

**Working document on a possible Commission Regulation implementing Directive
2005/32/EC with regard to household dishwashers**

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 dishwashers that can also be powered by batteries.
2. This Regulation shall apply to electric mains-operated household dishwashers, including where those are sold for non-household use.
3. The Regulation shall not apply to household dishwashers that are primarily powered by energy sources other than electricity such as LPG, kerosene and bio-diesel fuels.

Article 2

Definitions

In addition to the definitions set out in 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) “rated capacity” means a whole number of place settings together with the serving pieces stated by the manufacturer, which can be cleaned and dried when loaded in accordance with the manufacturer’s instructions;
- (3) “place settings” means a defined set of crockery, glass and cutlery for use by one person;
- (4) “programme” means a series of functions which are pre-defined and which are declared by the manufacturer suitable for specified levels of soil type of load or both and together form a complete cycle;
- (5) “programme time” means the time elapsed from the initiation of the programme (excluding any user-programmed delay) until an end of programme indicator and the user has access to the load. If there is no end of programme indicator, the programme time is equal to the cycle time;
- (6) “cycle” means a complete washing, rinsing, and drying process, as defined by the programme selected, consisting of a series of functions;
- (7) “off-mode” is a condition where the dishwasher is switched off using appliance controls or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while connected to a mains power source and used in accordance with the manufacturer’s instructions. Where there are no controls, the dishwasher is left to revert to a steady state power consumption of its own accord;

- (8) “left-on mode” is the lowest power consumption mode that may persist for an indefinite time after the completion of the programme and unloading of the machine without any further intervention of the user;
- (9) “equivalent dishwasher” means a model placed on the market with the same rated capacity, technical and performance characteristics, energy and water consumption and airborne acoustical noise of another model 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, Part 1 and the specific ecodesign requirements are set out in Annex I, Part 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 of that Directive or the management system set out in Annex V of that Directive.
2. For the purposes of conformity assessment pursuant to Article 8 of Directive 2005/32/EC, the technical documentation file shall contain the copy of the product information listed in Annex II, Part 2 and the results of the calculation provided in Annex III of this Regulation.

Where the information included in the technical documentation for a particular dishwasher model has been obtained by calculation on the basis of design, or extrapolation from other equivalent dishwashers or both, the 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 dishwasher models, the information of which has been 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 compliance with requirements set out in Annex I of this Regulation, the authorities of Member State shall apply the verification procedure described in Annex IV of this Regulation.

Article 6

Benchmarks

The indicative benchmarks for best-performing dishwashers and technologies 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 light of technological progress no later than five years after the 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, Part 1 shall apply from [two years after entry into force -specific date to be added before formal adoption of this Regulation];
The specific ecodesign requirement of the Energy Efficiency Index set out in point 1 of Annex I, Part 2 shall apply from [one year after entry into force -specific date to be added before formal adoption of this Regulation];
The specific ecodesign requirement of the Energy Efficiency Index set out in point 2 of Annex I, Part 2 shall apply from 1 January 2013 [four years after entry into force -specific date to be added before formal adoption of this Regulation].
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) The standard washing cycle to be used for the purpose of this Regulation shall be:
 - (a) a cycle for normal use, to clean normal soiled tableware;
 - (b) clearly identifiable on the appliance programme selection device and/or the machine display, if any, and named “Normal Programme”;
 - (c) indicated in the booklet of instructions provided by manufacturers under 'Normal Programme' and with the specification that it is suitable for normal use, to clean normal soiled tableware and that it is the most efficient programme in relation to combined energy and water consumption for that type of tableware;
 - (d) set as the default cycle for machines equipped with an automatic programme selection or any function allowing the automatic selection of a washing programme or to maintain the selection of a given programme.
- (2) In the booklet of instructions provided by manufacturers, the different levels of energy and water consumption in different programmes and between full and half load shall be listed.

2. Specific ecodesign requirements

Household dishwashers shall comply with the requirements listed below.

- (1) Stage 1:
 - (a) the Energy Efficiency Index (EEI) of all household dishwashers, except for 10 place settings household dishwashers with a width equal or below 45 cm, shall be lower than 71;
 - (b) the Energy Efficiency Index (EEI) of 10 place settings household dishwashers with a width equal or below 45 cm, shall be lower than 80;
 - (b) the cleaning efficiency index I_C shall be higher than 1,12.
- (2) Stage 2:
 - (a) the EEI of household dishwashers with a rated capacity equal or higher than 7 place settings shall be lower than 63;
 - (b) the drying efficiency index I_D shall be higher than 1,08 for dishwashers with a rated capacity equal to or higher than 8 place settings;
 - (c) the drying efficiency index P_D shall be higher than 0,86 for dishwashers with a rated capacity equal or lower than 7 place settings.

The Energy Efficiency Index, of household dishwashers shall be calculated in accordance with Annex III. The cleaning efficiency index and drying efficiency index shall be established in accordance with Annex II, Part 2.

ANNEX II

Measurement of the 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, which takes into account the generally recognised state of the art measurement methods. They shall fulfil all of the following conditions.

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 lower than the rated value of I_C by more than 10 %.
Drying efficiency index	The measured value shall not be lower 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 verification of the power consumption P_o and P_l shall be done in accordance with Commission Regulation (EC) N° 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment.
Duration of the left-on mode	The measured value shall not be longer than the rated value of T_l by more than 10 %.

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

2. TECHNICAL PARAMETERS

The following parameters 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 logarithm of the ratio of the average score of the soil traces and remains found on each load item, in the machine under test and the reference machine. At least 5 cleaning test cycles of the standard programme shall be run and the logarithm is calculated for each cycle. The cleaning efficiency index I_C is the average of the results of all the cycles rounded to 2 decimal places;
- (d) "drying efficiency" which is the logarithm of the ratio of the average score of the water traces found on each load item, in the machine under test and the reference machine. The drying effect is evaluated by visual inspection and judged to be "dry", "intermediate" or "wet"; inspection of the items in the machine under test and the reference machine shall be carried out by the same person. At least 5 cleaning test cycles of the standard programme shall be run and the logarithm is calculated for each cycle. The drying efficiency index I_D is the average of the results of all the cycles rounded to 2 decimal places;
- (e) "power consumption in 'off mode'" which is measured as prescribed in Commission Regulation (EC) N° 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment;
- (f) "power consumption in 'left-on mode'" which is measured as prescribed in Commission Regulation (EC) N° 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment;
- (g) "'left-on mode' duration" which is measured as prescribed in Commission Regulation N° 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment.

ANNEX III
Method for calculating the Energy Efficiency Index

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

a) The Energy Efficiency Index is calculated as:

$$EEI = \frac{AE_C}{SAE_C} \times 100 \text{ and is rounded to one decimal place}$$

where:

AE_C = annual energy consumption of a dishwasher

SAE_C = standard annual energy consumption of a dishwasher.

b) The Annual Energy Consumption AE_C of a dishwasher, in kWh/year rounded to two decimal places, shall be calculated as:

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

where

- E_t is the energy consumption for the standard cycle, in kWh and rounded to three decimal places;
- P_l is the power in the “left-on mode” for the standard cycle, in W and rounded to two decimal places;
- P_o is the power in “off-mode” for the standard cycle, in W and rounded to two decimal places;
- T_t is the programme time for the standard cycle, in minutes and rounded to the nearest minute.

When a power management is enforced, reverting automatically the product to the ‘off mode’ after the end of the programme, AE_C shall be calculated taking into consideration the effective duration of the “left-on mode”, according to the following formula:

$$AE_C = E_t \times 280 + \frac{\{(P_l \times T_1 \times 280) + P_o \times [525.600 - (T_t \times 280) - (T_1 \times 280)]\}}{60 \times 1.000}$$

where T_1 is the measured time in “left-on mode” for the standard cycle, in minutes and rounded to the nearest minute.

The value 280 is the total number of standard washing cycles per year.

c) The Standard Annual Energy Consumption SAE_C of a dishwasher shall be calculated, in kWh/year and rounded to two decimal places, as:

$$SAE_C = 7,0 \times ps + 378 \quad \text{for dishwashers with rated capacity } ps \geq 10 \text{ and width } > 45\text{cm}$$

$$SAE_C = 25,2 \times ps + 126 \quad \begin{array}{l} \text{for dishwashers with rated capacity } ps \leq 9 \text{ and} \\ \text{dishwashers with rated capacity } 9 < ps \leq 11 \text{ and width } \leq \\ 45\text{cm.} \end{array}$$

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 applied to three more household dishwashers. The arithmetical mean of the measured values of these three household dishwashers shall meet the requirements within the range defined in Table 1 of Annex II.

Otherwise, the model and all other equivalent household dishwasher models shall be considered not to comply.

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, 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 was identified as follows.

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 litre/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: 41 dB(A) re 1pW

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 litre/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: 41 dB(A) re 1pW

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 litre/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: 44 dB(A) re 1pW

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 litre/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: 45 dB(A) re 1pW

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 of this machines is 65 dB(A)
- (b) water consumption: 9,5 litre/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: 53 dB(A) re 1pW