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

*Article 1*
***Subject matter and scope***

1. This Regulation establishes eco-design requirements related to electric mains-operated household washing machines and electric mains-operated washing machines that can also be powered by batteries.

2. This Regulation shall apply to electric mains operated automatic household washing machines, including where those are sold for non-household use.

3. This Regulation shall not apply to:

   (a) washing machines with no spin capability;

   (b) combined washer-driers;

   (c) washing machines which 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 washing machine" means a machine which cleans and rinses textiles using water which may also have a means of extracting excess water from the textiles and which is designed to be used principally for non-professional purposes;

(2) "automatic washing machine" means a washing machine where the load is fully treated by the machine without the need for user intervention at any point during the programme prior to its completion. Examples of user intervention could include manual fill (non automatic water level), transfer of the load between a washing drum and a spin extractor drum or manual draining;

(3) "rated capacity" means the maximum mass in kg of dry textiles, at 0,5 kg intervals, stated by the manufacturer which can be cleaned and rinsed when loaded in the washing machine on the programme selected in accordance with the manufacturer's instructions;

(4) "capacity at partial load" means a half of the washing machine rated capacity for the same programme;

(5) "programme" means a series of functions which are pre-defined and which are declared by the manufacturer suitable for washing certain types of textile;

(6) "cycle" means a complete washing process, as defined by the programme selected, consisting of a series of functions (wash, rinse, spin, etc.) and including any functions that occur after the completion of the programme, such as pumping, monitoring and anti-creasing functions where applicable;

(7) "programme time" means the time elapsed from the initiation of the programme (excluding any user programmed delay) until the completion of the programme. If the end of programme is not indicated, the programme time is equal to the cycle

time. The programme is complete when the washing machine indicates the end of the programme and the load is accessible to the user. Where there is no end of programme indicator and the door is locked during operation, the programme is complete when the load is accessible to the user. Where there is no end of programme indicator and the door is not locked during operation, the programme is complete when the power consumption of the appliance drops to some steady state condition and is not performing any function;

(8) "remaining moisture content" means the amount of moisture that is contained in the load in relation to the equilibrium condition defined as 0% remaining moisture content;

(9) "off-mode" is a condition where the washing machine 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 washing machine is left to revert to a steady state power consumption of its own accord;

(10) "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;

(11) "equivalent washing machine" means a model placed on the market with the same rated capacity, technical and performance characteristics, energy and water consumption and airborne acoustical noise in washing and spinning 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 washing machines 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(2) 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 provided in Annex II, Part 2 and the results of the calculation provided in Annexes III and IV of this Regulation.

Where the information included in the technical documentation for a particular washing machine model has been obtained by calculation on the basis of design, and/or extrapolation from other equivalent washing machines, the documentation shall include details of such calculations and/or extrapolations, 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 washing machine 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 requirements set out in Annex I of this Regulation, the authorities of Member States shall apply the verification procedure described in Annex V of this Regulation.

*Article 6*

***Benchmarks***

The indicative benchmarks for best-performing washing machines and technologies available on the market at the time of entry into force of this Regulation are set out in Annex VI of this Regulation.

*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 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 requirement of the Energy Efficiency Index set out in Part 2, point 1 of Annex I shall apply from [one year after entry into force-specific date to be added before formal adoption of this Regulation]

   The specific requirement of the Energy Efficiency Index set out in Part 2 of Annex I, point 2 shall apply from [four years after entry into force-specific date to be added before formal adoption of this Regulation]

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*

## LIST OF ANNEXES

## ANNEX I
## Ecodesign requirements

### 1. Generic ecodesign requirements

(1) The standard cotton 60°C and cotton 40°C programmes to be used for the purpose of this Regulation shall be:

(a) programmes for normal use, to clean normal soiled cotton laundry;

(b) clearly identifiable on the appliance programme selection device and/or the machine display, if any, and named "60°C cotton normal programme" and "40°C cotton normal programme";

(c) indicated in the booklet of instructions provided by manufacturers with the same name and with the specification that they are suitable for normal use, to clean normal soiled cotton laundry and that they are the most efficient programmes in relation to combined energy and water consumptions for washing that type of cotton laundry.

(2) In the booklet of instructions provided by manufacturers, the different levels of energy and water consumption in different programmes shall be listed.

### 2. Specific ecodesign requirements

Household washing machines shall comply with the requirements listed below.

1) From [one year after this Regulation has come into force specific date to be added before formal adoption of this Regulation]:

– the Energy Efficiency Index (EEI) shall be lower than 68;

– for washing machines with a rated capacity higher than 3 kg, the Washing Efficiency Index $W_P$ shall be higher than 1,03;

– for washing machines with a rated capacity equal or lower than 3 kg, the Washing Efficiency Index $W_P$ shall be higher than 1,00;

– the water consumption $W_t$ shall be: $W_t \leq 5 \times c + 35$

where $c$ is the machine rated capacity for the standard 60°C cotton programme at full load or the standard 40°C cotton programme at full load, whichever is the lowest.

2) From [four years after this Regulation has come into force -specific date to be added before formal adoption of this Regulation]:

– the EEI shall be lower than 59 for washing machines with a rated capacity equal or higher than 4 kg

– the water consumption shall be: $W_t \leq 5 \times c_1 + 35$

where $c_1$ is the machine capacity for the standard 60°C cotton programme at partial load or the standard 40°C cotton programme at partial load, whichever is the lowest.

The Energy Efficiency Index (EEI), the Washing Efficiency Index $W_P$ and the water consumption $W_t$ shall be calculated in accordance with Annex IV.

## 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.

| 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 %. |
| Washing efficiency index | The measured value shall not be lower than the rated value of $W_P$ by more than 4 %. |
| 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 %. |
| Water consumption | The measured value shall not be greater than the rated value of $W_t$ 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 parameters listed below shall be measured for the standard 60°C cotton programme at full and partial load and the standard 40°C cotton programme at partial load. They 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) "water consumption" which is expressed in litre and rounded to one decimal place;

(d) "washing performance" which is rounded to three decimal places;

(e) "remaining moisture" which is calculated in percentage and rounded to the nearest whole percent;

(f) "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;

(g) "power consumption in 'left-on mode'" which is measured as prescribed in Commission Regulation (EC) N° 1275/2008;

(h) "'left-on mode' duration" which is measured as prescribed in Commission Regulation (EC) N° 1275/2008.

## ANNEX III
## Method for calculating the Energy Efficiency Index, the washing performance and the water consumption

### 1. CALCULATION OF THE ENERGY EFFICIENCY INDEX

For the calculation of the EEI of a washing machine, the energy consumption of any given washing machine is compared to the standard energy consumption of a washing machine with the same rated capacity.

a) The Energy Efficiency Index (EEI) shall be calculated as:

$$EEI = \frac{AE_C}{SAE_C} \times 100$$ and rounded to the first decimal place

where:

$AE_C$ = annual energy consumption of a washing machine

$SAE_C$ = standard annual energy consumption of a washing machine.

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

$$AE_C = E_t \times 220 + \frac{\left[ P_o \times \frac{525.600 - (T_t \times 220)}{2} + P_l \times \frac{525.600 - (T_t \times 220)}{2} \right]}{60 \times 1.000}$$

$E_t$ is the energy consumption for the standard washing programmes, in kWh and rounded to three decimal places, determined as:

$E_t = (3 \times E_{t,60} + 2 \times E_{t,60½} + 2 \times E_{t,40½})/7$

where

– $E_{t,60}$ is the energy consumption for the standard 60°C cotton programme at full load, in kWh, rounded to three decimal places;

– $E_{t,60½}$ is the consumption for the standard 60°C cotton programme at half load, in kWh, rounded to three decimal places;

– $E_{t,40½}$ is the energy consumption for the standard 40°C cotton programme at half load, in kWh, rounded to three decimal places;

$P_l$ is the power in the 'left-on mode' for the standard washing programmes, in W and rounded to the second decimal place, determined as:

$P_l = (3 \times P_{l,60} + 2 \times P_{l,60½} + 2 \times P_{l,40½})/7$

where

– $P_{l,60}$ is the power in 'left-on mode' for the standard 60°C cotton programme at full load, in W and rounded to the second decimal place;

– $P_{l,60½}$ is the power in 'left-on mode' for the for the standard 60°C cotton programme at half load, in W and rounded to the second decimal place;

– $P_{l,40½}$ is the power in 'left-on mode' for the standard 40°C cotton programme at half load, in W and rounded to the second decimal place.

$P_o$ is the power in 'off mode' for the standard washing programmes, in W and rounded to the second decimal place, determined as:

$P_o = (3 \times P_{o,60} + 2 \times P_{o,60½} + 2 \times P_{o,40½})/7$

where

$P_{o,60}$ is the power in 'off-mode' for the standard 60°C cotton programme at full load, in W and rounded to the second decimal place;
$P_{o,60½}$ is the power in 'off-mode' for the for the standard 60°C cotton programme at half load, in W and rounded to the second decimal place;
$P_{o,40½}$ is the power in 'off-mode' for the standard 40°C cotton programme at half load, in W and rounded to the second decimal place.

$T_t$ is the programme time for the standard washing programmes, in minutes and rounded to the nearest minute, determined as:

$T_t = (3 \times T_{t,60} + 2 \times T_{t,60½} + 2 \times T_{t,40½})/7$

where

– $T_{t,60}$ is the programme time for the standard 60°C cotton programme at full load, in minutes and rounded to the nearest minute;

– $T_{t,60½}$ is the programme time for the for the standard 60°C cotton programme at half load, in minutes and rounded to the nearest minute;

– $T_{t,40½}$ is the programme time for the standard 40°C cotton programme at half load, 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:

$$AE_C = E_t \times 220 + \frac{\{(P_l \times T_l \times 220) + P_o \times [525.600 - (T_t \times 220) - (T_l \times 220)]\}}{60 \times 1.000}$$

where $T_l$ is the time in 'left-on mode' for the standard washing programmes, in minutes and rounded to the nearest minute, determined as:

$T_l = (3 \times T_{l,60} + 2 \times T_{l,60½} + 2 \times T_{l,40½})/7$

where

– $T_{l,60}$ is the time in 'left-on mode' for the standard 60°C cotton programme at full load, in minutes and rounded to the nearest minute;

– $T_{l,60½}$ is the time in 'left-on mode' for the for the standard 60°C cotton programme at half load, in minutes and rounded to the nearest minute;

– $T_{l,40½}$ is the time in 'left-on mode' for the standard 40°C cotton programme at half load, in minutes and rounded to the nearest minute.

The value 220 is the total number of standard washing cycles per year.

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

$$SAE_C = 47{,}0 \times c + 51{,}7$$

where $c$ is the machine rated capacity for the standard 60°C cotton programme at full load or the standard 40°C cotton programme at full load, whichever is the lowest.

## 2. CALCULATION OF THE WASHING EFFICIENCY INDEX

The washing efficiency index $W_P$ of a washing machine for the standard washing programmes shall be determined as:

$W_P = (3 \times W_{P,60} + 2 \times W_{P,60½} + 2 \times W_{P,40½})/7$ and rounded to three decimal places,

where

– $W_{P,60}$ is the washing performance for the standard 60°C cotton programme at full load, rounded to three decimal places;

– $W_{P,60½}$ is the washing performance for the standard 60°C cotton programme at half load, rounded to three decimal places;

– $W_{P,40½}$ is the washing performance for the standard 40°C cotton programme at half load, rounded to three decimal places.

## 3. CALCULATION OF THE WATER CONSUMPTION

The water consumption $W_t$ for the standard washing programmes shall be determined as:

$W_t = (3 \times W_{t,60} + 2 \times W_{t,60½} + 2 \times W_{t,40½})/7$ and rounded to the integer,

where

$W_{t,60}$ is the water consumption for the standard 60°C cotton programme at full load, rounded to one decimal place;
$W_{t,60½}$ is the water consumption for the standard 60°C cotton programme at half load, rounded to one decimal place;
$W_{t,40½}$ is the water consumption for the standard 40°C cotton programme at half load, rounded to one decimal place.

## 4. TRANSITIONAL PERIOD

In case no harmonised standard for the measurement of the standard 40°C cotton programme at partial load and the standard 60°C cotton programme at partial load is available one year after the entry into force of this Regulation, and unless this harmonised standard becomes available, the formulae for the calculation of $E_t$, $P_l$, $P_o$, $T_t$, $T_l$, $W_P$ and $W_t$ in Parts 1, 2 and 3 of this Annex are substituted by the corresponding formulae in Annex IV.

## ANNEX IV
## Formulae for the transitional period

### 1. CALCULATION OF THE ENERGY CONSUMPTION

$E_t = [3 \times E_{t,60} + 2 \times (0{,}8 \times E_{t,60}) + 2 \times (0{,}64 \times E_{t,60})]/7$

where $E_{t,60}$ is the energy consumption for the standard 60°C cotton programme at full load, in kWh and rounded to three decimal places.

$P_l = P_{l,60}$

where $P_{l,60}$ is the power in 'left-on mode' for the standard 60°C cotton programme at full load, in W and rounded to two decimal places.

$P_o = P_{o,60}$

where $P_{o,60}$ is the power in 'off-mode' for the standard 60°C cotton programme at full load, in W and rounded two decimal places..

$T_t = T_{t,60}$

where $T_{t,60}$ is the programme time for the standard 60°C cotton programme at full load, in minutes and rounded to the nearest minute.

$T_l = T_{l,60}$

where $T_{l,60}$ is the measured time in "left-on mode" for the standard 60°C cotton programme at full load, in minutes and rounded to the nearest minute.

### 2. CALCULATION OF THE WASHING EFFICIENCY INDEX

$W_P = W_{P,60}$

where $W_{P,60}$ is the washing performance for the standard 60°C cotton programme at full load, rounded to three decimal places.

### 3. CALCULATION OF THE WATER CONSUMPTION

$W_t = W_{t,60}$

where $W_{t,60}$ is the water consumption for the standard 60°C cotton programme at full load, rounded to the integer.

## ANNEX V
## 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 washing machines. 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 washing machines. The arithmetical mean of the measured values of these three household washing machines shall meet the requirements within the range defined in Table 1 of Annex II.

Otherwise, the model and all other equivalent household washing machines 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 VI
## Benchmarks

At the time of entry into force of this Regulation, the best available technology on the market for household washing machines in terms of their Energy Efficiency Index and water consumption, energy consumption, washing performance and airborne acoustical noise in washing/spinning for the standard 60°C cotton programme at full load was identified as follows*.

Washing machines with a rated capacity of 3kg:

(a) energy consumption: 0,70 kWh/cycle (or 0,23 kWh/kg), corresponding to an overall annual energy consumption of 166,5 kWh/year, of which 154 kWh/year for 220 standard washing cycles for cotton at 60°C and full load and 12,5 kWh/year expected to be due to the low power modes

(b) water consumption: 39 litre/cycle, corresponding to 8.580 litre/year for 220 standard washing cycles for cotton at 60°C and full load

(c) washing efficiency index: $W_P$ of 1,03

(d) airborne acoustical noise in washing/spinning: 53/74 dB(A) re 1pW.

Washing machines with a rated capacity of 4,5kg:

(a) energy consumption: 0,76 kWh/cycle (or 0,17 kWh/kg) corresponding to an overall annual energy consumption of 179,7 kWh/year, of which 167,2 kWh/year for 220 standard washing cycles for cotton at 60°C and full load and 12,5 kWh/year expected to be due to the low power modes

(b) water consumption: 40 litre/cycle, corresponding to 8.800 litre/year for 220 standard washing cycles for cotton at 60°C and full load

(c) washing efficiency index: $W_P$ of 1,03

(d) airborne acoustical noise in washing/spinning (1.000 rpm): 55/70 dB(A) re 1pW.

Washing machines with a rated capacity of 5kg:

(a) energy consumption: 0,850 kWh/cycle (or 0,17 kWh/kg) corresponding to an overall annual energy consumption of 199,5 kWh/year, of which 187 kWh/year for 220 standard washing cycles for cotton at 60°C and full load and 12,5 kWh/year expected to be due to the low power modes

(b) water consumption: 39 litre/cycle, corresponding to an annual water consumption of 8.580 litre for 220 standard washing cycles for cotton at 60°C and full load

(c) washing efficiency index: $W_P$ of 1,03

(d) airborne acoustical noise in washing/spinning (1.200 rpm): 53/73 dB(A) re 1pW.

Washing machines with a rated capacity of 6kg:

(a) energy consumption: 1,02 kWh/cycle (or 0,17 kWh/kg) corresponding to an overall annual energy consumption of 236,9 kWh/year, of which 224,4 kWh/year for 220 standard washing cycles for cotton at 60°C and full load and 12,5 kWh/year expected to be due to the low power modes

(b) water consumption: 39 litre/cycle, corresponding to an annual water consumption of 8.580 litre for 220 standard washing cycles for cotton at 60°C and full load

(c) washing efficiency index: $W_P$ of 1,03

(d) airborne acoustical noise in washing/spinning (1.600 rpm): 54/78 dB(A) re 1pW.

Washing machines with a rated capacity of 7kg:

(a) energy consumption: 1,020 kWh/cycle (or 0,15 kWh/kg) corresponding to an overall annual energy consumption of 236,9 kWh/year, of which 224,4 kWh/year for 220 standard washing cycles for cotton at 60°C and full load and 12,5 kWh/year expected to be due to the low power modes

(b) water consumption: 43 litre/cycle, corresponding to an annual water consumption of 9.460 litre for 220 standard washing cycles for cotton at 60°C and full load

(c) washing efficiency index: $W_P$ of 1,03

(d) airborne acoustical noise in washing/spinning (1.000 rpm): 57/73 dB(A) re 1pW

(e) airborne acoustical noise in washing/spinning (1.400 rpm): 59/76 dB(A) re 1pW

(f) airborne acoustical noise in washing/spinning (1.200 rpm): 48/62 dB(A) re 1pW (when built-in).

Washing machines with a rated capacity of 8kg:

(a) energy consumption: 1,200 kWh/cycle (or 0,15 kWh/kg) corresponding to an overall annual energy consumption of 276,5 kWh/year, of which 264,0 kWh/year for 220 standard washing cycles for cotton at 60°C and full load and 12,5 kWh/year expected to be due to the low power modes

(b) water consumption: 56 litre/cycle, corresponding to an annual water consumption of 12.320 litre for 220 standard washing cycles for cotton at 60°C and full load

(c) washing efficiency index: $W_P$ of 1,03

(d) airborne acoustical noise washing/spinning (1.400 rpm): 54/71 dB(A) re 1pW

(e) airborne acoustical noise washing/spinning (1.600 rpm): 54/74 dB(A) re 1pW.

*For the evaluation of the overall annual energy consumption a programme time of 90 min was considered along with an off mode power of 1W and a left on mode power of 2 W.