



COMMISSION OF THE EUROPEAN COMMUNITIES

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Draft

COMMISSION REGULATION (EC) No .../..

implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for household dishwashers

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(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council¹, and in particular Article 15(1) thereof,

After consulting the Ecodesign Consultation Forum,

Whereas:

- (1) Under Directive 2005/32/EC ecodesign requirements should be set by the Commission for energy-using products representing significant volumes of sales and trade, having significant environmental impact and presenting significant potential for improvement in terms of their environmental impact without entailing excessive costs.
- (2) Article 16(2), first indent, of Directive 2005/32/EC provides that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Ecodesign Consultation Forum, the Commission shall, as appropriate, introduce an implementing measure for domestic appliances, including household dishwashers.
- (3) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of household dishwashers typically used in households. The study has been developed together with stakeholders and interested parties from the Community and third countries, and the results have been made publicly available.
- (4) This Regulation should cover products designed for washing tableware in households.
- (5) The environmental aspect of household dishwashers, identified as significant for the purposes of this Regulation, is energy consumption in the use phase. The annual electricity consumption of products subject to this Regulation was estimated to have

¹ OJ L 191, 22.7.2005, p. 29.

been 24.7 TWh in the Community in 2005 corresponding to 13 million tonnes of CO₂. Unless specific measures are taken, annual electricity consumption is estimated to increase to 35 TWh in 2020. The preparatory study shows that the electricity and water consumption of products subject to this Regulation can be significantly reduced.

- (6) The preparatory study shows that requirements regarding other ecodesign parameters referred to in Annex I, Part 1, of Directive 2005/32/EC are not necessary as electricity consumption of household dishwashers in the use phase is by far the most important environmental aspect.
- (7) The electricity consumption of products subject to this Regulation should be made more efficient by applying existing non-proprietary cost effective technologies that can reduce the combined costs of purchasing and operating these products.
- (8) The ecodesign requirements should not affect functionality from the user's perspective and should not negatively affect health, safety or the environment. In particular, the benefits of reducing electricity consumption during the use phase should more than offset any additional environmental impacts during the production phase.
- (9) The ecodesign requirements should be introduced gradually in order to provide a sufficient timeframe for manufacturers to re-design products subject to this Regulation. The timing should be set in such a way as to avoid negative impacts on the functionalities of equipment on the market, and to take into account cost impacts for end-users and manufacturers, in particular small and medium-sized enterprises, while ensuring timely achievement of the objectives of this Regulation.
- (10) Measurements of the relevant product parameters should be performed through reliable, accurate and reproducible measurement methods, which take into account the recognised state of the art measurement methods including, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services².
- (11) In accordance with Article 8 of Directive 2005/32/EC, this Regulation should specify the applicable conformity assessment procedures.
- (12) In order to facilitate compliance checks, manufacturers should provide information in the technical documentation referred to in Annexes V and VI of Directive 2005/32/EC insofar as this information relates to the requirements laid down in this Regulation.
- (13) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to ensure the wide availability and easy accessibility of information on the life-cycle environmental performance of products subject to this Regulation.
- (14) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2005/32/EC,

² OJ L 204, 21.7.1998, p. 37.

HAS ADOPTED THIS REGULATION:

Article 1
Subject matter and scope

1. This Regulation establishes eco-design 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 those sold for non-household use.

Article 2
Definitions

In addition to the definitions set out in Article 2 of Directive 2005/32/EC, the following definitions shall apply:

- (1) “household dishwasher” means a machine which cleans, rinses, and dries dishware, glassware, cutlery, and, cooking utensils by chemical, mechanical, thermal, and electric means and which is designed to be used principally for non-professional purposes;
- (2) “place settings” means a defined set of crockery, glass and cutlery for use by one person;
- (3) “rated capacity” means the number of place settings of a household dishwasher, together with the serving pieces stated by the manufacturer, which can be cleaned and dried when loaded in accordance with the manufacturer’s instructions;
- (4) “programme” means a series of functions which are pre-defined and which are declared as suitable by the manufacturer for specified levels of soil or types of load, or both, and together form a complete cycle;
- (5) “programme time” means the time that elapses from the initiation of the programme (excluding any user-programmed delay) until the completion of the programme;
- (6) “cycle” means a complete cleaning, rinsing, and drying process, as defined for the selected programme;
- (7) “off-mode” means a condition where the household dishwasher is switched off using controls or switches accessible to and intended for operation by the end-user during normal use to attain the lowest power consumption that may persist for an indefinite time while the household dishwasher is connected to a power source and used in accordance with the manufacturer’s instructions. Where there are no controls, ‘off-mode’ means the condition reached after the dishwasher is left to revert to a steady-state power consumption of its own accord;
- (8) “left-on mode” means the lowest power consumption mode that may persist for an indefinite time after completion of the programme and unloading of the machine without any further intervention of the end-user;

- (9) “equivalent dishwasher” means a model of household dishwasher placed on the market with the same rated capacity, technical and performance characteristics, energy and water consumption and airborne acoustical noise emissions as another model of household dishwasher placed on the market under a different commercial code number by the same manufacturer.

Article 3
Ecodesign requirements

The generic ecodesign requirements for household dishwashers are set out in Annex I, point 1. The specific ecodesign requirements for household dishwashers are set out in Annex I, point 2.

Article 4
Conformity assessment

1. The conformity assessment procedure referred to in Article 8 of Directive 2005/32/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 conformity assessment pursuant to Article 8 of Directive 2005/32/EC, the technical documentation file shall contain a copy of the product information provided in accordance with Annex II, point 2, and the results of the calculation set out in Annex III to this Regulation.

Where the information included in the technical documentation for a particular household dishwasher model has been obtained by calculation on the basis of design, or extrapolation from other equivalent household dishwashers, or both, the technical documentation shall include details of such calculations or extrapolations, or both, and of tests undertaken by manufacturers to verify the accuracy of the calculations undertaken. In such cases, the technical documentation shall also include a list of all other equivalent household dishwasher models where the information included in the technical documentation was obtained on the same basis.

Article 5
Verification procedure for market surveillance purposes

When performing the market surveillance checks referred to in Article 3(2) of Directive 2005/32/EC for the requirements set out in Annex I to this Regulation, the Member State authorities shall apply the verification procedure described in Annex IV to this Regulation.

Article 6
Benchmarks

The indicative benchmarks for best-performing household dishwashers available on the market at the time of entry into force of this Regulation are set out in Annex V.

Article 7
Revision

The Commission shall review this Regulation in the light of technological progress no later than five years after its entry into force and present the result of this review to the Ecodesign Consultation Forum.

Article 8
Entry into force

1. This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.
2. The generic ecodesign requirements set out in Annex I, point 1, shall apply from 1 July 2011;

The specific ecodesign requirement for the Energy Efficiency Index set out in point 2(1) of Annex I shall apply from 1 July 2010;

The specific ecodesign requirement for the Energy Efficiency Index set out in point 2(2) of Annex I shall apply from 1 July 2013.
3. This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the Commission

Member of the Commission

ANNEX I
Ecodesign requirements

1. Generic ecodesign requirements

- (1) For the calculation of the energy consumption and other parameters for household dishwashers, the cycle which cleans normally soiled tableware (hereafter "standard cleaning cycle") shall be used. This cycle shall be clearly identifiable on the programme selection device of the household dishwasher or the household dishwasher display, if any, or both, and named 'standard programme' and shall be set as the default cycle for household dishwashers equipped with automatic programme selection or any function for automatically selecting a cleaning programme or maintaining the selection of a programme.
- (2) The booklet of instructions provided by the manufacturer shall indicate:
 - (a) the standard cleaning cycle referred to as 'standard programme' and shall specify that it is suitable to clean normally soiled tableware and that it is the most efficient programme in terms of its combined energy and water consumption for that type of tableware;
 - (b) the energy and water consumption in each programme.

2. Specific ecodesign requirements

Household dishwashers shall comply with the following requirements:

- (1) From 1 July 2010:
 - (a) for all household dishwashers, except household dishwashers with a rated capacity of 10 place settings and a width equal to or less than 45 cm, the Energy Efficiency Index (EEI) shall be less than 71;
 - (b) for household dishwashers with a rated capacity of 10 place settings and a width equal or less than 45 cm, the Energy Efficiency Index (EEI) shall be less than 80;
 - (b) for all household dishwashers, the Cleaning Efficiency Index (I_C) shall be greater than 1.12.
- (2) From 1 July 2013:
 - (a) for household dishwashers with a rated capacity equal to or higher than 7 place settings, the Energy Efficiency Index (EEI) shall be less than 63;
 - (b) for household dishwashers with a rated capacity equal to or higher than 8 place settings, the Drying Efficiency Index (I_D) shall be greater than 1.08;
 - (c) for household dishwashers with a rated capacity equal to or less than 7 place settings, the Drying Efficiency Index (I_D) shall be greater than 0.86.

The Energy Efficiency Index (EEI), the Cleaning Efficiency Index (I_C) and the Drying Efficiency Index (I_D) of household dishwashers are calculated in accordance with Annex III.

ANNEX II
Measurement of energy consumption and other parameters

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements shall be made using a reliable, accurate and reproducible measurement procedure that takes into account the generally recognised state of the art measurement methods, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union.

1. TEST PROCEDURE AND MEASUREMENT ACCURACY

Measurements shall be made within the accuracy prescribed in Table 1.

Table 1

Measured parameter	Measurement accuracy
Annual energy consumption	The measured value shall not be greater than the rated value* of AE_C by more than 10 %.
Cleaning efficiency index	The measured value shall not be less than the rated value of I_C by more than 10 %.
Drying efficiency index	The measured value shall not be less than the rated value of I_D by more than 19 %.
Energy consumption	The measured value shall not be greater than the rated value of E_t by more than 10 %.
Programme time	The measured value shall not be longer than the rated values T_t by more than 10 %.
Power consumption in off-mode and left-on mode	The measured value of power consumption P_o and P_l of more than or equal to 0,50 W shall not be greater than the rated value by 2 % at the 95 % confidence level. The measured value of power consumption P_o and P_l of less than 0,50 W shall not be greater than 0,01 W at the 95 % confidence level in accordance with Commission Regulation (EC) No ³ 1275/2008 ³ .
Duration of left-on mode	The value measured shall not be longer than the rated value of T_l by more than 10 %.

* “rated value” means a value declared by the manufacturer

³ OJ L 339, 18.12.2008, p.45

2. TECHNICAL PARAMETERS

The parameters listed in points (a) to (g) shall be established as indicated:

- (a) "energy consumption" which is expressed in kWh and rounded to three decimal places;
- (b) "programme time" which is expressed in minutes and rounded to the nearest minute;
- (c) "cleaning efficiency " which is the average soil score of each load item after completion of the standard cleaning cycle as set out in Annex III, point 2(b) and rounded to three decimal places.
- (d) "drying efficiency" which is the average wet score of each load item after completion of the standard cleaning cycle as set out in Annex III, point 3(b) and rounded to three decimal places.
- (e) "power consumption in 'off-mode'" which is expressed in Watts and rounded to two decimal places, in accordance with Regulation (EC) No° 1275/2008;
- (f) "power consumption in 'left-on mode'" which is expressed in Watts and rounded to the two decimal places, in accordance with Regulation (EC) No° 1275/2008;
- (g) "'left-on mode' duration" which is expressed in minutes and rounded to the nearest minute, in accordance with Regulation (EC) No° 1275/2008.

ANNEX III

Method for calculating the Energy Efficiency Index, the Cleaning Efficiency Index and the Drying Efficiency Index

1. CALCULATION OF THE ENERGY EFFICIENCY INDEX

For the calculation of the Energy Efficiency Index (EEI) of a household dishwasher model, the energy consumption of the household dishwasher is compared to the standard energy consumption of a household dishwasher with the same number of place settings.

- (a) The Energy Efficiency Index (EEI) is calculated as follows and rounded to one decimal place:

$$EEI = \frac{AE_C}{SAE_C} \times 100$$

where:

AE_C = annual energy consumption of the household dishwasher

SAE_C = standard annual energy consumption of the household dishwasher

- (b) The Annual Energy Consumption (AE_C) is calculated in kWh/year as follows and rounded to two decimal places:

- (i)

$$AE_C = E_t \times 280 + \frac{\left[P_o \times \frac{525.600 - (T_t \times 280)}{2} + P_l \times \frac{525.600 - (T_t \times 280)}{2} \right]}{60 \times 1.000}$$

where:

E_t = energy consumption for the standard cycle, in kWh and rounded to three decimal places;

P_l = power in “left-on mode” for the standard cleaning cycle, in W and rounded to two decimal places;

P_o = power in “off-mode” for the standard cleaning cycle, in W and rounded to two decimal places;

T_t = programme time for the standard cleaning cycle, in minutes and rounded to the nearest minute.

- (ii) When power management is enforced, with the household dishwasher reverting automatically to 'off-mode' after the end of the programme, AE_C is calculated taking into consideration the effective duration of 'left-on mode', according to the following formula:

$$AE_C = E_t \times 280 + \frac{\{(P_l \times T_l \times 280) + P_o \times [525.600 - (T_l \times 280) - (T_l \times 280)]\}}{60 \times 1.000}$$

where:

T_l = measured time in "left-on mode" for the standard cleaning cycle, in minutes and rounded to the nearest minute.

280 = total number of standard cleaning cycles per year.

- (c) The Standard Annual Energy Consumption SAE_C is calculated in kWh/year as follows and rounded to two decimal places:

- (i) for household dishwashers with rated capacity $ps \cdot 10$ and width >45 cm:

$$SAE_C = 7,0 \times ps + 378$$

- (ii) for household dishwashers with rated capacity $ps \cdot 9$ and household dishwashers with rated capacity $9 < ps \cdot 11$ and width >45 cm:

$$SAE_C = 25,2 \times ps + 126$$

where:

ps = number of place settings.

2. CALCULATION OF THE CLEANING EFFICIENCY INDEX

For the calculation of the Cleaning Efficiency Index (I_C) of a household dishwasher model, the cleaning efficiency of the household dishwasher is compared to the cleaning efficiency of a reference household dishwasher where the reference household dishwasher shall have the same characteristics for all suppliers.

- (a) The Cleaning Efficiency Index (I_C) is calculated as follows and rounded to two decimal places

$$\ln I_C = \frac{1}{n} \times \sum_{i=1}^n \ln \times \left(\frac{C_{T,i}}{C_{R,i}} \right)$$

$$I_C = \exp(\ln I_C)$$

where:

$C_{T,i}$ = cleaning efficiency of the household dishwasher under test for one test cycle (i)

$C_{R,i}$ = cleaning efficiency of the reference household dishwasher for one test cycle (i)

n = number of test cycles, $n \cdot 5$

(b) The cleaning efficiency (C) is the average of the soil score of each load item after completion of a standard cleaning cycle. The soil score is calculated as shown in Table 1:

Table 1

Number of small dot shaped soil particles (n)	Total soiled area (A_S) in mm ²	Soil score
$n = 0$	$A_S = 0$	5 (most efficient)
$0 < n \cdot 4$	$0 < A_S \cdot 4$	4
$4 < n \cdot 10$	$0 < A_S \cdot 4$	3
$10 < n$	$0 < A_S \cdot 4$	2
Not applicable	$50 < A_S \cdot 200$	1
Not applicable	$200 < A_S$	0 (least efficient)

3. CALCULATION OF THE DRYING EFFICIENCY INDEX

For the calculation of the Drying Efficiency Index (I_D) of a household dishwasher model, the cleaning efficiency of the household dishwasher is compared to the cleaning efficiency of a reference household dishwasher where the reference household dishwasher shall have the same characteristics for all suppliers.

(a) The Drying Efficiency Index (I_D) is calculated as follows and rounded to two decimal places:

$$\ln I_D = \frac{1}{n} \times \sum_{i=1}^n \ln \left(\frac{D_{T,i}}{D_{R,i}} \right)$$

$$I_D = \exp(\ln I_D)$$

where:

$D_{T,i}$ = drying efficiency of the household dishwasher under test for one test cycle (i)

$D_{R,i}$ = drying efficiency of the reference household dishwasher for one test cycle (i)

n = number of test cycles, $n \cdot 5$

(b) The Drying Efficiency (D) is the average of the wet score of each load item after completion of a standard cleaning cycle. The wet score is calculated as shown in Table 2:

Table 2

Number of water traces (W_T) or wet streak (W_S)	Total wet area (A_w) in mm^2	Wet score
$W_T = 0$ and $W_S = 0$	Not applicable	2 (most efficient)
$1 < W_T \cdot 2$ or $W_S = 1$	$A_w < 50$	1
$2 < W_T$ or $W_S = 2$ or $W_S = 1$ and $W_T = 1$	$A_w > 50$	0 (least efficient)

ANNEX IV

Verification procedure for market surveillance purposes

For the purposes of checking conformity with the requirements laid down in Annex I, Member State authorities shall test a single household dishwasher. If the measured parameters do not meet the declared values within the meaning of Article 5 (2) of the manufacturer within the range set out in Table 1 of Annex II, the measurements shall be carried out on three more household dishwashers. The arithmetic mean of the measured values of these three household dishwashers shall meet the requirements within the ranges defined in Table 1 of Annex II.

Otherwise, the model and all other equivalent household dishwasher models shall be considered not to comply with the requirements laid down in Annex I.

In addition to the procedure set out in Annex II, Member States authorities shall use reliable, accurate and reproducible measurement procedures, which take into account the generally recognised state of the art measurement methods, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union.

ANNEX V Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market for household dishwashers in terms of their energy efficiency, energy and water consumption, cleaning and drying efficiency and airborne acoustical noise emissions was identified as follows:

- (1) Household dishwashers with 14 place settings (under-table model):
 - (a) energy consumption: 0.950 kWh/cycle, corresponding to an overall annual energy consumption of 278.5 kWh/year, of which 266 kWh/Year for 280 washing cycles and 12.5 kWh/year due to the low power modes
 - (b) water consumption: 10 litres/cycle, corresponding to 2 800 litres/year for 280 cycles
 - (c) cleaning efficiency index: $I_C > 1.12$
 - (d) drying efficiency index: $I_D > 1.08$
 - (e) airborne acoustical noise emissions: 41 dB(A) re 1pW
- (2) Household dishwashers with 12 place settings (free-standing model):
 - (a) energy consumption: 0.950 kWh/cycle, corresponding to an overall annual energy consumption of 278.5 kWh/year, of which 266 kWh/year for 280 washing cycles and 12.5 kWh/year due to the low power modes
 - (b) water consumption: 9 litres/cycle, corresponding to 2 520 litres/year for 280 cycles
 - (c) cleaning efficiency index: $I_C > 1.12$
 - (d) drying efficiency index: $I_D > 1.08$
 - (e) airborne acoustical noise emissions: 41 dB(A) re 1pW
- (3) Household dishwashers with 9 place settings (built-in model):
 - (a) energy consumption: 0.800 kWh/cycle, corresponding to an overall annual energy consumption of 236.5 kWh/year, of which 224 kWh/year for 280 washing cycles and 12.5 kWh/year due to the low power modes
 - (b) water consumption: 9 litres/cycle, corresponding to 2 520 litres/year for 280 cycles
 - (c) cleaning efficiency index: $I_C > 1.12$
 - (d) drying efficiency index: $I_D > 1.08$
 - (e) airborne acoustical noise emissions: 44 dB(A) re 1pW

- (4) Household dishwashers with 6 place settings (built-in model):
- (a) energy consumption: 0.63 kWh/cycle, corresponding to an overall annual energy consumption of 208.5 kWh/year, of which 196 kWh/year for 280 washing cycles and 12.5 kWh/year due to the low power modes
 - (b) water consumption: 7 litres/cycle, corresponding to 1 960 litres/year for 280 cycles
 - (c) cleaning efficiency index: $I_C > 1.12$
 - (d) drying efficiency index: $1,08 \geq I_D > 0.86$
 - (e) airborne acoustical noise emissions: 45 dB(A) re 1pW
- (5) Household dishwashers with 4 place settings (free standing model):
- (a) energy consumption: 0.51 kWh/cycle, corresponding to an overall annual energy consumption of 155.3 kWh/year, of which 142.8, kWh/year for 280 washing cycles and 12.5 kWh/year due to the low power modes; the airborne acoustical noise emissions of this machines is 65 dB(A)
 - (b) water consumption: 9.5 litres/cycle, corresponding to 2 660 litres/year for 280 cycles
 - (c) cleaning efficiency index: $I_C > 1.12$
 - (d) drying efficiency index: $1,08 \geq I_D > 0.86$
 - (e) airborne acoustical noise emissions: 53 dB(A) re 1pW