

## Commission Working Document on possible Ecodesign Requirements for domestic ovens, hobs and range hoods

- (1) Under Directive 2009/125/EC ecodesign requirements should be set by the Commission for energy-related products representing significant volumes of sales and trade, having significant environmental impact and presenting significant potential for improvement through design in terms of their environmental impact, without entailing excessive costs.
- (2) Article 16(1), second indent, of Directive 2009/125/EC provides that in accordance with the procedure referred to in Article 19(3) and the criteria set out in Article 15(2), and after consulting the Ecodesign Consultation Forum, the Commission shall, as appropriate, introduce implementing measures which are considered as priorities.
- (3) The Commission has carried out preparatory studies to analyse the technical, environmental and economic aspects of domestic kitchen appliances typically used in households such as domestic ovens, hobs and range hoods. The studies have been developed together with stakeholders and interested parties from the EU and third countries, and the results have been made publicly available.
- (4) The environmental aspect of the products covered, identified as significant for the purposes of this Regulation, is energy consumption in form of direct or indirect emissions in the use phase in the use phase, due to its impacts on consumption of non-renewable resources and the emissions related to conversion of energy.
- (5) Standby and off-mode functions can be responsible for an important part of the total power consumption of these appliances. For domestic kitchen appliances, power consumption of these functions is part of the minimum energy performance requirements. Standby and off-mode requirements for domestic ovens and hobs are set on the basis of the Ecodesign requirements of Commission Regulation 1275/2008/EC<sup>1</sup>.
- (6) The annual energy consumption of products subject to this Regulation was estimated to be 94 TWh (electricity final energy consumption) in the EU in 2011, representing 846 PJ or 20 Mtoe of primary energy consumption. Unless specific measures are taken, annual energy consumption is predicted to be 93 TWh (electricity final energy consumption) representing 837 PJ or 20 Mtoe of primary energy consumption in 2020. The preparatory studies show that the energy consumption of products subject to this Regulation can be significantly reduced. In total the annual savings<sup>2</sup> potential of the proposed measures amounts to 6.1 TWh by 2020 (electricity final energy consumption) representing 55 PJ or 1.3 Mtoe of primary energy consumption compared to the situation if no measures were taken. The savings will increase up to 7.1 TWh by 2030 (electricity final energy consumption) representing 64 PJ or 1.5 Mtoe of primary energy consumption.
- (7) The preparatory studies shows that requirements regarding other ecodesign parameters referred to in Annex I, Part 1, of Directive 2009/125/EC are not necessary as

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<sup>1</sup> OJ L 339, 18.12.2008, p. 45.

<sup>2</sup> consisting of 10% for ovens, 24% for hobs and 66% of range hoods

electricity and gas consumption of domestic kitchen appliances in the use phase is by far the most significant environmental aspect.

- (8) Products subject to this Regulation should be made more energy efficient by applying existing non-proprietary cost-effective technologies that can reduce the combined costs of purchasing and operating these products.
- (9) The ecodesign requirements should not affect functionality from the end-user's perspective and should not negatively affect health, safety or the environment. In particular, the benefits of reducing energy consumption during the use phase should more than offset any possible additional environmental impact during the production phase.
- (10) The ecodesign requirements should be introduced gradually in order to provide a sufficient timeframe for manufacturers to re-design products subject to this Regulation. The timing should be such as to avoid negative impacts on the functionalities of equipment on the market, and to take into account cost impacts for end-users and manufacturers, in particular small and medium-sized enterprises, while ensuring timely achievement of the objectives of this Regulation.
- (11) Measurements of the relevant product parameters should be performed through reliable, accurate and reproducible measurement methods, which take into account the recognised state of the art measurement methods including, where available, harmonised standards adopted by the European standardisation bodies, as listed in Annex I to Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on Information Society services<sup>3</sup>.
- (12) In accordance with Article 8 of Directive 2009/125/EC, this Regulation specifies the applicable conformity assessment procedures.
- (13) In order to facilitate compliance checks, manufacturers should provide information in the technical documentation referred to in Annexes V and VI of Directive 2009/125/EC insofar as this information relates to the requirements laid down in this Regulation.
- (14) In addition to the legally binding requirements laid down in this Regulation, indicative benchmarks for best available technologies should be identified to ensure the wide availability and easy accessibility of information on the most relevant environmental aspects in the life-cycle environmental performance of products subject to this Regulation.
- (15) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 19(1) of Directive 2009/125/EC.

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<sup>3</sup> OJ L 204, 21.7.1998, p. 37.

### *Subject matter and scope*

1. This Regulation establishes eco-design requirements for the placing on the market and putting into service of domestic ovens including when incorporated in cookers, domestic hobs, and electric mains-operated domestic range hoods also when used for non-domestic purposes.
2. This Regulation shall not apply to:
  - appliances that use energy sources other than electricity or gas;
  - appliances which have 'microwave heating' as a primary cooking function;
  - small ovens (cavity sizes: width and depth < 250 mm or height < 120 mm);
  - portable (free standing) ovens with a product mass of 18 kilograms or less;
  - domestic range hoods without motor.

### *Definitions*

In addition to the definitions set out in Article 2 of Directive 2009/125/EC, the following definitions shall apply:

1. 'Appliance' means an energy using apparatus with a specific function.
2. 'Domestic' means for household use;
3. 'Oven' means an appliance or part of an appliance which incorporates one or more cavities using gas and/or electricity to operate;
4. 'Cavity' means the enclosed compartment in which the temperature can be controlled for preparation of food;
5. 'Microwave heating' is heating of food using microwave radiation to transfer heat.
6. 'Hob' means an "electric hob", "gas hob" or a combination of both;
7. 'Cooking zone' means part of a hob or area visible or marked on the surface of the hob where pans or pots are placed for cooking;
8. 'Electric hob' means an appliance or part of an appliance which incorporates one or more cooking zones heated by electricity, where a cooking zone is part of the hob or area marked on the surface of the hob where pans are placed for heating;
9. 'Gas hob' means an appliance or part of an appliance which incorporates one or more cooking zones, heated by gas burners;
10. 'Cooker' or 'cooking range' means an appliance consisting of an oven and a hob using gas or electricity;
11. 'Domestic range hood' means a motor operated appliance intended to collect contaminated air from above a hob or includes a downdraft system intended for installation adjacent to domestic cooking ranges, hobs and similar cooking appliances, that draws vapor down into an internal exhaust duct. The blower of the domestic range hood may be internal or external, provided that is controlled by the domestic range hood. The air may be ducted away or discharged back into the room after filtration;

12. 'Domestic range hood without motor' means an appliance intended to collect contaminated air from above a hob connected to a ventilation appliance not controlled by the range hood.
13. 'Conventional mode' means the operation mode of an oven only using natural convection for circulation of heated air;
14. 'Fan-forced mode' means a mode when a built-in fan circulates heated air inside the cavity of the oven;
15. 'Operation mode' means the status of the oven or hob during use;
16. 'Automatic functioning mode during the cooking period' means a condition in which the air flow of the domestic range hood during the cooking period is automatically controlled through sensor(s), such as humidity, temperature, etc.;
17. 'Cycle' means the period of heating a standardised load in a cavity of an oven under defined conditions;
18. 'Energy consumption' means the energy consumption per measured cycle of the appliance or the energy consumption measured in one hour in 'idle mode';
19. 'Heat source' means the main energy form for heating an oven or hob;
20. 'Fully automatic range hood' means a domestic range hood in which the air flow and/or other functions are automatically controlled through sensor(s) during the 24h hours including the cooking period.
21. 'EEI<sub>oven</sub>' is the energy efficiency index of a domestic electric oven;
22. 'EE<sub>hob</sub>' is the energy efficiency of a cooking zone in a domestic hob;
23. 'Fluid Dynamic Efficiency' (FDE<sub>hood</sub>) is the fluid dynamic efficiency of the domestic range hood at its best efficiency point (BEP);
24. 'Best efficiency point' (BEP) identifies the domestic range hood operating point with maximum fluid dynamic efficiency;
25. 'Air flow at the BEP' (Q<sub>BEP</sub>), identifies the air flow at best efficiency point of a domestic range hood (in m<sup>3</sup>/h);
26. 'Static pressure at the BEP' (P<sub>BEP</sub>) identifies the pressure at best efficiency point of a domestic range hood (in Pa);
27. 'Electric power consumption at BEP' (W<sub>BEP</sub>) identifies the electric power at best efficiency point of a domestic range hood (in Watt);
28. 'Annual Energy Consumption' (AEC<sub>hood</sub>) is the annual energy consumption of the domestic range hood in kWh/year;
29. 'Standard Annual Energy Consumption' (SAEC<sub>hood</sub>) is the standard annual energy consumption of the domestic range hood in kWh/year;
30. 'Energy Efficiency Index hood' (EEI<sub>hood</sub>) is the ratio between AEC<sub>hood</sub> and SAEC<sub>hood</sub>;
31. 'Off mode' is a condition in which the equipment is connected to the mains power source and is not providing any function. Also considered as off mode are conditions providing

only an indication of off mode condition, as well as conditions providing only functionalities intended to ensure electromagnetic compatibility pursuant to Directive 2004/108/EC of the European Parliament and of the Council<sup>4</sup>;

32. 'Standby mode' means a condition where the equipment is connected to the mains power source, depends on energy input from the mains power source to work as intended and provides only the following functions, which may persist for an indefinite time: reactivation function, or reactivation function and only an indication of enabled reactivation function, and/or information or status display;
33. 'Reactivation function' means a function facilitating the activation of other modes, including active mode, by remote switch including remote control, internal sensor, timer to a condition providing additional functions, including the main function;
34. 'Information or status display' is a continuous function providing information or indicating the status of the equipment on a display, including clocks.

### ***Ecodesign requirements***

The ecodesign requirements for domestic ovens, hobs and range hoods are set out in Annex I.

### ***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 a copy of the calculation set out in Annex II to this Regulation.
3. Where the information included in the technical documentation for a model has been obtained by calculation on the basis of design, or extrapolation from other equivalent appliance, 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 models where the information included in the technical documentation was obtained on the same basis.

### ***Verification procedure for market surveillance purposes***

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

### ***Benchmarks***

The indicative benchmarks for best-performing appliances available on the market at the time of entry into force of this Regulation are set out in Annex IV.

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<sup>4</sup> OJ L 390 of 31.12.2004, p. 24.

### ***Revision***

The Commission shall review this Regulation in the light of technological progress no later than seven 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 scope of the Regulation, especially with regards to small ovens and/or a product mass of 18 kilograms or less, to the efficiency requirements and to the verification tolerances set out in Annex III.

### ***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. This Regulation shall apply from *[date to be inserted: 1 year after the entry into force of the Regulation]*.
2. The generic ecodesign requirements set out in point 1 of Annex I shall apply from *[date to be inserted: 1 year after the entry into force of the Regulation]*.
3. The specific ecodesign requirements for domestic ovens set out in point 2.1 of Annex I shall apply respectively from *[date to be inserted: 1 year after the entry into force of the Regulation]* (1<sup>st</sup> tier), *[date to be inserted: 3 years after the entry into force of the Regulation]* (2<sup>nd</sup> tier), *[date to be inserted: 5 years after the entry into force of the Regulation]* (3<sup>rd</sup> tier).
4. The specific ecodesign requirements for domestic hobs set out in point 2.2 of Annex I shall apply respectively from *[date to be inserted: 1 year after the entry into force of the Regulation]* (1<sup>st</sup> tier), *[date to be inserted: 3 years after the entry into force of the Regulation]* (2<sup>nd</sup> tier), *[date to be inserted: 5 years after the entry into force of the Regulation]* (3<sup>rd</sup> tier).
5. The specific ecodesign requirements for domestic range hoods set out in point 2.3 of Annex I shall apply respectively from *[date to be inserted: 1 years after the entry into force of the Regulation]* (1<sup>st</sup> tier), *[date to be inserted: 3 years after the entry into force of the Regulation]* (2<sup>nd</sup> tier), *[date to be inserted: 5 years after the entry into force of the Regulation]* (3<sup>rd</sup> tier).
6. The specific ecodesign requirements for domestic range hoods set out in point 2.4 of Annex I shall apply respectively from *[date to be inserted: 1 year after the entry into force of the Regulation]*.
7. The specific ecodesign requirements for domestic range hoods set out in point 3.1 of Annex I shall apply respectively from *[date to be inserted: 2 years after the entry into force of the Regulation]*.
8. The specific ecodesign requirements for domestic range hoods set out in point 3.2 of Annex I shall apply respectively from *[date to be inserted: 5 years after the entry into force of the Regulation]*.

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

## ANNEX I

### Ecodesign requirements

#### 1. Generic ecodesign requirements

The information on domestic kitchen appliances set out in points below shall be visibly displayed on:

- (a) the technical documentation of the product;
- (b) free access websites of manufacturers of domestic kitchen appliances.

From [1 year after the regulation has entered into force], the following product information to shall be provided:

##### 1.1. For domestic ovens:

<b>Table 1 – Information for domestic ovens</b>			
	Symbol	Value	Unit
Model identification			
Type of oven			
Number of cavities		X	
Heat source per cavity			
Operation mode(s) per cavity			
Volume per cavity	V	X	l
Mass of the appliance	M	X	kg
Electricity consumption per cycle in conventional mode per cavity	$E_{\text{electricity}}$	X.X	kWh/cycle
Gas energy consumption per cycle in conventional mode per cavity	$E_{\text{gas}}$	X.X	kWh/cycle
Electricity consumption per cycle in fan forced mode per cavity	$E_{\text{electricity}}$	X.X	kWh/cycle
Gas energy consumption per cycle in fan forced mode per cavity	$E_{\text{gas}}$	X.X	kWh/cycle
Energy Efficiency Index	$EEI_{\text{oven}}$	X.X	%

1.2. For domestic hobs:

<b>Table 2 – Information for domestic hobs</b>			
	Symbol	Value	Unit
Model identification			
Type of hob			
Number of cooking zones		X	
Heat source per cooking zone			
Power per cooking zone	P	X	kW
Diameter of useful surface area per electric heated cooking zone	Ø	X	cm
Energy efficiency per cooking zone	EE <sub>hob</sub>	X.X	%

1.3. For domestic range hoods:

<b>Table 3 – Information for domestic range hoods</b>			
	Symbol	Value	Unit
Model identification			
Type of hood			
Annual Energy Consumption	AEC <sub>hood</sub>	X.X	kWh/year
Increase factor	f	X.X	
Fluid Dynamic Efficiency	FDE <sub>hood</sub>	X.X	%
Energy Efficiency Index	EEI <sub>hood</sub>	X.X	%
Measured air flow at best efficiency point	Q <sub>BEP</sub>	X.X	m <sup>3</sup> /h
Measured air pressure at best efficiency point	P <sub>BEP</sub>	X.X	Pa
Maximum air flow	Q <sub>max</sub>	X	m <sup>3</sup> /h
Measured power at best efficiency point	W <sub>BEP</sub>	X.X	W
Nominal power of the lighting system	W <sub>L</sub>	X.X	W
Average illumination of the lighting system on the cooking surface	E <sub>middle</sub>	X.X	lux
Lighting Efficiency	LE <sub>hood</sub>	X.X	lux/W
Grease Filtering Efficiency	GFE <sub>hood</sub>	X.X	%
Measured power consumption in standby mode	P <sub>s</sub>	X.XX	W
Description of how the standby mode is selected or programmed			
Measured power consumption off mode	P <sub>o</sub>	X.XX	W
Description of how the off mode is selected or programmed			
Notes regarding operation of the equipment			

## 2. Specific ecodesign requirements

2.1. The domestic ovens (including when incorporated in cookers) within the scope of this Regulation shall comply with the energy efficiency index limits in Table 1.

<b>Table 4 - Energy Efficiency Index limits for domestic ovens (<math>EEI_{oven}</math>)</b>		
	Electric domestic oven	Gas fired domestic ovens
1 year after entry into force	$EEI_{oven} < 120$	$EEI_{oven} < 105$
3 years after entry into force	$EEI_{oven} < 105$	$EEI_{oven} < 95$
5 years after entry into force	$EEI_{oven} < 95$	$EEI_{oven} < 75$

2.2. The domestic hobs within the scope of this Regulation shall comply with the Energy Efficiency ( $EE_{hob}$ ) limits in Table 2.

<b>Table 5 - Energy efficiency performance limits for domestic hobs (<math>EE_{hob}</math>)</b>		
	Electric domestic hobs	Gas fired domestic hobs
1 year after entry into force	$EE_{hob} > 60 \%$	$EE_{hob} > 52 \%$
3 years after entry into force	$EE_{hob} > 65 \%$	$EE_{hob} > 60 \%$
5 years after entry into force	$EE_{hob} > 70 \%$	$EE_{hob} > 65 \%$

2.3. The domestic range hoods within the scope of this Regulation shall comply with the Energy Efficiency Index ( $EEI_{hood}$ ) limits and the Fluid Dynamic Efficiency (FDE) limits in Table 3.

<b>Table 6 - Energy Efficiency Index (<math>EEI_{hood}</math>) and Fluid Dynamic Efficiency (<math>FDE_{hood}</math>) for domestic range hoods</b>		
	$EEI_{hood}$	$FDE_{hood}$
1 years after entry into force	$EEI_{hood} < 108$	$FDE_{hood} > 4$
3 years after entry into force	$EEI_{hood} < 101$	$FDE_{hood} > 8$
5 years after entry into force	$EEI_{hood} < 94$	$FDE_{hood} > 13$

2.4. The domestic range hoods within the scope of this Regulation shall comply with the following specific ecodesign requirement on the limitation of the exhaust air from [date to be inserted: 1 year after the entry into force of the Regulation].

Domestic range hoods with a maximum air flow in any of the available setting higher than 650 m<sup>3</sup>/h shall automatically revert to an air flow lower than or equal to 650 m<sup>3</sup>/h in a time *t* as defined in Annex II.

### 3. Specific ecodesign requirements on low power modes for domestic range hoods

3.1. From [*date to be inserted: 2 years after the entry into force of the Regulation*]

a) Power consumption in ‘off mode’: the power consumption in any off-mode condition shall not exceed 1.00 W.

b) Power consumption in ‘standby mode(s)’:

The power consumption in any condition providing only a reactivation function, or providing only a reactivation function and a mere indication of enabled reactivation function, shall not exceed 1.00 W.

The power consumption of equipment in any condition providing only information or status display, or providing only a combination of reactivation function and information or status display, shall not exceed 2.00 W.

c) Availability of ‘off mode’ and/or ‘standby mode’: domestic range hoods shall, except where this is inappropriate for the intended use (i.e. full automatic range hoods), provide ‘off mode’ and/or ‘standby mode’, and/or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source.

3.2. From [*date to be inserted: 5 years after the entry into force of the Regulation*]:

a) Power consumption in ‘off mode’: the power consumption in any off mode condition shall not exceed 0.50 W.

b) Power consumption in ‘standby mode(s)’: the power consumption in any condition providing only a reactivation function, or providing only a reactivation function and a mere indication of enabled reactivation function, shall not exceed 0.50 W.

The power consumption of equipment in any condition providing only information or status display, or providing only a combination of reactivation function and information or status display shall not exceed 1.00 W.

c) Domestic range hoods shall, provide off mode and/or standby mode, and/or another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source.

d) Power management: when domestic range hoods are not providing the main function, or when other energy-using product(s) are not dependent on its functions, equipment shall, unless inappropriate for the intended use, offer a power management function, or a similar function, that switches equipment after the shortest possible period of time appropriate for the intended use of the equipment, automatically into:

– standby mode, or

- off mode, or
- another condition which does not exceed the applicable power consumption requirements for off mode and/or standby mode when the equipment is connected to the mains power source.

The power management function shall be activated before delivery.

## 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, which takes into account the generally recognised state of the art methods, and whose results are deemed to be of low uncertainty, 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*. They shall fulfil all of the following technical parameters.

The test parameters below shall be assessed in accordance with the definitions in [Article 2], complemented by reliable, accurate and reproducible measurement procedures, which take into account 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*.

#### 1) Domestic ovens

The useable volume of the cavity of an oven shall be calculated as product of height, width and depth of the cavity. Height, width and depth are determined with a cylinder with a diameter of 200 mm. The height is the maximum length of the vertically placed cylinder from the middle of the bottom of the cavity to the lowest point on the ceiling. The width of the cavity is the maximum length of the cylinder between the two side walls and the depth is the maximum length of the cylinder between the centre of the back wall to the inner face of the closed door.

Heating of an oven shall be done with a standardised load, soaked with water.

The energy consumption of a domestic oven shall be measured for one cycle, if available in both the conventional mode and the fan-forced mode, by heating a wet brick. The lowest value of the cycle in conventional mode or in fan-forced mode is used.

For domestic electric and gas ovens, the Energy Efficiency Index ( $EEI_{oven}$ ) shall be calculated according to the following formulas:

$$EEI_{oven} = (EC_{electric}/SEC_{oven}) \times 100 \quad (\text{for electric ovens})$$

$$EEI_{oven} = (EC_{gas}/SEC_{oven}) \times 100 \quad (\text{for gas ovens})$$

$$SEC_{oven} = 0.0283 \times V + 0.4824$$

Where:

$EEI_{oven}$  = Energy Efficiency Index for ovens, in % and rounded to the first decimal place

$SEC_{oven}$  = Standard Energy Consumption required to heat a standardised load in a cavity of an oven during a cycle, expressed in kWh as primary energy consumption (by applying a conversion factor 2.5) and rounded to the first decimal place

$V$  = Volume of the cavity of the oven in (l)

$EC_{electric}$  = Electricity consumption required to heat a standardised load in a cavity of an oven during a cycle, expressed in kWh as primary energy consumption (by applying a conversion factor 2.5) and rounded to the first decimal place

$EC_{gas}$  = Energy consumption required to heat a standardised load in a cavity of an oven during a cycle, expressed in kWh

## 2) Domestic hobs

### a) Domestic electric hobs

Measuring the efficiency of a domestic electric hob shall be done for each cooking zone separately with a stainless steel pot with lid filled with water. The size of the pot and the amount of water depend on the diameter of the useful surface of the cooking zone as indicated in Table 7. The water is heated from 293K to 363K.

<b>Table 7: Sizes and water amount for measuring efficiency of domestic electric hobs</b>				
Diameter* useful surface area (mm)	Diameter pot (mm)	Height pot (mm)	Thickness bottom of pan (mm)	Quantity of water $m_1$ (kg)
< 145	145	140	3	1
> 145 < 180	180	140	3 < < 5	1.5
> 180 < 220	220	140	3 < < 5	2

\* In case of a non-circular cooking zone, the average between maximum length and maximum width is taken instead of the diameter.

The efficiency of electric cooking zones in a hob is calculated using the formulas:

$$EE_{hob} = (E_{theoretic} / E_{electricity}) \times 100$$

and

$$E_{theoretic} = (m_1 \times c_1 + m_2 \times c_2) \times (t_2 - t_1)$$

Where:

$EE_{hob}$  = energy efficiency of the hob in % and rounded to the first decimal place

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

$E_{electricity}$  = consumed electricity for heating the prescribed amount of water in MJ and rounded to the first decimal place

$m_1$  = mass of water in the pan in kg and rounded to the first decimal place

$m_2$  = mass of the pan including its lid in kg and rounded to the first decimal place

$c_1$  = specific heat of water in kJ/kg.K and rounded to the first decimal place

$c_2$  = specific heat of stainless steel in kJ/kg.K and rounded to the first decimal place

$t_1$  = initial temperature of the water in K

$t_2$  = the maximum temperature of the water in K

#### b) Domestic gas hobs

The measuring of the efficiency of domestic gas hobs shall be done with an aluminium pot with lid. The sizes of the pots and the amount of water shall be fit to the size of the gas hobs according to the sizes in the Table 8. The water is heated from 293K to 363K.

<b>Table 8: Sizes and water amount for measuring efficiency of domestic gas hobs</b>		
Maximum power of the cooking zone (kW)	Internal diameter pot (mm)	Quantity of water – $m_{e1}$ (kg)
<1.16 < 1.64	220	3.7
<1.64 < 1.98	240	4.8
<1.99 < 4.20*	260	6.1

\* burners > 2.36 kW maximum power are set at 2.36 W power.

The efficiency of gas burners in a hob is calculated using the formulas:

$$EE_{hob} = (E_{theoretic} / E_{gas}) \times 100$$

and

$$E_{theoretic} = (m_1 \times c_1 + m_3 \times c_3) \times (t_2 - t_1)$$

Where:

$EE_{hob}$  = energy efficiency of the hob in % and rounded to the first decimal place

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

$E_{gas}$  = energy content of the consumed gas for heating the prescribed amount of water in MJ and rounded to the first decimal place

$m_1$  = mass of water in the pan in kg and rounded to the first decimal place

$m_3$  = mass of the aluminium pan including its lid in kg and rounded to the first decimal place

$c_1$  = specific heat of water in kJ/kg.K and rounded to the first decimal place

$c_3$  = specific heat of aluminium in kJ/kg.K and rounded to the first decimal place

$t_1$  = initial temperature of the water in K

$t_2$  = the maximum temperature of the water in K

### 3) Domestic range hoods

Calculation of the Fluid Dynamic Efficiency, Energy Efficiency Index and Annual Energy Consumption of domestic range hoods are set out below.

#### a) Calculation of the Energy Efficiency Index ( $EEI_{hood}$ )

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

$$EEI_{hood} = (AEC_{hood} / SAEC_{hood}) \times 100 \quad (\%)$$

and is rounded to the first decimal place

Where:

- $SAEC_{hood}$  = standard annual energy consumption of the domestic range hood in kWh/year and rounded to the first decimal place.
- $AEC_{hood}$  = annual energy consumption of the domestic range hood in kWh/year and rounded to the first decimal place

The Standard Annual Energy Consumption ( $SAEC_{hood}$ ) of a domestic range hood shall be calculated, in kWh/year and rounded to the first decimal places, as:

$$SAEC_{hood} = 0.6217 \times (W_{BEP} + W_L) + 2.7482$$

The Annual Energy Consumption ( $AEC_{hood}$ ) of a domestic range hood is calculated, in kWh/year and rounded to the first decimal place, as:

*i) for the fully automatic range hoods:*

$$AEC = \left[ \frac{(W_{BEP} \times 60 \times f) + (W_L \times t_L)}{60 \times 1.000} + \frac{P_o \times (1.440 - 60 \times f)}{2 \times 60 \times 1.000} + \frac{P_s \times (1.440 - 60 \times f)}{2 \times 60 \times 1.000} \right] \times 365$$

*ii) for all other domestic range hoods:*

$$AEC = \frac{[W_{BEP} \times (t_H \times f) + W_L \times t_L]}{60 \times 1000} \times 365$$

Where:

- $W_{BEP}$  is the electric power consumption at the best efficiency point, in Watt and rounded to the first decimal place
- $W_L$  is the nominal power consumption of the lighting system on the cooking surface, in Watt and rounded to the first decimal place
- $t_L$  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 power consumption in off-mode for domestic range hoods, in Watt and rounded to the second decimal place
- $P_s$  is the power consumption in standby mode for domestic old range hoods, in Watt and rounded to the second decimal place
- $f$  is the time increase factor, rounded to the first decimal place, as:

$$f = 2 - (FDE_{hood} \times 3.6) / 100$$

b) Calculation of the Fluid Dynamic Efficiency ( $FDE_{hood}$ )

The Fluid Dynamic Efficiency ( $FDE_{hood}$ ) at the best efficiency point is calculated by the following formula, and is rounded to the first decimal place:

$$FDE = \frac{Q_{BEP} \times P_{BEP}}{3600 \times W_{BEP}} \times 100$$

Where:

- $Q_{BEP}$  is the air flow at best efficiency point, in  $m^3/h$  and rounded to the integer
- $P_{BEP}$  is the static pressure at best efficiency point, in Pa and rounded to the integer
- $W_{BEP}$  is the electric power consumption at the best efficiency point, in Watt and rounded to the first decimal place.

c) Calculation on the limitation of the exhaust air

- i) 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  $t_{limit}$  as defined in the following formula:

$$V_{max} = \int_0^t \frac{Q(t) * dt}{60}$$

where

- $V_{max}$  is the maximum air volume and is equal to  $100 m^3$
- $Q(t)$  is the function of the air flow over time of the domestic range hood from the start of the operation mode where the air flow is higher than  $650 m^3/h$  (booster or intensive mode) in  $m^3/h$  and is rounded to the first decimal place
- $t$  is the time in minutes from the start of the booster or intensive mode till the air volume of  $100 m^3$  has been reached and rounded to the integer
- $dt$  is the time differential.

*The formula can be simplified, assuming a  $Q_{max}$  constant and a maximum volume of air to be extracted of  $100 m^3$ , to:*

$$t_{limit} = (V_{max} / Q_{max}) \times 60$$

Where:

- $t_{limit}$  is the time limit, in minutes and rounded to the integer
- $V_{max}$  is the maximum volume of air extracted (100m<sup>3</sup>)

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

ii) 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

d) Calculation of the Lighting Efficiency (LE<sub>hood</sub>)

The Lighting Efficiency (LE<sub>hood</sub>) of a domestic range hood shall be calculated in lux per Watt and rounded to first decimal place, as:

$$LE_{hood} = E_{middle} / W_L$$

Where:

- $E_{middle}$  is the average illumination of the lighting system on the cooking surface, in lux and rounded to the first decimal place
- $W_L$  is the nominal power consumption of the lighting system on the cooking surface in W and rounded to the first decimal place

e) Calculation of the Grease Filtering Efficiency (GFE<sub>hood</sub>)

The Grease Filtering Efficiency (GFE<sub>hood</sub>) of a domestic range hood shall be calculated as the percentage of grease retained within the grease filters:

$$GFE_{hood} = [w_g / (w_r + w_t + w_g)] \times 100 \quad (\%)$$

Where:

$w_g$  = the mass of oil in the grease filter, including all detachable coverings;

$w_r$  = the mass of oil retained in the airways of the range hood;

$w_t$  = the mass of oil retained in the absolute filter

f) Noise

The **Noise Value** (in dB) is measured as the airborne acoustical A-weighted sound power emissions (weighted average value - L<sub>WA</sub>) of a household range hood at the highest setting for normal use, intensive or boost excluded.

### ANNEX III

#### Verification procedure for market surveillance purposes

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 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 methods, and whose results are deemed to be of low uncertainty.

For the purposes of checking conformity with the requirements laid down in Annex I, Member State authorities shall test a single household tumble drier. If the measured parameters do not meet the values declared in the technical documentation file within the meaning of [Article 4(2)] by the manufacturer within the ranges set out in Table 9, the measurements shall be carried out on three more household tumble driers. The arithmetic mean of the measured values of those three household tumble driers shall meet the requirements within the ranges set out in Table 9.

Otherwise, the model and all other equivalent household tumble driers models shall be considered not to comply with the requirements laid down in Annex I.

<b>Table 9: Verification tolerances</b>	
Measured parameters	Verification tolerances
$EEI_{oven}$ , $EE_{hob}$ or $EEI_{hood}$	The measured value shall not be greater than the rated value* of $EEI_{oven}$ , $EE_{hob}$ or $EEI_{hood}$ by more than 5 %.
Volume of the cavity of the oven (V)	The measured value shall not be greater than the rated value of V by more than 5%.
$FDE_{hood}$	The measured value shall not be greater than the rated value of $FDE_{hood}$ by more than 5%.
$AEC_{hood}$	The measured value shall not be less than the rated value of $AEC_{hood}$ by more than 5 %.
$t_{limit}$	The measured value shall not be longer than the rated values of $t_{limit}$ by more than 1 %.
$Q_{max}$	The measured value shall not be longer than the rated values of $Q_{max}$ by more than 8 %.
$P_o$ , $P_s$	The measured value of power consumption $P_o$ and $P_s$ shall not be greater than the rated value by more than 5%.
Sound power level $L_{WA}$	The measured value shall not be greater than the rated value.

\* 'rated value' means a value that is declared by the manufacturer. The uncertainty in the measurement represents the current acceptable testing laboratory error in measuring the declared parameters.

## ANNEX IV

### Benchmarks

At the time of entry into force of this Regulation, the best available technologies on the market for domestic ovens (including when incorporated in cookers), hobs and range hoods in terms of their energy performance were identified as follows:

Domestic ovens	Electric	$E_{EEI_{oven}} = 66.2$
	Gas	$E_{EEI_{oven}} = 63.7$
Domestic hobs	Electric	
	Gas	
Domestic range hoods	< 280 W	$F_{DE_{hood}} = 22$
	$\geq 280$ W	$F_{DE_{hood}} = 24.5$
	Noise	51dB at 550 m <sup>3</sup> /h ; 57 dB at 750 m <sup>3</sup> /h
	Grease	$G_{FE_{hood}} = 91\%$
	Lighting	$L_{E_{hood}} = 29\%$