ANNEX II

Measurements and calculations

For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using a reliable, accurate and reproducible method that take into account the generally recognised state-of-the-art measurement and calculation methods, including harmonised standards the reference numbers of which have been published for the purpose in the *Official Journal of the European Union*. They shall meet the technical definitions, conditions, equations and parameters set out in this Annex.

1. DOMESTIC OVENS

The energy consumption of a cavity of a domestic oven shall be measured for one standardised cycle, in a conventional mode and in a fan-forced mode, if available, by heating a standardised load soaked with water. It shall be verified that the temperature inside the oven cavity reaches the temperature setting of the thermostat and/or the oven control display within the duration of the test cycle. The energy consumption per cycle corresponding to the best performing mode (conventional mode or fan-forced mode) shall be used in the following calculations.

For each cavity of a domestic oven, the Energy Efficiency Index (EEI_{cavity}) shall be calculated according to the following formulas:

for domestic electric ovens:

$$EEI_{cavity} = \frac{EC_{electric\ cavity}}{SEC_{electric\ cavity}} \times 100$$

$$SEC_{electric\ cavity} = 0{,}0042 \times V + 0{,}55 \text{ (in kWh)}$$

for domestic gas ovens:

$$EEI_{cavity} = \frac{EC_{gas\ cavity}}{SEC_{gas\ cavity}} \times 100$$

$$SEC_{gas\ cavity} = 0{,}044 \times V + 3{,}53 \text{ (in MJ)}$$

Where:

— EEI_{cavity} = Energy Efficiency Index for each cavity of a domestic oven, rounded to the first decimal place,

— $SEC_{electric\ cavity}$ = Standard Energy Consumption (electricity) required to heat a standardised load in a cavity of a domestic electric heated oven during a cycle, expressed in kWh, rounded to the second decimal place,

— $SEC_{gas\ cavity}$ = Standard Energy Consumption required to heat a standardised load in a cavity of a domestic gas-fired oven during a cycle, expressed in MJ, rounded to the second decimal place,

— V = Volume of the cavity of the domestic oven in litres (L), rounded to the nearest integer,

— $EC_{electric\ cavity}$ = Energy Consumption required to heat a standardised load in a cavity of a domestic electric heated oven during a cycle, expressed in kWh, rounded to the second decimal place,

— $EC_{gas\ cavity}$ = Energy Consumption required to heat a standardised load in a gas-fired cavity of a domestic oven during a cycle, expressed in MJ, rounded to the second decimal place.

2. DOMESTIC HOBS

2.1. **Domestic electric hobs**

The energy consumption of a domestic electric hob ($EC_{electric\ hob}$) is measured in Wh per kg of water heated in a normalised measurement (Wh/kg) considering all cookware pieces under standardised test conditions and rounded to the first decimal place.

2.2. **Domestic gas hobs**

The energy efficiency of gas burners in a domestic hob is calculated as follows:

$$EE_{gas\ burner} = \frac{E_{theoretic}}{E_{gas\ burner}} \times 100$$

Where:

— $EE_{gas\ burner}$ = energy efficiency of a gas burner in % and rounded to the first decimal place,

— $E_{gas\ burner}$ = energy content of the consumed gas for the prescribed heating in MJ and rounded to the first decimal place,

— $E_{theoretic}$ = theoretic minimum required energy for the corresponding prescribed heating in MJ and rounded to the first decimal place.

The energy efficiency of the gas hob ($EE_{gas\ hob}$) is calculated as the average of the energy efficiency of the different gas burners ($EE_{gas\ burner}$) of the hob.

2.3. **Domestic mixed electric/gas hobs**

Domestic mixed electric and gas hobs are treated in the measurements as two separate appliances. Electric cooking zones and cooking areas of the domestic mixed hobs shall follow the provisions of the previous Section 2.1 and cooking zones heated by gas burners shall follow the provisions of the previous Section 2.2.

3. DOMESTIC RANGE HOODS

3.1. **Calculation of the Energy Efficiency Index (EEI_{hood})**

The Energy Efficiency Index (EEI_{hood}) is calculated as:

$$EEI_{hood} = \frac{AEC_{hood}}{SAEC_{hood}} \times 100$$

and is rounded to the first decimal place.

Where:

— $SAEC_{hood}$ = Standard Annual Energy consumption of the domestic range hood in kWh/a, rounded to the first decimal place,

— AEC_{hood} = Annual Energy Consumption of the domestic range hood in kWh/a, rounded to the first decimal place.

The Standard Annual Energy Consumption ($SAEC_{hood}$) of a domestic range hood shall be calculated as:

$$SAEC_{hood} = 0{,}55 \times (W_{BEP} + W_L) + 15{,}3$$

Where:

— W_{BEP} is the electric power input of the domestic range hood at the best efficiency point, in Watt and rounded to the first decimal place,

— W_L is the nominal electric power input of the lighting system of the domestic range hood on the cooking surface, in Watt and rounded to the first decimal place.

The Annual Energy Consumption (AEC_{hood}) of a domestic range hood is calculated as:

(i) for the fully automatic domestic range hoods:

$$AEC_{hood} = \left[\frac{(W_{BEP} \times t_H \times f) + (W_L \times t_L)}{60 \times 1\,000} + \frac{P_0 \times (1\,440 - t_H \times f)}{2 \times 60 \times 1\,000} + \frac{P_S \times (1\,440 - t_H \times f)}{2 \times 60 \times 1\,000}\right] \times 365$$

(ii) for all other domestic range hoods:

$$AEC_{hood} = \frac{[W_{BEP} \times (t_H \times f) + W_L \times t_L]}{60 \times 1\,000} \times 365$$

Where:

— t_L is the average lighting time per day, in minutes (t_L = 120),

— t_H is the average running time per day for domestic range hoods, in minutes (t_H = 60),

— P_o is the electric power input in off mode of the domestic range hood, in Watt and rounded to the second decimal place,

— P_s is the electric power input in standby mode of the domestic range hood, in Watt and rounded to the second decimal place,

— f is the time increase factor, calculated and rounded to the first decimal place, as:

$$f = 2 - (FDE_{hood} \times 3{,}6)/100$$

3.2. **Calculation of the Fluid Dynamic Efficiency (FDE_{hood})**

The FDE_{hood} at the best efficiency point is calculated by the following formula, and is rounded to the first decimal place:

$$FDE_{hood} = \frac{Q_{BEP} \times P_{BEP}}{3\,600 \times W_{BEP}} \times 100$$

Where:

— Q_{BEP} is the flow rate of the domestic range hood at best efficiency point, expressed in m^3/h and rounded to the first decimal place,

— P_{BEP} is the static pressure difference of the domestic range hood at best efficiency point, expressed in Pa and rounded to the nearest integer,

— W_{BEP} is the electric power input of the domestic range hood at the best efficiency point, expressed in Watt and rounded to the first decimal place.

3.3. **Calculation on the limitation of the exhaust air**

3.3.1. Domestic range hoods with a maximum air flow in any of the available setting higher than 650 m^3/h shall automatically revert to an air flow lower than or equal to 650 m^3/h in a time t_{limit}. This is the time limit to extract a volume of air of 100 m^3 by the domestic range hood operating with an airflow higher than 650 m^3/h, before automatically switching to an airflow of 650 m^3/h or lower. It is calculated, expressed in minutes and rounded to the nearest integer as:

$$t_{limit} = \frac{6\,000\ m^3}{Q_{max}}\ (^1)$$

Where:

— Q_{max} is the maximum air flow of the domestic range hood, including intensive/boost mode if present, in m^3/h and rounded to the first decimal place.

The mere presence of a manual switch or setting decreasing the air flow of the appliance to a value lower than or equal to 650 m^3/h is not considered fulfilling this requirement.

3.3.2. For domestic range hoods with automatic functioning mode during the cooking period:

— the activation of the automatic functioning mode shall be possible only through a manual operation by the user, either on the hood or elsewhere,

— the automatic functioning mode shall revert to manual control after no more than 10 minutes from the moment the automatic function switches off the motor.

3.4. **Illumination of lighting system (E_{middle})**

The average illumination of the lighting system on the cooking surface (E_{middle}) is measured under standard conditions in lux and rounded to the nearest integer.

3.5. **Noise**

The Noise Value (in dB) is measured as the airborne acoustical A-weighted sound power emissions (weighted average value — L_{WA}) of a domestic range hood at the highest setting for normal use, intensive or boost excluded, and rounded to the nearest integer.

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(1) See $V = \int_0^t \frac{Q_{max}}{60} \times dt$ which can be simplified to $t_{limit} = \frac{V_{max}}{Q_{max}} \times 60$

Where:
— V_{max} is the maximum volume of air to be extracted, set at 100 m^3,
— Q_{max} is the maximum air flow of the range hood, including intensive/boost mode if present,
— t is the time expressed in minutes and rounded to the nearest integer,
— dt is the total time until the air volume of 100 m^3 has been reached,
— t_{limit} is the time limit, expressed in minutes and rounded to the nearest integer, needed to extract 100 m^3.