

TECHNICAL REGULATION ON ECODESIGN REQUIREMENTS FOR HOUSEHOLD WASHING MACHINES, NO (XXX) FOR THE YEAR 2012, ISSUED IN ACCORDANCE TO ARTICLE (XXX) AND ARTICLE (XXX) OF STANDARDS AND METROLOGY LAW NO 22/2000

Article 1:

This Technical Regulation shall be referred to as the "Technical Regulation on ecodesign requirements for household washing machines, No. ... for 2012."

Article 2:

This Technical Regulation represents an implementing Technical Regulation on ecodesign requirements for energy related products, No. ... (hereinafter: Framework Technical Regulation), both of which shall be used to establish the ecodesign requirements for washing machines.

Section 1
Definitions

Article 3:

In addition to the definitions laid down in Article 2 of the Framework Technical Regulation, the following definitions shall apply for the purpose of this implementing Technical Regulation:

3-1 Household washing machine: an automatic washing machine which cleans and rinses textiles using water which also has a spin extraction function and which is designed to be used principally for non-professional purposes;

3-2 Built-in household washing machine: a household washing machine intended to be installed in a cabinet, a prepared recess in a wall or a similar location, requiring furniture finishing;

3-3 Automatic washing machine: a washing machine where the load is fully treated by the machine without the need for user intervention at any point during the programme;

3-4 Household combined washer-drier: a household washing machine, which includes both a spin extraction function and also a means for drying the textiles, usually by heating and tumbling;

3-5 Programme: a series of operations that are pre- defined and are declared by the manufacturer as suitable for washing certain types of textile;

3-6 Cycle: a complete washing, rinsing and spinning process, as defined for the selected programme;

3-7 Programme time: the time that elapses from the initiation of the programme until the completion of the programme excluding any end-user programmed delay;

3-8 Rated capacity: the maximum mass in kilograms stated by the manufacturer at 0,5 kg intervals kg of dry textiles of a particular type, which can be treated in a household washing machine on the selected programme, when loaded in accordance with the manufacturer's instructions;

3-9 Partial load: half of the rated capacity of a household washing machine for a given programme;

3-10 Remaining moisture content: the amount of moisture contained in the load at the end of the spinning phase;

3-11 Off-mode: a condition where the household washing machine 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 washing machine is connected to a power 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 washing machine reverts to a steady-state power consumption on its own;

3-12 Left-on mode: the lowest power consumption mode that may persist for an indefinite time after completion of the programme without any further intervention by the end-user besides unloading of the household washing machine;

3-13 Equivalent washing machine: a model of household washing machine placed on the market with the same rated capacity, technical and performance characteristics, energy and water consumption and airborne acoustical noise emissions during washing and spinning as another model of household washing machine placed on the market under a different commercial code number by the same manufacturer.

Section 2 Subject matter and scope

Article 4:

4-1 This implementing Technical Regulation establishes ecodesign requirements for placing on the market of electric mains-operated household washing machines and electric mains-operated household washing machines that can also be powered by batteries, including those sold for non-household use and built-in household washing machines.

4-2 This implementing Technical Regulation shall not apply to household combined washer-driers.

Section 3 Requirements, conformity assessment and market surveillance

Article 5: Ecodesign requirements

5-1 The generic ecodesign requirements for household washing machines are set out in point 1 of Annex A.

5-2 The specific ecodesign requirements for household washing machines are set out in point 2 of Annex A.

Article 6: Conformity assessment

6-1 The conformity assessment procedure referred to in Article 10 of the Framework Technical Regulation shall be the internal design control system set out in Annex B to that Technical Regulation or the management system set out in Annex C to that Technical Regulation.

6-2 For the purposes of conformity assessment pursuant to Article 10 of the Framework Technical Regulation, the technical documentation file shall contain a copy of the calculation set out in Annex B to this implementing Technical Regulation.

6-3 Where the information included in the technical documentation for a particular household washing machine model has been obtained by calculation on the basis of design, or extrapolation from other equivalent washing machines, 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 washing machine models where the information included in the technical documentation was obtained on the same basis.

Article 7: Verification procedure for market surveillance purposes

The Organization shall apply the verification procedure described in Annex C to this implementing Technical Regulation when performing the market surveillance checks referred to in Article 15 of the Framework Technical Regulation for compliance with requirements set out in Annex A to this implementing Technical Regulation.

Article 8: Benchmarks

The indicative benchmarks for best-performing household washing machines available on the market at the time of entry into force of this implementing Technical Regulation are set out in Annex D.

Section 4
Related documents

Article 9:

9-1 This Technical Regulation represents transposition of EU Commission Regulation 1015/2010 on ecodesign requirements for household washing machines.

9-2 Technical Regulation on the ecodesign requirements for energy related products, No. ...

9-3 Standards and Metrology Law, No. 22/2000.

9-4 Instructions on market surveillance, No.

Section 5
Entry into force

Article 10:

This Technical Regulation shall enter into force on 1/1/ 2014.

ANNEX A ECODESIGN REQUIREMENTS

1. Generic ecodesign requirements

(1) For the calculation of the energy consumption and other parameters for household washing machines, the cycles which clean normally soiled cotton laundry (hereafter standard cotton programmes) at 40 °C and 60 °C shall be used. These cycles shall be clearly identifiable on the programme selection device of the household washing machines or the household washing machines display, if any, or both, and indicated as 'standard 60 °C cotton programme' and 'standard 40 °C cotton programme'.

(2) The booklet of instructions provided by the manufacturer shall provide:

(a) the standard 60 °C and 40 °C cotton programmes, referred to as 'standard 60 °C cotton programme' and 'standard 40 °C cotton programme', and shall specify that they are suitable to clean normally soiled cotton laundry and that they are the most efficient programmes in terms of combined energy and water consumptions for washing that type of cotton laundry; in addition, an indication that the actual water temperature may differ from the declared cycle temperature;

(b) The power consumption of the off-mode and of the left-on mode;

(c) indicative information on the programme time, remaining moisture content, energy and water consumption for the main washing programmes at full or partial load, or both;

(d) Recommendation on the type of detergents suitable for the various washing temperatures.

(3) Household washing machines shall offer to end-users a cycle at 20 °C. This programme shall be clearly identifiable on the programme selection device of the household washing machines or the household washing machines display, if any, or both.

2. Specific ecodesign requirements

Household washing machines shall comply with the following requirements:

— for all household washing machines, the Energy Efficiency Index (EEI) shall be less than 68,

— for household washing machines with a rated capacity equal to or higher than 4 kg, the Energy Efficiency Index (EEI) shall be less than 59,

— for household washing machines with a rated capacity higher than 3 kg, the Washing Efficiency Index (I_w) shall be greater than 1,03,

— for household washing machines with a rated capacity equal to or lower than 3 kg, the Washing Efficiency Index (I_w) shall be greater than 1,00,

— for all household washing machines, the water consumption shall be:

$$W_t \leq 5 \times c_{1/2} + 35$$

where $c_{1/2}$ is the household washing machine's rated capacity for the standard 60 °C cotton programme at partial load or for the standard 40 °C cotton programme at partial load, whichever is the lower.

The Energy Efficiency Index (EEI), the Washing Efficiency Index (I_w) and the Water Consumption (W_t) are calculated in accordance with Annex B.

ANNEX B

METHOD FOR CALCULATING THE ENERGY EFFICIENCY INDEX, WASHING EFFICIENCY INDEX, WATER CONSUMPTION AND REMAINING MOISTURE CONTENT

1. Calculation of The energy efficiency index

For the calculation of the Energy Efficiency Index (EEI) of a household washing machine model, the weighted annual energy consumption of a household washing machine for the standard 60 °C cotton programme at full and partial load and for the standard 40 °C cotton programme at partial load is compared to its standard annual energy consumption.

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

$$EEI = \frac{AEC}{SAEC} \times 100$$

where:

AEC = weighted annual energy consumption of the household washing machine;

$SAEC$ = standard annual energy consumption of the household washing machine.

(b) The standard annual energy consumption ($SAEC$) is calculated in kWh/year as follows and rounded to two decimal places:

$$SAEC = 47.0 \times c + 51.7$$

where:

c = rated capacity of the household washing machine for the standard 60 °C cotton programme at full load or the standard 40 °C cotton programme at full load, whichever is the lower.

(c) The weighted annual energy consumption (AEC) is calculated in kWh/year as follows and is rounded to two decimal places:

(i)

$$AEC = E_t \times 220 + \frac{[P_o \times \frac{525600 - (T_t \times 220)}{2} + P_l \times \frac{525600 - (T_t \times 220)}{2}]}{60 \times 1000}$$

where:

E_t = weighted energy consumption;

P_o = weighted power in 'off-mode';

P_l = weighted power in the 'left-on mode';

T_t = programme time;

220 = total number of standard washing cycles per year.

(ii) Where the household washing machine is equipped with a power management system, with the household washing machine reverting automatically to 'off-mode' after the end of the programme, the weighted annual energy consumption (AEC) is calculated taking into consideration the effective duration of the 'left-on mode', according to the following formula:

$$AE_C = E_t \times 220 + \frac{\{(P_l \times T_l \times 220) + P_o \times [525600 - (T_l \times 200) - (T_l \times 200)]\}}{60 \times 1000}$$

where:

T_l = time in 'left-on mode'

(d) The weighted energy consumption (E_t) is calculated in kWh as follows and rounded to three decimal places:

$$E_t = [3 \times E_{t,60} + 2 \times E_{t,60\frac{1}{2}} + 2 \times E_{t,40\frac{1}{2}}] / 7$$

where:

$E_{t,60}$ = energy consumption of the standard 60 °C cotton programme;

$E_{t,60\frac{1}{2}}$ = energy consumption of the standard 60 °C cotton programme at partial load;

$E_{t,40\frac{1}{2}}$ = energy consumption of the standard 40 °C cotton programme at partial load.

(e) The weighted power in 'off-mode' (P_o) is calculated in W as follows and rounded to two decimal places:

$$P_o = (3 \times P_{o,60} + 2 \times P_{o,60\frac{1}{2}} + 2 \times P_{o,40\frac{1}{2}}) / 7$$

where:

$P_{o,60}$ = power in 'off-mode' of the standard 60 °C cotton programme at full load;

$P_{o,60\frac{1}{2}}$ = power in 'off-mode' of the standard 60 °C cotton programme at partial load;

$P_{o,40\frac{1}{2}}$ = power in 'off-mode' of the standard 40 °C cotton programme at partial load.

(f) The weighted power in the 'left-on mode' (P_l) is calculated in W as follows and rounded to two decimal places:

$$P_l = (3 \times P_{l,60} + 2 \times P_{l,60\frac{1}{2}} + 2 \times P_{l,40\frac{1}{2}}) / 7$$

where:

$P_{l,60}$ = power in 'left-on mode' of the standard 60 °C cotton programme at full load;

$P_{l,60\frac{1}{2}}$ = power in 'left-on mode' of the standard 60 °C cotton programme at partial load;

$P_{l,40\frac{1}{2}}$ = power in 'left-on mode' of the standard 40 °C cotton programme at partial load.

(g) The weighted programme time (T_t) is calculated in minutes as follows and rounded to the nearest minute:

$$T_t = (3 \times T_{t,60} + 2 \times T_{t,60\frac{1}{2}} + 2 \times T_{t,40\frac{1}{2}}) / 7$$

where:

$T_{t,60}$ = programme time of the standard 60 °C cotton programme at full load;

$T_{t,60\frac{1}{2}}$ = programme time of the standard 60 °C cotton programme at partial load;

$T_{t,40\frac{1}{2}}$ = programme time of the standard 40 °C cotton programme at partial load.

(h) The weighted time in 'left-on mode' (T_l) is calculated in minutes as follows and rounded to the nearest minute:

$$T_1 = (3 \times T_{1,60} + 2 \times T_{1,60\frac{1}{2}} + 2 \times T_{1,40\frac{1}{2}}) / 7$$

where:

$T_{1,60}$ = time in 'left-on mode' of the standard 60 °C cotton programme at full load;

$T_{1,60\frac{1}{2}}$ = time in 'left-on mode' of the standard 60 °C cotton programme at partial load;

$T_{1,40\frac{1}{2}}$ = time in 'left-on mode' of the standard 40 °C cotton programme at partial load.

2. Calculation of the washing efficiency Index

For the calculation of the Washing Efficiency Index (I_w), the weighted washing efficiency of the household washing machine for the standard 60 °C cotton programme at full and partial load and for the standard 40 °C cotton programme at partial load is compared to the washing efficiency of a reference washing machine, where the reference washing machine shall have the characteristics indicated in the generally recognised state-of-the-art measurement methods, including methods set out in Jordanian standards adopting EU documents, the reference numbers of which have been published for that purpose in the Official gazette.

(a) The Washing Efficiency Index (I_w) is calculated as follows and rounded to three decimal places

$$I_w = \frac{(3 \times I_{w,60} + 2 \times I_{w,60\frac{1}{2}} + 2 \times I_{w,40\frac{1}{2}})}{7}$$

where:

$I_{w,60}$ = Washing Efficiency Index of the standard 60 °C cotton programme at full load;

$I_{w,60\frac{1}{2}}$ = Washing Efficiency Index of the standard 60 °C cotton programme at partial load;

$I_{w,40\frac{1}{2}}$ = Washing Efficiency Index of the standard 40 °C cotton programme at partial load.

(b) The Washing Efficiency Index of one standard cotton programme (p) is calculated as follows:

$$I_{w,p} = \frac{1}{n} \times \sum_{i=1}^n \left(\frac{W_{T,i}}{W_{R,a}} \right)$$

where:

$W_{T,i}$ = Washing Efficiency of the household washing machine under test for one test cycle (i);

$W_{R,a}$ = Average Washing Efficiency of the reference washing machine;

n = number of test cycles, $n \geq 3$ for the standard 60 °C cotton programme at full load, $n \geq 2$ for the standard 60 °C cotton programme at partial load and $n \geq 2$ for the standard 40 °C cotton programme at partial load.

(c) The Washing Efficiency (W) is the average of the reflectance values of each test strip after completion of a test cycle.

3. Calculation of water consumption

The water consumption (W_t) is calculated as follows and rounded to one decimal place:

$$W_t = W_{t,60}$$

where:

$W_{t,60}$ = water consumption of the standard 60 °C cotton programme at full load.

4. Calculation of the remaining moisture content

The remaining moisture content (D) of a programme is calculated in percentage and rounded to the nearest whole per cent.

ANNEX C
VERIFICATION PROCEDURE FOR MARKET SURVEILLANCE PURPOSES

For the purposes of checking conformity with the requirements laid down in Annex A, the Organization shall test a single household washing machine. If the measured parameters do not meet the values declared in the technical documentation file within the meaning of Article 7 by the manufacturer within the ranges set out in Table 1, the measurements shall be carried out on three more household washing machines. The arithmetic mean of the measured values of these three household washing machines shall meet the requirements within the ranges set out in Table 1, except for the energy consumption, where the measured value shall not be greater than the rated value of E_t by more than 6 %.

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

The Organization 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 Jordanian standards adopting EU documents, the reference numbers of which have been published for that purpose in the Official gazette.

Table 1

Measured Parameter	Verification tolerances
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 less than the rated value of I_w 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 of 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 measured value of power consumption P_o and P_l of more than 1,00 W shall not be greater than the Rated value by more than 10%. The measured value of power consumption P_o and P_l of less than or equal to 1,00 W shall not be greater than the rated value by more than 0,10 W.
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	

ANNEX D BENCHMARKS

At the time of entry into force of this Technical Regulation, the best available technology on the market for household washing machines, in terms of their water and energy consumptions, washing efficiency and airborne acoustical noise emissions during washing/spinning for the standard 60 °C cotton programme at full load, is identified as follows (*):

(1) Household washing machines with a rated capacity of 3 kg:

(a) Energy consumption: 0,57 kWh/cycle (or 0,19 kWh/kg), corresponding to an overall annual energy consumption of 117,84 kWh/year, of which 105,34 kWh/year for 220 cycles and 12,5 kWh/year during the low-power modes;

(b) Water consumption: 39 litres/cycle, corresponding to 8 580 litres/year for 220 cycles;

(c) Washing efficiency index: of $1,03 \geq I_w > 1,00$.

(d) Airborne acoustical noise emissions during washing/spinning (900 rpm): not available.

(2) Household washing machines with a rated capacity of 3,5 kg:

(a) Energy consumption: 0,66 kWh/cycle (or 0,19 kWh/kg), corresponding to an overall annual energy consumption of 134,50 kWh/year, of which 122,00 kWh/year for 220 cycles and 12,5 kWh/year during the low-power modes

(b) Water consumption: 39 litres/cycle, corresponding to 8 580 litres/year for 220 cycles

(c) Washing efficiency index: I_w of 1,03

(d) Airborne acoustical noise emissions during washing/spinning (1 100 rpm): not available.

(3) Household washing machines with a rated capacity of 4,5 kg:

(a) Energy consumption: 0,76 kWh/cycle (or 0,17 kWh/kg) corresponding to an overall annual energy consumption of 152,95 kWh/year, of which 140,45 kWh/year for 220 cycles and 12,5 kWh/year during the low-power modes

(b) Water consumption: 40 litres/cycle, corresponding to 8 800 litres/year for 220 cycles

(c) Washing efficiency index: I_w of 1,03

(d) Airborne acoustical noise emissions during washing/spinning (1 000 rpm): 55/70 dB(A) re 1 pW

(4) Household washing machines with a rated capacity of 5 kg:

(a) Energy consumption: 0,850 kWh/cycle (or 0,17 kWh/kg) corresponding to an overall annual energy consumption of 169,60 kWh/year, of which 157,08 kWh/year for 220 cycles and 12,5 kWh/year during the low-power modes;

(b) Water consumption: 39 litres/cycle, corresponding to an annual water consumption of 8 580 litres for 220 cycles;

(c) Washing efficiency index: I_w of 1,03

Note:

(*) For evaluation of the annual energy consumption, the calculation method set out in Annex B was used for a programme time of 90 min along with an off-mode power of 1 W and a left-on mode power of 2 W.

(d) Airborne acoustical noise emissions during washing/spinning (1 200 rpm): 53/73 dB(A) re 1pW.

(5) Household washing machines with a rated capacity of 6 kg:

(a) Energy consumption: 0,90 kWh/cycle (or 0,15 kWh/kg) corresponding to an overall annual energy consumption of 178,82 kWh/year, of which 166,32 kWh/year for 220 cycles and 12,5 kWh/year during the low-power modes;

(b) Water consumption: 37 litres/cycle, corresponding to an annual water consumption of 8 140 litres for 220 cycles;

(c) Washing efficiency index: *I_w* of 1,03

(d) Airborne acoustical noise emissions during washing/spinning (1 600 rpm): not available.

(6) Household washing machines with a rated capacity of 7 kg:

(a) Energy consumption: 1,05 kWh/cycle (or 0,15 kWh/kg) corresponding to an overall annual energy consumption of 201,00 kWh/year, of which 188,50 kWh/year for 220 cycles and 12,5 kWh/year during the low-power modes;

(b) Water consumption: 43 litres/cycle, corresponding to an annual water consumption of 9 460 litres for 220 cycles;

(c) Washing efficiency index: *I_w* of 1,03;

(d) Airborne acoustical noise emissions during washing/spinning (1 000 rpm): 57/73 dB(A) re 1pW;

(e) Airborne acoustical noise emissions during washing/spinning (1 400 rpm): 59/76 dB(A) re 1pW;

(f) Airborne acoustical noise emissions during washing/spinning (1 200 rpm): 48/62 dB(A) re 1pW (for built-in household washing machines).

(7) Household washing machines with a rated capacity of 8 kg:

(a) Energy consumption: 1,200 kWh/cycle (or 0,15 kWh/kg) corresponding to an overall annual energy consumption of 234,26 kWh/year, of which 221,76 kWh/year for 220 cycles and 12,5 kWh/year during the low-power modes;

(b) Water consumption: 56 litres/cycle, corresponding to an annual water consumption of 12 320 litres for 220 cycles;

(c) Washing efficiency index: *I_w* of 1,03;

(d) Airborne acoustical noise emissions during washing/spinning (1 400 rpm): 54/71 dB(A) re 1 pW;

(e) Airborne acoustical noise emissions during washing/spinning (1 600 rpm): 54/74 dB(A) re 1 pW.