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COMMISSION REGULATION (EU) No 1016/2010

of 10 November 2010

implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household dishwashers

(Text with EEA relevance)

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**COMMISSION REGULATION (EU) No 1016/2010****of 10 November 2010****implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household dishwashers****(Text with EEA relevance)***Article 1***Subject matter and scope**

This 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 those sold for non-household use and built-in household dishwashers.

*Article 2***Definitions**

In addition to the definitions laid down in Article 2 of Directive 2009/125/EC, the following definitions shall apply for the purpose of this Regulation:

- (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) ‘built-in household dishwasher’ means a household dishwasher intended to be installed in a cabinet, a prepared recess in a wall or a similar location, requiring furniture finishing;
- (3) ‘place settings’ means a defined set of crockery, glass and cutlery for use by one person;
- (4) ‘rated capacity’ means the maximum number of place settings together with the serving pieces, as stated by the manufacturer, which can be treated in a household dishwasher on the programme selected when loaded in accordance with the manufacturer’s instructions;
- (5) ‘programme’ means a series of operations that are pre-defined and are declared as suitable by the manufacturer for specified levels of soil or types of load, or both, and together form a complete cycle;
- (6) ‘programme time’ means the time that elapses from the initiation of the programme until the completion of the programme, excluding any user-programmed delay;
- (7) ‘cycle’ means a complete cleaning, rinsing, and drying process, as defined for the selected programme;
- (8) ‘off-mode’ means a condition where the household dishwasher is switched off using appliance 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

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source and used in accordance with the manufacturer's instructions; where there is no control or switch accessible to the end-user, 'off-mode' means the condition reached after the household dishwasher reverts to a steady-state power consumption on its own;

- (9) '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;
- (10) '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 point 1 of Annex I.

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

*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 conformity assessment pursuant to Article 8 of Directive 2009/125/EC, the technical documentation file shall contain the results of the calculation set out in Annex II 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

Member States shall apply the verification procedure described in Annex III to this Regulation when performing the market surveillance checks referred to in Article 3(2) of Directive 2009/125/EC for compliance with the requirements set out in Annex I 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 IV.

Article 7

Revision

The Commission shall review this Regulation in the light of technological progress no later than 4 years after its entry into force and present the result of this review to the Ecodesign Consultation Forum. The review shall 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.

Article 8

Entry into force and application

1. This Regulation shall enter into force on the 20th day following its publication in the *Official Journal of the European Union*.

2. It shall apply from 1 December 2011.

However, the ecodesign requirements listed below shall apply in accordance with the following timetable:

- (a) the generic ecodesign requirements set out in point 1(1) of Annex I shall apply from 1 December 2012;
- (b) the generic ecodesign requirements set out in point 1(2) of Annex I shall apply from 1 June 2012;
- (c) the specific ecodesign requirements set out in point 2(2) of Annex I shall apply from 1 December 2013;
- (d) the specific ecodesign requirements set out in point 2(3) of Annex I shall apply from 1 December 2016;

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



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 provide:
 - (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 power consumption of the off-mode and of the left-on mode;
 - (c) indicative information on the programme time, energy and water consumption for the main cleaning programmes.

2. SPECIFIC ECODESIGN REQUIREMENTS

Household dishwashers shall comply with the following requirements:

- (1) From 1 December 2011:
 - (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 to or less than 45 cm, the Energy Efficiency Index (*EEI*) shall be less than 80;
 - (c) for all household dishwashers, the Cleaning Efficiency Index (*I_C*) shall be greater than 1,12.
- (2) From 1 December 2013:
 - (a) for household dishwashers with a rated capacity equal to or higher than 11 place settings and household dishwashers with a rated capacity of 10 place settings and a width higher than 45 cm, the Energy Efficiency Index (*EEI*) shall be less than 63;
 - (b) for 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;
 - (c) 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;
 - (d) 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.

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(3) From 1 December 2016:

- (a) for household dishwashers with a rated capacity of 8 and 9 place settings and 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 63.

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 II.



ANNEX II

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 Annual Energy Consumption of the household dishwasher is compared to its Standard Energy Consumption.

- (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) where the household dishwasher is equipped with a power management system, 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:

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- (i) for household dishwashers with rated capacity $ps \geq 10$ and width > 50 cm:

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

- (ii) for household dishwashers with rated capacity $ps \leq 9$ and household dishwashers with rated capacity $ps > 9$ and width ≤ 50 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 dishwasher, where the reference dishwasher shall have the characteristics indicated in 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*.

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

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

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

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 dishwasher for one test cycle (i)

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

- (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)
$0 < n \leq 4$	$0 < A_S \leq 4$	4
$4 < n \leq 10$	$0 < A_S \leq 4$	3
$10 < n$	$4 < A_S \leq 50$	2
Not applicable	$50 < A_S \leq 200$	1
Not applicable	$200 < A_S$	0 (least efficient)

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3. CALCULATION OF THE DRYING EFFICIENCY INDEX

For the calculation of the Drying Efficiency Index (I_D) of a household dishwasher model, the drying efficiency of the household dishwasher is compared to the drying efficiency of a reference dishwasher, where the reference dishwasher shall have the characteristics indicated in 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*.

- (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 dishwasher for one test cycle (i)

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

- (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 (Aw) in mm ²	Wet score
$W_T = 0$ and $W_S = 0$	Not applicable	2 (most efficient)
$1 < W_T \leq 2$ or $W_S = 1$	$Aw < 50$	1
$2 < W_T$ or $W_S = 2$ or $W_S = 1$ and $W_T = 1$	$Aw > 50$	0 (least efficient)

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The verification tolerances defined in this Annex relate only to the verification of the measured parameters by Member State authorities and shall not be used by the manufacturer or importer 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 communicate better performance by any means.

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, for the requirements referred to in this Annex, the authorities of the Member States shall apply the following procedure:

- (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 or importer than the results of the corresponding measurements carried out pursuant to paragraph (g) thereof; and
 - (b) the declared values meet any requirements laid down in this Regulation, and any required product information published by the manufacturer or importer does not contain values that are more favourable for the manufacturer or importer than the declared values; and
 - (c) 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 given in Table 1.
- (3) If the results referred to in point 2(a) or (b) are not achieved, the model and all models that have been listed as equivalent household dishwasher models in the manufacturer's or importer's technical documentation shall be considered not to comply with this Regulation.
- (4) If the result referred to in point 2(c) 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 different models that have been listed as equivalent models in the manufacturer's or importer's technical documentation.
- (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 the respective verification tolerances given in Table 1.
- (6) If the result referred to in point 5 is not achieved, the model and all models that have been listed as equivalent household dishwasher models in the manufacturer's or importer's technical documentation 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 after a decision being taken on the non-compliance of the model according to points 3 and 6.

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Member States' authorities shall use measurement procedures which take into account the generally recognised, state-of-the-art, reliable, accurate and reproducible measurement methods, including methods set out in documents whose reference numbers have been published for that purpose in the *Official Journal of the European Union*. The Member State authorities shall use the measurement and calculation methods set out in Annex II.

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

Table 1

Verification tolerances

Parameters	Verification tolerances
Annual energy consumption (AE_C)	The determined value shall not exceed the declared value of AE_C by more than 10 %.
Cleaning efficiency index (I_C)	The determined value shall not be less than the declared value of I_C by more than 10 %.
Drying efficiency index (I_D)	The determined value shall not be less than the declared value of I_D by more than 19 %.
Energy consumption (E_t)	The determined value shall not exceed the declared value of E_t by more than 10 %. Where three additional units need to be selected, the arithmetic mean of the determined values of these three units shall not exceed the declared value of E_t by more than 6 %.
Programme time (T_t)	The determined value shall not exceed the declared values T_t by more than 10 %.
Power consumption in off mode and left-on mode (P_o and P_l)	The determined values of power consumption P_o and P_l of more than 1,00 W shall not exceed the declared values of P_o and P_l by more than 10 %. The determined values of power consumption P_o and P_l of less than or equal to 1,00 W shall not exceed the declared values of P_o and P_l by more than 0,10 W.
Duration of left-on mode (T_l)	The determined value shall not exceed the declared value of T_l by more than 10 %.

*ANNEX IV***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 is identified as follows:

- (1) Household dishwashers with 15 place settings (built-in model):
 - (a) energy consumption: 0,88 kWh/cycle, corresponding to an overall annual energy consumption of 268,9 kWh/year, of which 246,4 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: 45 dB(A) re 1 pW;
- (2) Household dishwashers with 14 place settings (under-table model):
 - (a) energy consumption: 0,83 kWh/cycle, corresponding to an overall annual energy consumption of 244,9 kWh/year, of which 232,4 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 1 pW;
- (3) Household dishwashers with 13 place settings (under-table model):
 - (a) energy consumption: 0,83 kWh/cycle, corresponding to an overall annual energy consumption of 244,9 kWh/year, of which 232,4 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: 42 dB(A) re 1 pW;
- (4) 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 1 pW;

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- (5) 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 1 pW;
- (6) 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 1 pW;
- (7) 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;
 - (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 1 pW.