

Brussels, XXX
[...](2017) XXX draft

Explanatory Memorandum to

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

of XXX

**implementing Directive 2009/125/EC of the European Parliament and of the Council
with regard to ecodesign requirements for household dishwashers, repealing Regulation
(EU) No 1016/2010 with regard to ecodesign requirements for household dishwashers**

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1. CONTEXT OF THE PROPOSAL

Grounds for and objectives of the proposal

The Ecodesign Directive 2009/125/EC¹ establishes a framework for the setting of ecodesign requirements for energy-related products at EU level. It is a key instrument of the union policy for improving the energy and other environmental aspects of products placed on the market or put into service in the European Economic Area (EEA). It is an important instrument for achieving the EU energy savings objectives for 2020 and 2030, and its implementation is one of the priorities in the commission's Communication on Energy 2020 and Energy Efficiency Plan 2011, being reinforced by the current Ecodesign Working Plan 2016-2019². It is also expected to contribute significantly to the transition towards a more circular economy, as expressed in the Circular Economy action plan 2015³. Furthermore, implementation of Directive 2009/125/EC will contribute to the EU's target of reducing greenhouse gases by at least 20% by 2020 and by 40% by 2030.

The revision clause (Article 7) of Regulation EU (No) 1016/2010 states that by December 2014 the Commission should review the regulation in the light of the technological development and in particular assess the verification tolerances set out in Annex III, the possibilities for setting requirements with regard to the water consumption of household dishwashers and the potential for hot water inlet.

Dishwashers were included as one of the priority products for revision in the Ecodesign Working Plan 2012-2014. Furthermore, according to Article 11(5) of the new framework Regulation (EU) 2017/1369, a new delegated act for energy labelling of dishwashers must be adopted at the latest by 2 November 2018 to rescale the label to an A to G range.

In order to revise both the Ecodesign and Energy Label regulations, a review study⁴ was launched in 2014, resulting in a final report published in June 2017. The study included a stakeholder survey, two stakeholder meetings in 2015 and a web-seminar in 2016. It involved approximately 140 stakeholders.

General context

Household dishwashers are widely used in the European Union. It is estimated that on average 44% of the European households are equipped with a household dishwasher (96 million units). The electricity consumption of the dishwashers was estimated at around 31 TWh/year in 2015 and 317 million m³ of water. Unless new measures specifically relating to these products are introduced, the total electricity consumption of dishwashers in the EU is expected to reach around 40 TWh/year by 2030, equivalent to around 15 million ton CO_{2eq}.

The energy consumption and emissions related to the usage of dishwashers can be reduced below the level they would reach in a business-as-usual scenario in a cost-effective way.

The main reasons for not realising these saving potentials are the failure of the market to:

- (i) provide a better fit between the Ecoprogramme used for testing (optimised by the manufacturers) and the real demand of cleaning programmes done by the consumers;

¹ 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 (OJ L 285, 31.10.2009, p. 10).

² Communication from the Commission on the Ecodesign Working Plan 2016-2019, COM(2016) 773 final, 30.11.2016

³ Closing the loop - An EU action plan for the Circular Economy". COM(2015) 614 final, Brussels, 2.12.2015

⁴ Ecodesign and energy label preparatory study on Dishwashers, available at: <http://susproc.jrc.ec.europa.eu/Dishwashers/documents.html>

- (ii) guide consumers to make informed purchase decisions based on the life cycle cost rather than the purchase cost (asymmetric information) and
- (iii) provide incentives for repairing the appliances and for managing properly the products at the end of their use phase.

The objective of the revision of Regulation 1016/2010 on ecodesign requirements for household dishwashers is to trigger a change in market conditions and appliances optimisation, without damaging the increasing penetration rate of dishwashers into the EU market experienced during the last years.

The proposed revision is expected to reduce the total energy consumption of these products each year across the EU, compared to a business-as-usual scenario, by around 1.1 TWh/ year, 0.4 Mt CO₂ eq/year and up to 12 million m³/year by 2030. It is also expected to facilitate repair activities and end-of-life treatment by ensuring that the necessary information and spare parts are available.

Existing regulation and standards in EU and third countries

The Ecodesign Framework Directive 2009/125/EC is an important instrument for achieving the European targets on energy efficiency and the implementation of this revised regulation is a concrete contribution to this process.

Additionally, other eco-design regulations are of relevance for dishwashers are the standby and off mode regulation 1275/2008, the eco-design regulation 801/2013 on networked standby or the low voltage directive 201/35/EC and the electromagnetic compatibility directive 2014/30/EC.

Regarding the legislation set in third countries, many economies around the world (e.g. US, Japan, Australia, China, Brazil or Mexico) have introduced in recent years some sort of legislation on these products. The US Department of Energy introduced in 2012 a final rule prescribing the energy conservation standards for dishwashers manufactured on or after May 30, 2013. Additionally, standard dishwashers may be awarded the Energy Star Label. The revision of this label is foreseen to come into force from 2019 and will include thresholds for slim dishwashers too.

The performance of dishwashers is tested in accordance with standards EN 50242 and EN60436. Currently, CENELEC is working on the adaptation of the existing measurement standards to fill a number of gaps concerning the identified level of performance between the real washing programme used by consumers and the currently standardised test. This adaptation includes the adoption of a new test load with a higher variety of shapes and materials, the combined assessment procedure for combined cleaning and drying performance, the new reference detergent, test procedures for automatic programmes and the rinsing performance.

The adaptation of the standard is in an advanced stage of development and very likely to be in place by the time of the adoption of the ecodesign implementing measure.

2. CONSULTATION OF INTERESTED PARTIES AND IMPACT ASSESSMENT

Consultation of interested parties

Methods used, main sectors targeted and general profile of respondents

The Commission consulted interested parties from within and outside the EU, and Member States' experts, from the very beginning of the review study for this Regulation. The proposed working documents (energy labelling and ecodesign) are to be discussed in the Ecodesign and

Energy Label Consultation Forum set up under Directive 2009/125/EC and Regulation 2017/1369. The Consultation Forum comprises Member States' experts and a balanced representation of interested parties, namely manufacturers, retailers, environmental NGOs and consumer organisations. The Commission will present two working documents proposing the changes to the ecodesign requirements and the energy label for household dishwashers at the Consultation Forum meeting of 22nd November 2017.

All relevant working documents were circulated to the Member States, the European Parliament and interested parties. The working documents for the Consultation Forum will be published in the Commission's CIRCA system, together with comments received in writing from interested parties during the preparatory review. Commission staff also discussed the initiative bilaterally with various interested parties and Member States. The World Trade Organisation was notified of the draft Regulation on [insert date], to ensure that no barriers to trade (prohibited under the Technical Barriers to Trade Agreement) would be introduced.

Collection and use of expertise

Relevant scientific fields

Internal and external expertise was mainly gathered through the review study, which was designed to provide technical, environmental and economic analysis.

Methodology used

The technical, environmental and economic analysis of the study followed the structure recommended in the *Methodology for Ecodesign of Energy-related Products*⁵.

Main organisations and experts consulted

The review study was conducted as an open process, with input from interested parties including individual manufacturers, associations of manufacturers, repairers and waste managers, representatives of the national bodies, environmental NGOs and consumer organisations and experts.

Publication of the expert advice

Interim results of the review study and further relevant material were published regularly on the website⁶ created for the study in order that interested parties could consult this information and provide their input promptly. Additionally, all registered stakeholders were invited to provide comments on the published study throughout an information exchange information platform (BATIS).

Interested parties were invited to consultation meetings held in June 2015, in November 2015 and in October 2016 to discuss the preliminary results. The written contributions received during the consultation process [and the minutes of the Consultation Forum] meeting are available on the Commission's CIRCA portal.

The review study made a number of recommendations as to the ecodesign and energy label requirements that could be introduced or modified for dishwashers. These were based on the technical, market and economic analysis carried out. The Commission used these recommendations, together with the most recent data available from industry, as the basis for the proposed revised eco-design and energy label requirements. [The views expressed by the members of the Consultation Forum were addressed during the impact assessment.]

⁵ http://ec.europa.eu/growth/industry/sustainability/ecodesign_en

⁶ <http://susproc.jrc.ec.europa.eu/Dishwashers/documents.html>

The main results of the review study are the following:

- Energy label classes: some dishwasher models already exceed the highest current energy efficiency class A+++, especially appliances with larger rated capacity and heat pump equipped dishwashers. A rescaling of the energy labelling classes should therefore simplify comparisons for consumers and provide an incentive to manufacturers to continue improving their appliances.
- Water consumption: the water consumption of household dishwashers per cycle and place setting is closely related to the energy consumption and has been reduced significantly during the past years. On the other hand, the consumer survey shows that a large share of households still usually pre-rinse each item, or at least pots, pans and casseroles, under the tap which additionally consumes water (and energy, if hot water is used).
- Use of the standard programme: the standard (Eco) cleaning programme that is used for testing the energy performance of the appliance is used in practice by consumers only to a minor extent (19%) according to the consumer survey. More often, other programmes labelled as normal or regular are used (39% altogether) which consume more energy and water than the standard programme. It has to be noted however that the standard (Eco) programme is used more often since the introduction of an obligation in 2012 to clearly mark this programme on the machine and to set it by default. The increased use of the standard (Eco) programme among the consumers underpins the continuation of the selection of this programme for measurement purposes. Moreover, certain aspects of the standard are currently under revision to better reflect the actual use of dishwashers.
- Programme duration: the standard cleaning programme, whose consumption value is displayed on the energy label and thus influences the purchase decisions of consumers, is designed to improve the energy efficiency, often with the consequence of reducing the cleaning temperature and prolonging the programme duration. This consequence is in contradiction with the usual preference of consumers: the 2015 user survey indicates that the most consumers accept a maximum of 2 to 3 hours whereas there is clear reluctance to use longer programmes (beyond 3 hours). On the other hand, it is observed that the use of the standard (Eco) programme increased recently even though its duration has been stabilised at around 3.5 hours.
- Technical innovation: the results from the review study show that further energy savings could be achieved by technical improvements in fans, automatic door opening, improved sensors, heat exchangers or consumer feedback mechanisms. These options barely influence the life cycle cost. The use of heat pumps leads to energy savings but these do not make up for the initial investment cost over the lifetime of the appliance because consumers often chose other programmes for which the heat-pump does not contribute much to energy savings.
- Resource efficiency: statistics point to an increased proportion of household dishwashers which have to be replaced earlier than the expected average lifetime, especially within the first five years due to a defect. Early device defects may be due in part to inadequate consumer behaviour.

The main results of the review study regarding the other aspects mentioned in Article 7 of Regulation 1016/2010 are the following:

- Water consumption: Continuous technical advances and changes in programme courses lead to decreasing energy and water consumptions per cycle. Savings in

energy and water consumption have been closely related until now but in the case of water it is expected that further savings will be more limited as the use of water is also closely linked to the capacity of the appliance. Appliances with water reservoirs (where the rinsing water from one cycle is stored and re-used in the next cycle for pre-rinsing) allow for higher optimisation of water use but their market share is very limited. Given the complexity of assessing possible trade-offs between water consumption, energy efficiency and the cleaning and drying performance of dishwashers, it is proposed to keep the current framework unchanged.

- Hot water inlet: the use of hot water inlet could lead to additional energy savings if the optimal conditions are met (e.g. short and well-insulated pipelines, high efficient water boilers, provision of renewable energy sources to heat-up the water). However, given the variety of installations and boilers used in houses and the complexity of assessing possible trade-offs, it does not seem advisable to set stronger requirements at this stage. Additionally, the market share of appliances that are compatible with hot water inlet is currently very low although some increase is expected in the near future in relation with the installations of renewable energy technologies in the residential sector as supported by Art 13(4) of Directive 2009/28/EC.
- Verification tolerances: The revision of the standard for testing the performance of dishwashers includes a round robin test (also called ring test) to be performed among different laboratories. The analysis of the round robin test results allowed for a better understanding of the repeatability and reproducibility of the relevant measurements and new thresholds are proposed accordingly.

In order to assess different policy options that could address the points highlighted above, several scenarios were created. In addition to the 'business-as-usual' case (i.e. not introducing any change other than the re-scaling of the energy classes), options include keeping the energy label only and implementing eco-design and rescaling the energy labelling with different stringencies (three scenarios were analysed).

Based on an assessment of the costs and benefits of the three options, the scenario that combines ecodesign requirements with a medium strictness combined with a rescaling of the energy label for dishwashers was chosen as the preferred option.

This option would result in lower overall energy consumption, water consumption and related emissions at no excessive lifecycle costs, as well as material efficiency requirements, which were analysed in parallel in consultation with experts and interested parties. Implementation of the requirements proposed in the working documents would result in around 1.1 TWh electricity, 0.4 Mt CO₂ and 12 million m³ of water savings.

The aim of the measures is to address the market failures that have led to the sub-optimal design and low use of dishwasher programmes with improved environmental performance. The measures taken should not discourage the increasing penetration rate of dishwashers into the EU market, which has an overall beneficial effect on energy and water savings. The chosen option best fulfils the requirements of the Ecodesign Directive and those of the revised energy labelling framework Regulation.

The proposed ecodesign requirements will have the following results:

- realising the potential for cost-effective improvements to the energy efficiency of dishwashers;
- reducing the use-phase energy consumption and emissions from dishwashers thus reducing the total effect that these products have on the environment over their lifecycle;

- reducing the combined cost of purchase and use for the consumer: the consumer will have to pay more for the dishwashers, but will save in energy costs, resulting in a pay-back time shorter than the lifetime of the product;
- keeping a clear legal framework that ensures fair competition;
- improving the competitiveness of industry;
- benefiting employment in the EU;
- harmonising EU requirements for the placing on the market of dishwashers relating to energy efficiency and emissions, thus ensuring the lowest possible administrative burden and cost for businesses;
- avoiding, as far as possible, creating a disproportionate burden or additional costs for manufacturers, by providing for transitional periods that take into account redesign cycles, the pace of innovation and the return on investment.

3. LEGAL ELEMENTS OF THE PROPOSAL

3.1. Summary of the proposed options for the Ecodesign Regulation

The working document on potential ecodesign requirements for dishwashers proposes the following changes in comparison to Regulation 1016/2010.

1. Definition of the scope of the proposed Regulations

The Regulation establishes ecodesign requirements for the placing on the market of electric mains-operated household dishwashers and electric mains-operated household dishwashers that can also be powered by batteries, including built-in household dishwashers.

2. Implementation of Ecodesign requirements related to the name of the programmes

- clear identification of the Eco programme (for which the Energy efficiency index (EEI) is calculated) on the programme selection of the network-connection application;
- use of the name ECO only once and exclusively for this programme;
- allow only the combination of temperature information with the name ECO;
- prohibition of other programme names that can divert the user from using the ECO cycle such as "normal", "daily" or "standard".

3. Information requirements

The proposed Regulation includes in addition to those required by Regulation 1015/2010:

- information that the standard cleaning cycle is referred as ECO cycle;
- recommendations on loading the machine up to the capacity indicated by the manufacturer to save energy and water;

- information that manual pre-rinsing of dish items leads to increased water and energy consumption and that this is not needed to achieve the minimum cleaning performance;
- information about the lower energy consumption and water consumption of dishwashing compared to hand dishwashing.

4. Implementation of Ecodesign requirements related to low power modes

- maximum duration of the left on mode (≤ 20 min);
- maximum energy consumption of the left-on mode (≤ 1 W);
- maximum energy consumption of the left-off mode (≤ 0.5 W);
- maximum energy consumption of the delay start mode (≤ 2 W).

5. Implementation of Ecodesign requirements related to minimum energy requirement

- reference to the width of the dishwasher is removed. Dishwasher are classified depending on their rated capacity;
- minimum EEI for dishwashers with a rated capacity higher than 7 place setting should be 58;
- minimum EEI for dishwashers with a rated capacity equal or less than 7 place setting should be 63;
- increase in the minimum drying efficiency of dishwasher with a rated capacity equal or less than 7 place settings.

6. Resource efficiency requirements

Following the adoption of the Circular Economy package, this proposal includes a number of requirements related to circular economy and resource efficiency, over and above those related to energy efficiency.

The benefits of resource efficiency requirements are typically realised during repair or at the end-of-life stage of the product life cycle, as opposed to energy savings during the use phase. The proposed resource efficiency requirements could represent the most suitable and balanced approach based on the currently available data.

Resource efficiency requirement proposed for dishwashers in the working document include:

- (a) instructions to users in the booklet of instructions on
 - i. correct installation (including level positioning, connection to mains, connection to hot or cold water inlets)
 - ii. Correct loading of dishware and consequences of incorrect loading
 - iii. Correct dosage of detergent, salt and other additives, and consequences of inadequate dosage
 - iv. Energy and water saving, including programme and sub-programme option selection
 - v. Foreign object removal from the appliance

- vi. Periodical cleaning, including optimal frequency, and procedure
- vii. Door opening between cycles, if applicable.
- viii. Periodical checks of filters, periodical decalcification, including optimal frequency, and procedure
- ix. Identification of errors, the meaning of the errors, and the action required, including identification of errors requiring professional assistance
- x. Access to professional repair (internet webpages, addresses, contact details)
- xi. Implications of self-repair or non-professional repair to the legal guarantee and when applicable also to the commercial guarantee
- (b) Marking of Annex VII WEEE (2012/19/EU) components
 - i. Information requirements for refrigeration gases
 - ii. Identification marking on electrolytic capacitors containing substances of high concern
- (c) Design for dismantling for the purposes of depollution, material recovery and recycling.
- (d) Spare part availability horizon time declaration
- (e) Spare part maximum delivery time
- (f) Access to repair and maintenance information (RMI)
 - i. Unrestricted and standardized access to appliance repair and maintenance information to independent operators including
 - an unequivocal appliance identification;
 - service handbooks, including disassembly map/exploded view, and repair step manuals;
 - technical manuals;
 - component and diagnosis information (such as minimum and maximum theoretical values for measurements);
 - wiring and connection diagrams;
 - diagnostic trouble codes (including manufacturer specific codes);
 - information provided concerning, and delivered by means of, proprietary tools and equipment; and
 - ii. Availability of training material to independent operators and authorised dealers and repairers
 - iii. Fees for access to appliance repair and maintenance information
 - iii. Implementing measures.

3.2. Measurements and calculations

Measurements and calculations of the relevant product parameters should be performed using methods that are reliable, accurate and reproducible. Manufacturers may apply the

measurement and calculation methods and harmonised standards established in accordance with Article 13 of Regulation (EU) 2017/1369 as soon as they are made available and their references are published for that purpose in the *Official Journal of the European Union*. These methods are developed specifically so as to be reliable, accurate and reproducible. Requirements for calculation and measurement methods are laid down in Annex VII of the working document for the energy label regulation.

CENELEC should adapt the existing measurement standards that would provide proper measurement methods for all household dishwashers covered by the scope of the proposed measure.

3.3. Conformity assessment procedures

As required by Article 8(2) of the Ecodesign Directive, the proposed Regulation specifies the conformity assessment procedures to be used and allows manufacturers the choice between internal design control set out in Annex IV to that Directive and the management system set out in Annex V.

3.4. Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC, the authorities of the Member States shall apply the verification procedure for the requirements set out for the Ecodesign and the labelling measure respectively in Annex III of the working document for the revised EU Ecodesign regulation for household dishwashers and in Annex VIII of the working document for the revised EU Energy label regulation for household dishwashers.

The verification tolerances set out in the Annexes relate only to the verification of the measured parameters by Member States authorities and shall not be used by the manufacturer or importer as an allowed tolerance to establish the values in the technical documentation.

3.5. Benchmarks

Benchmarks for energy efficiency and emissions are provided to allow the best performing products to be identified. The benchmarks define in quantitative terms ‘energy consumption’, ‘water consumption’, ‘programme time’ and ‘low noise emissions’, on the basis of the currently available technologies.

3.6. Date for evaluation and possible revision

The Regulation is to be reviewed no later than 1 December 2023.

The main issues for a possible revision are:

- energy and water consumption,
- changes in the user behaviour increasing the use of most-efficient programmes,
- assessment if further requirements on increasing material efficiency and durability of the products can be applied.

Legal basis

The proposed Regulation is an implementing measure adopted pursuant to Directive 2009/125/EC (the Ecodesign Directive), in particular Article 15(1) thereof. This Directive is based on Article 114 of the Treaty.

Subsidiarity principle

The adoption of ecodesign measures for household dishwashers by individual Member States, through their national legislation, would create obstacles to the free movement of goods within the EU. It is necessary for such measures in force throughout the EU to have the same content. In line with the principle of subsidiarity, it is thus appropriate for the measures in question to be adopted at EU level.

Proportionality principle

In accordance with the principle of proportionality, this measure does not go beyond what is necessary in order to achieve the objective, which is to set harmonised ecodesign requirements for dishwashers. It repeals and replaces an existing Regulation. It sets requirements that act as an incentive for technology leaders to invest in high-efficiency household dishwashers. It also leads to higher savings than any other conceivable option whilst imposing minimum administrative costs.

Choice of instrument

Proposed instrument: Regulation.

Other means would not be appropriate for the following reason(s):

The proposed form of action is a Commission Regulation implementing Directive 2009/125/EC. This form has been chosen because the objectives of the action can be achieved most efficiently by introducing fully harmonised requirements throughout the EU, thus ensuring the free movement of household dishwashers that comply with the requirements. Furthermore, as it repeals and replaces an existing Commission Regulation and the legal base is Directive 2009/125/EC, any other legal instrument would be inappropriate.

4. BUDGETARY IMPLICATION

The proposal has no implications for the EU budget.

5. ADDITIONAL INFORMATION

Review/revision/sunset clause

The proposal includes a review clause.

European Economic Area

The proposed Regulation concerns an EEA matter and should therefore extend to the European Economic Area.