Commission Delegated Regulation (EU) 2019/2014 of 11 March 2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of household washing machines and household washer-dryers and repealing Commission Delegated Regulation (EU) No 1061/2010 and Commission Directive 96/60/EC (Text with EEA relevance)

ANNEX IV

Measurement methods and calculations

Modifications etc. (not altering text)

C1 Annexes 1-5 applied (with modifications) (31.12.2020) by The Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2020 (S.I. 2020/1528), regs. 1(4), 30(1)-(3), **Sch. 2**

C2 Annex 4, as applied and modified by S.I. 2020/1528, Sch. 2, amended (1.10.2021) by The Ecodesign for Energy-Related Products and Energy Information (Amendment) Regulations 2021 (S.I. 2021/1097), regs. 1(2), 5(4)

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or other reliable, accurate and reproducible methods, which takes into account the generally recognised state-of-the-art, and in line with the following provisions.

The eco 40-60 programme shall be used for the measurement and calculation of the energy consumption, Energy Efficiency Index (EEI_W), maximum temperature, water consumption, remaining moisture content, programme duration, washing efficiency, rinsing effectiveness, spin-drying efficiency and airborne acoustical noise emissions in the spinning phase for household washing machines and the washing cycle of household washer-dryers. The energy consumption, maximum temperature, water consumption, remaining moisture content, programme duration, washing efficiency and rinsing effectiveness shall be measured concurrently.

The wash and dry cycle shall be used for the measurement and calculation of the energy consumption, Energy Efficiency Index (EEI_{WD}), maximum temperature in the washing phase, water consumption, final moisture content, cycle duration, washing efficiency and rinsing effectiveness for household washer-dryers. The energy consumption, maximum temperature, water consumption, final moisture content, cycle duration, washing efficiency and rinsing effectiveness shall be measured concurrently.

When measuring the parameters of this annex for the eco 40-60 programme and for the wash and dry cycle, the highest spin speed option for the eco 40-60 programme shall be used at rated capacity, at half of the rated capacity and, where relevant, at a quarter of the rated capacity.

For household washing machines with a rated capacity lower than or equal to 3 kg and for household washer-dryers with a rated washing capacity lower than or equal to 3 kg, the parameters for the eco 40-60 programme and for the wash and dry cycle shall be measured at rated capacity only.

The duration of the eco 40-60 programme (t_W) at rated washing capacity, at half of the rated washing capacity and at a quarter of the rated washing capacity, and the duration of the wash and dry cycle (t_{WD}) at rated capacity and at half of the rated capacity, are expressed in hours and minutes and rounded to the nearest minute.

Airborne acoustical noise emissions are measured in dB(A) with respect to 1 pW and rounded to the nearest integer.

1. RATED CAPACITY OF HOUSEHOLD WASHER-DRYERS

The rated capacity of household washer-dryers shall be measured, using the wash and dry cycle.

If the household washer-dryer provides a continuous cycle, the rated capacity of the wash and dry cycle shall be the rated capacity for this cycle.

If the household washer-dryer does not provide a continuous cycle, the rated capacity of the wash and dry cycle shall be the lower value of the rated washing capacity of the eco 40-60 programme and the rated drying capacity of the drying cycle achieving cupboard dry status.

2. ENERGY EFFICIENCY INDEX

2.1. *Energy Efficiency Index (EEI_W) of household washing machines and the washing cycle of household washer-dryers*

For the calculation of the EEI_W, the weighted energy consumption of the eco 40-60 programme at the rated washing capacity, half of the rated washing capacity and a quarter of the rated washing capacity is compared to its standard energy consumption.

(a) The EEI_W is calculated as follows, and is rounded to one decimal place:

$$EEI_W = (E_W/SCE_W) \times 100$$

where:

E_W is the weighted energy consumption of the household washing machine or the washing cycle of the household washer-dryer;

SCE_W is the standard cycle energy consumption of the household washing machine or the washing cycle of the household washer-dryer.

(b) The SCE_W is calculated in kWh per cycle and rounded to three decimal places as follows:

$$SCE_W = -0{,}0025 \times c^2 + 0{,}0846 \times c + 0{,}392$$

where c is the rated capacity of the household washing machine or the rated washing capacity of the household washer-dryer for the eco 40-60 programme.

(c) The E_W is calculated in kWh per cycle as follows and rounded to three decimal places:

where:

$E_{W,full}$ is the energy consumption of the household washing machine or of the washing cycle of the household washer-dryer for the eco 40-60 programme at the rated washing capacity and rounded to three decimal places;

$E_{W,½}$ is the energy consumption of the household washing machine or of the washing cycle of the household washer-dryer for the eco 40-60 programme at half of the rated washing capacity and rounded to three decimal places;

$E_{W,1/4}$ is the energy consumption of the household washing machine or of the washing cycle of the household washer-dryer for the eco 40-60 programme at a quarter of the rated washing capacity and rounded to three decimal places;

A is the weighting factor for rated washing capacity and rounded to three decimal places;

B is the weighting factor for half of the rated washing capacity and rounded to three decimal places;

C is the weighting factor for a quarter of the rated washing capacity and rounded to three decimal places.

For household washing machines with a rated capacity lower than or equal to 3 kg and for household washer-dryers with a rated washing capacity lower than or equal to 3 kg, A shall be equal to 1; B and C shall be equal to 0.

For other household washing machines and household washer-dryers, the values of the weighting factors depend on the rated capacity according to the following equations:

$A = -0{,}0391 \times c + 0{,}6918$

$B = -0{,}0109 \times c + 0{,}3582$

$C = 1 - (A + B)$

where c is the rated capacity of the household washing machine or the rated washing capacity of the household washer dryer.

(d) The weighted energy consumption per 100 cycles of the household washing machine or of the washing cycle of the household washer-dryer is calculated as follows and rounded to the nearest integer:

$E_W \times 100$

2.2. *Energy Efficiency Index (EEI_{WD}) of the complete cycle of household washer-dryers*

For the calculation of the EEI_{WD} of a household washer-dryer model, the weighted energy consumption of the wash and dry cycle at the rated capacity and half of the rated capacity is compared to its standard cycle energy consumption.

(a) The EEI_{WD} is calculated as follows, and is rounded to one decimal place:

$EEI_{WD} = (E_{WD}/SCE_{WD}) \times 100$

where:

E_{WD} is the weighted energy consumption of the complete cycle of the household washer-dryer;

SCE_{WD} is the standard cycle energy consumption of the complete cycle of the household washer-dryer.

(b) The SCE_{WD} is calculated in kWh per cycle and rounded to three decimal places as follows:

$SCE_{WD} = -0{,}0502 \times d^2 + 1{,}1742 \times d - 0{,}644$

where d is the rated capacity of the household washer-dryer for the wash and dry cycle.

(c) For household washer-dryers with a rated washing capacity lower than or equal to 3 kg, the E_{WD} is the energy consumption at rated capacity and rounded to three decimal places.

For other household washer-dryers, the E_{WD} is calculated in kWh per cycle as follows and rounded to three decimal places:

where:

$E_{WD,full}$ is the energy consumption of the household washer-dryer for the wash and dry cycle at rated capacity and rounded to three decimal places;

$E_{WD,½}$ is the energy consumption of the household washer-dryer for the wash and dry cycle at half the rated capacity and rounded to three decimal places.

(d) The weighted energy consumption per 100 cycles of the complete cycle of the washer-dryer is calculated as follows and rounded to the nearest integer:

$E_{WD} \times 100$

3. WASHING EFFICIENCY INDEX

The washing efficiency index of household washing machines and of the washing cycle of household washer-dryers (I_w) and the washing efficiency index of the complete cycle of household washer-dryers (J_w) shall be calculated using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, and rounded to two decimal places.

4. RINSING EFFECTIVENESS

The rinsing effectiveness of household washing machines and of the washing cycle of household washer-dryers (I_R) and the rinsing effectiveness of the complete cycle of household washer-dryers (J_R) shall be calculated using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or other reliable, accurate and reproducible method based on the detection of the linear alkylbenzene sulfonate (LAS) marker, and rounded to one decimal place.

5. MAXIMUM TEMPERATURE

The maximum temperature reached for 5 minutes inside the laundry being treated in household washing machines and in the washing cycle of household washer-dryers shall be determined using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or other reliable, accurate and reproducible method, and rounded to the nearest integer.

6. WEIGHTED WATER CONSUMPTION

(1) The weighted water consumption (W_W) of a household washing machine or the washing cycle of a household washer-dryer is calculated in litres and rounded to the nearest integer:

$$W_W = (A \times W_{W,full} + B \times W_{W,1/2} + C \times W_{W,1/4})$$

where:

$W_{W,full}$ is the water consumption of the household washing machine or of the washing cycle of a household washer-dryer for the eco 40-60 programme at rated washing capacity, in litres and rounded to one decimal place;

$W_{W,½}$ is the water consumption of the household washing machine or of the washing cycle of a household washer-dryer for the eco 40-60 programme at half of the rated washing capacity, in litres and rounded to one decimal place;

$W_{W,1/4}$ is the water consumption of the household washing machine or of the washing cycle of a household washer-dryer for the eco 40-60 programme at a quarter of the rated washing capacity, in litres and rounded to one decimal place;

A, B and C are the weighting factors as described in point 2.1(c).

(2) For household washer-dryers with a rated washing capacity lower than or equal to 3 kg, the weighted water consumption is the water consumption at rated capacity and rounded to the nearest integer.

For other household washer-dryers, the weighted water consumption (W_{WD}) of the wash and dry cycle of a household washer-dryer is calculated as follows and rounded to the nearest integer:

$$W_{WD} = \frac{[3 \times W_{WD,full} + 2 \times W_{WD,\frac{1}{2}}]}{5}$$

where:

$W_{WD,full}$ is the water consumption of the wash and dry cycle of a household washer-dryer at rated capacity, in litres and rounded to one decimal place;

$W_{WD,½}$ is the water consumption of the wash and dry cycle of a household washer-dryer at half of the rated capacity, in litres and rounded to one decimal place.

7. REMAINING MOISTURE CONTENT

The weighted remaining moisture content after washing (D) of a household washing machine and of the washing cycle of a household washer-dryer is calculated in percentage as follows and rounded to the nearest whole percent:

$$D = \left[A \times D_{full} + B \times D_{\frac{1}{2}} + C \times D_{\frac{1}{4}}\right]$$

where:

D_{full} is the remaining moisture content for the eco 40-60 programme at rated washing capacity, in percentage and rounded to one decimal place;

$D_{1/2}$ is the remaining moisture content for the eco 40-60 programme at half of the rated washing capacity in percentage and rounded to one decimal place;

$D_{1/4}$ is the remaining moisture content for the eco 40-60 programme at a quarter of the rated washing capacity in percentage and rounded to one decimal place;

A, B and C are the weighting factors as described in point 2.1(c).

8. FINAL MOISTURE CONTENT

For the drying cycle of a household washer-dryer, cupboard dry status corresponds to 0 % final moisture content, which is the thermodynamic equilibrium of the load with the ambient air conditions of temperature (tested at 20 ± 2 °C) and relative humidity (tested at 65 ± 5 %).

The final moisture content is calculated in accordance with the harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union* and rounded to one decimal place.

9. LOW POWER MODES

The power consumption of the off mode (P_o), standby mode (P_{sm}) and where applicable delay start (P_{ds}) are measured. The measured values are expressed in W and rounded to two decimal places.

During measurement of the power consumption in low power modes, the following shall be checked and recorded:

— the display or not of information;

— the activation or not of a network connection.

If a household washing machine or a household washer-dryer provides for a wrinkle guard function, this operation shall be interrupted by opening the household washing machine or household washer-dryer door, or any other appropriate intervention 15 minutes before the measurement of energy consumption.

10. ACOUSTIC AIRBORNE NOISE EMISSION

The acoustic airborne noise emission of the spinning phase of household washing machines and household washer-dryers shall be calculated for the eco 40-60 programme at rated washing capacity, using harmonised standards the reference numbers of which have been published for this purpose in the *Official Journal of the European Union*, or other reliable, accurate and reproducible methods, which take into account the generally recognised state-of-the-art, and rounded to the nearest integer.

Changes to legislation:
There are currently no known outstanding effects for the Commission Delegated Regulation (EU) 2019/2014, ANNEX IV.