ\text{C},V_{\text{rated}}}$ until the kettle shuts off ($t=t_e$). It shall be verified, that the water temperature is higher than 70°C when the kettle shuts off ($T_{t=t_e} \geq 70^\circ\text{C}$). The heating time is measured as $t_{70^\circ\text{C},V_{\text{rated}}} = t_e - t_s$ at the condition of the test.

Figure 2 shows a typical energy efficiency measurement for heating test at pre-set temperature to have as an example.

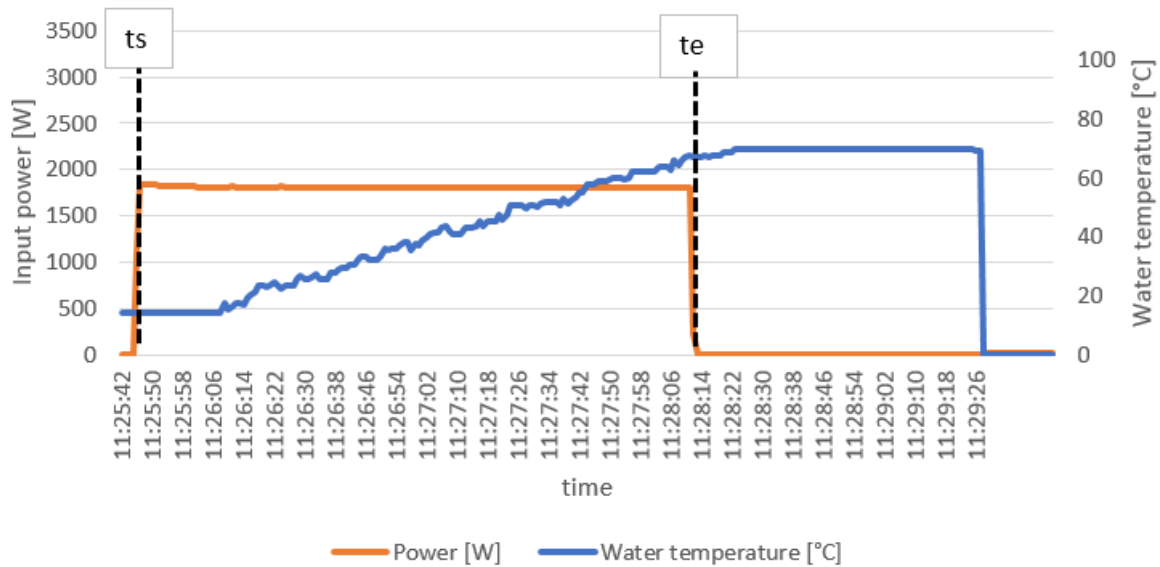


Figure 2. Example of a heating test at pre-set temperature measurements

Test 5: Energy consumption and time measurement for heating until shut-off at pre-set temperature of 70°C (or the nearest pre-set temperature above 70°C) at minimum water capacity

Fill the kettle with cold water (15°C) to the minimum water capacity level of the kettle. Start the heating process ($t=t_s$). Measure the energy consumption $E_{70^\circ\text{C},V_{\text{min}}}$ until the kettle shuts off ($t=t_e$). It shall be verified, that the water temperature is higher than 70°C when the kettle shuts off ($T_{t=t_e} \geq 70^\circ\text{C}$). The heating time is measured as $t_{70^\circ\text{C},V_{\text{min}}} = t_e - t_s$ at the condition of the test.

Test 6: Average input power, average water temperature and maximum keep warm time measurement for keep warm function at maximum keep warm temperature and maximum time setting at a rated water capacity

Fill the kettle with cold water (15°C) to the rated water capacity level of the kettle; select the highest pre-set temperature for keep-warm function and the longest possible keep-warm time and start. At the end of the heating process, the keep-warm phase starts ($t=t_{\text{kw-s}}$). Measure the average input power P_{kw} and the average water temperature T_{kw} during the keep-warm phase. Check that T_{kw} corresponds to the pre-set temperature $\pm 3^\circ\text{C}$. The maximum keep-warm time $t_{\text{kw-max}}$ is defined as $t_{\text{kw-e}} - t_{\text{kw-s}}$.

Calculate the specific average power input as follows:

$$p_{kw,V_{rated}} = \frac{P_{kw,V_{rated}}}{V_{rated}}$$

Where:

- $P_{kw,V_{rated}}$: average input power to keep warm the rated water capacity when the highest keep-warm temperature is selected, expressed in W;
- V_{rated} : rated water capacity of a kettle, expressed in litre;
- $p_{kw,V_{rated}}$: specific input power to keep warm the rated water capacity when the highest keep-warm temperature is selected, expressed in W/l.

Figure 3 shows a typical measurement of a keep-warm test.

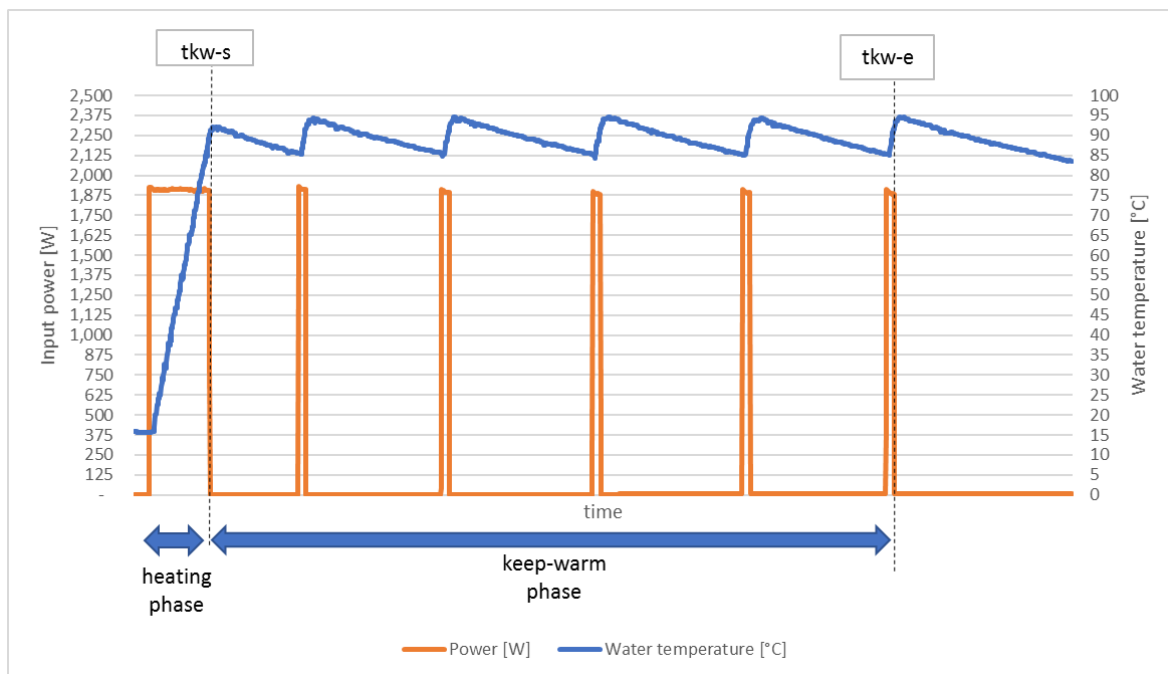


Figure 3. Example of keep-warm test measurements

Test 7: Temperature drop for cool-down 30 minutes after boiling at rated water capacity

Fill the kettle with cold water (15°C) to the rated water capacity level of the kettle. Start the boiling process. Measure the water temperature when the boiling process stops ($t=t_s$) and 30 minutes later. Report the temperature drop $T_{drop} = T_{(t=t_s)} - T_{(t=t_e)}$.

Figure 4 shows typical measurements of a cool-down test to have as an example.

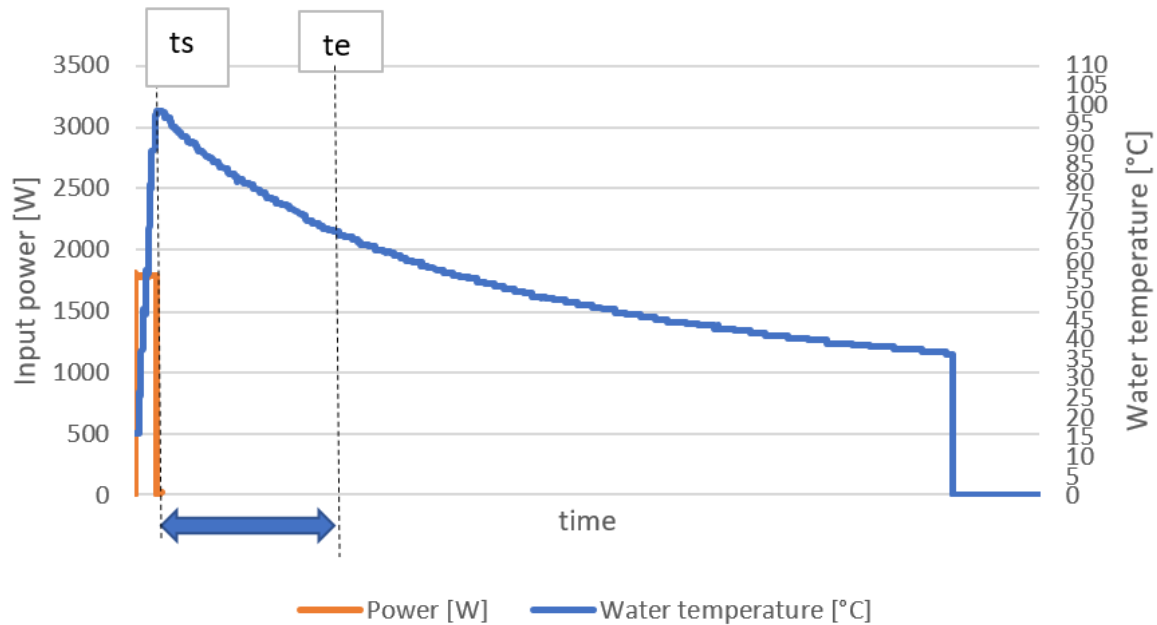


Figure 4. Example of cool-down test measurements

Test 8: Stand-by and off-mode tests

To be measured according to according to current harmonized standard.

Test 9: Durability test

Each cycle is defined as follows: fill in the container with 1 litre of cold water and boil the water, check that the water temperature could at least reach 95°C. After the kettle shuts off, pour the water out. The kettle shall work normally, meaning the power switch shall operate smoothly; the lid shall open and close without smoothly, the container has no leak. Repeat the cycle and when required, descale the kettle.

The maximum number of cycles carried out successfully with the same kettles is N_{cyc} .

Table 2 shows a summary of the required test measurements and calculations.

Table 1. Overview of the test conditions and calculation of the results

Test number	Type of test	Quantity of water	Measurement	Parameters measured or calculated
Test 1	Boiling	Rated water capacity	Until shut-off (at least T_{boil})	$E_{T_{\text{boil}},V_{\text{rated}}}$ $t_{T_{\text{boil}},V_{\text{rated}}}$ EEI
Test 2	Boiling	Minimum water capacity	Until shut-off (at least T_{boil})	$E_{T_{\text{boil}},V_{\text{min}}}$ $t_{T_{\text{boil}},V_{\text{min}}}$
Test 3	Boiling	1 litre (*)	Until shut-off (at least T_{boil})	$E_{T_{\text{boil}},1}$ $t_{T_{\text{boil}},1}$
Test 4	Heating	Rated water capacity	Until shut-off, when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected	$E_{70^{\circ}\text{C},V_{\text{rated}}}$ $t_{70^{\circ}\text{C},V_{\text{rated}}}$
Test 5	Heating	Minimum water capacity	Until shut-off, when 70°C pre-set temperature (or the nearest pre-set temperature above 70°C) is selected	$E_{70^{\circ}\text{C},V_{\text{min}}}$ $t_{70^{\circ}\text{C},V_{\text{min}}}$
Test 6	Keep-warm	Rated water capacity	Max keep-warm temperature selected Longest possible keep-warm time	t_{kwmax} T_{kw} $P_{\text{kw},V_{\text{rated}}}$ $\rho_{\text{kw},V_{\text{rated}}}$
Test 7	Cool down	Rated water capacity		T_{drop}
Test 8	Standby	0 litre	According to current harmonized standard	P_{standby}
Test 9	Durability	1 litre (or V_{rated} if $V_{\text{rated}} > 1\text{litre}$)	Until shut-off (at least T_{boil})	N_{cyc}

n.a. not applicable

* applicable if $V_{\text{rated}} > 1$ litre

Definition of the recyclability rate

The recyclability rate R_{cyc} is assessed according to EN 45555:2019 "General methods for assessing the recyclability and recoverability of energy-related products".

Definition of the post-consumer materials content

The post-consumer materials content R_{post} is assessed according to EN 45557:2020 "General method for assessing the proportion of recycled material content in energy-related products".

Annex IV

Verification procedure for market surveillance purposes

The verification tolerances set out in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer, importer or authorised representative as an allowed tolerance to establish the values in the technical documentation or in interpreting these values with a view to achieving compliance or to communicating better performance by any means.

Where a model has been designed to be able to detect it is being tested (e.g. by recognising the test conditions or test cycle), and to react specifically by automatically altering its performance during the test with the objective of reaching a more favourable level for any of the parameters specified in this Regulation or included in the technical documentation or included in any of the documentation provided, the model and all equivalent models shall be considered not compliant.

When verifying the compliance of a product model with the requirements laid down in this Regulation pursuant to Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the following procedure for the requirements referred to in Annex II:

- (1) The Member State authorities shall verify one single unit of the model.
- (2) The model shall be considered to comply with the applicable requirements if:
 - (a) the values given in the technical documentation pursuant to point 2 of Annex IV to Directive 2009/125/EC (declared values), and, where applicable, the values used to calculate these values, are not more favourable for the manufacturer, importer or authorised representative than the results of the corresponding measurements carried out pursuant to point (g) thereof; and
 - (b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer, importer or authorised representative does not contain values that are more favourable for the manufacturer, importer or authorised representative than the declared values; and
 - (c) when the Member State authorities check the unit of the model, they check whether the manufacturer, importer or authorised representative has put in place a system that complies with the requirements in the second paragraph of Article 6; and
 - (d) when the Member State authorities check the unit of the model, it complies with the functional requirements in point 2 of Annex II points from (a) to (e) and the requirements on resource efficiency in point 3 of Annex II; and
 - (e) when the Member State authorities test the unit of the model, the determined values (the values of the relevant parameters as measured in testing and the values calculated from these measurements) comply with the respective verification tolerances as set out in Table 2.
- (3) If the results referred to in point 2(a), (b), (c) or (d) are not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.

- (4) If the result referred to in point 2(e) is not achieved, the Member State authorities shall select three additional units of the same model for testing. As an alternative, the three additional units selected may be of one or more equivalent models.
- (5) The model shall be considered to comply with the applicable requirements if, for these three units, the arithmetical mean of the determined values complies with the respective verification tolerances set out in Table 2.
- (6) If the result referred to in point 5 is not achieved, the model and all equivalent models shall be considered not to comply with this Regulation.
- (7) The Member State authorities shall provide all relevant information to the authorities of the other Member States and to the Commission without delay once a decision has been taken on the non-compliance of the model according to points 3 or 6.

The Member State authorities shall use the measurement and calculation methods set out in ANNEX III.

The Member State authorities shall only apply the verification tolerances that are set out in Table 2 and shall use only the procedure described in points 1 to 7 for the requirements set out in this Annex. For the parameters in Table 2, no other tolerances, such as those set out in harmonised standards or in any other measurement method, shall be applied.

tbd

Annex V
Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market for kettles in terms of their energy efficiency index (EEI) achieved 97%.

Annex VI
Information requirements

The product manufacturer, importer or authorised representative shall make available the following information in a printed format with the product and online, either through the product database set up pursuant to Article 12 of Regulation (EU) 2017/1369¹⁰ or on a free-access website.

Table 2: Product information sheet

 ELECTRIC KETTLE	
Supplier's name or trade mark:	
Supplier's address:	
Model identifier:	
Made in: [Add country where the appliance is assembled]	
1. Recommendations	<p><i>Ensuring that only the required amount of water is heated to the required temperature can significantly reduce the energy use of your kettle, save time and money (see below under points 3 and 4)</i></p> <p><i>Descalcify the kettle regularly, since limescale deposit will reduce the energy efficiency and the lifetime of your appliance</i></p> <p><i>If your kettle is damaged or no longer working, it may be repaired. See information regarding spare parts availability under point 5</i></p>
2. General information	
Parameter	Value
Keep-warm function	YES/NO
Type of heating element	Concealed/Immersed
Rated capacity in l [V _{rated}]	X,X
Rated power in W [P _{rated}]	X

¹⁰ Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of electronic displays and repealing Commission Delegated Regulation (EU) No 1062/2010

Standby consumptions in W [P_{standby}]	X	
Temperature settings	[No], [T1, T2,...], [Tmin-Tmax], [Tmin-Tmax with x °C step]	
Standardised energy consumption [SEC], in kWh ¹	XXXX,XX	
Specific keep-warm power at maximum temperature and rated volume [$p_{\text{kw}}, V_{\text{rated}}$] in W/l ²	XX,XX	
Maximum keep warm time [t_{KWmax}], in min ²	XXXX	
Temperature decrease after 30 min [T_{drop}], in °C ³	XX	
Rated number of cycles	XXXXX	
Environmental label(s) obtained	Indicate which if any.	
GHG offsetting certificates obtained	Indicate which if any	
Guarantee duration, in years		
Recyclability rate [Rcyc] ($\geq 75\%$ required)	XX %	
Post-consumer material content [Rpost]	XX %	
3. Energy consumption in Wh		
Water volume in litre	[replace by 70°C pre-set temperature (or the nearest pre-set temperature above 70°C)]**	Boiling (until automatic shut-off)
[replace by V_{min}]		
1.0 [remove if $V_{\text{rated}} \leq 1$]		

[replace by V_{rated}]				
4. Time required (in s)				
Water volume in litre	[replace by 70°C pre-set temperature (or the nearest pre-set temperature above 70°C)]**	Boiling (until automatic shut-off)		
[replace by V_{min}]				
1 [remove if $V_{rated} \leq 1$]				
[replace by V_{rated}]				
5. Spare parts				
Spare parts ordering information		website		
List of available spare parts (also after the time of guarantee)*				
Name	Part number	Available	Professional required for reparation/change	Maximum Price
Lid				
Limescale filter				
Container				
Base				

¹ As set in Annex III, section 3.2

² As set in Annex III, section 3.3, Test 6.

³ As set in Annex III, section 3.3, Test 7.

* Add additional spare parts in the list if applicable

** only applicable for kettle with temperature pre-setting