

Commission Explanatory Working Document on possible Ecodesign and Energy Labelling Requirements for domestic ovens, hobs and range hoods

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Explanatory Notes

This working document sets out ecodesign and energy labelling requirements.

Pursuant to Directive 2009/125/EC, it establishes possible ecodesign requirements related to domestic kitchen appliances typically used in households such as domestic ovens including ovens incorporated in cookers, hobs, and electric mains-operated domestic range hoods also when used for non-domestic purposes.

The Lot 10, 22 and 23 preparatory studies showed that the energy in use phase is the only significant environmental aspect.

Ecodesign parameters referred to in Annex I, Part 1 of Directive 2009/125/EC are not considered as significant.

This working document also proposes energy labelling of domestic electric and gas ovens and domestic range hoods.

1. Form of the implementing measures

The intention is to give to the implementing measures the form of two directly applicable regulations for ecodesign and for labelling purposes.

2. Scope

This working document covers:

- domestic ovens (also when incorporated in cookers) and combined ovens with microwaves);
- domestic hobs;
- domestic range hoods (also when used for non-domestic purposes).

Ecodesign requirements are set for these products and energy labelling is proposed for domestic ovens and domestic range hoods.

3. Exclusions

Excluded from the working document are:

- commercial ovens;
- commercial hobs;
- commercial hoods;
- grills;
- microwave ovens when not associated to an electric or gas domestic oven (i.e. appliances which have ‘microwave heating’ as a primary cooking function);
- appliances that use energy sources other than electricity or gas;
- small ovens¹ (cavity sizes: width and depth < 250 mm or height < 120 mm);

¹ Excluded from EN 60350 on electric cooking ranges, hobs, ovens and grills.

- portable (free standing) ovens² with a product mass of 18 kilograms or less;
- domestic range hoods without motor.

Commercial appliances are excluded from this working document on the basis of the discussion of the Ecodesign Consultation Forum held on 18th April 2012. The exclusion of these categories was mainly due to the non-existence of reliable data and suitable efficiency measurements methods which would need to be further developed.

Grills are excluded since this category consists of a wide variety of different appliances with different purposes and there is no consistent data available currently.

4. Market structure of the products covered by this working document

Domestic kitchen appliances are mainly produced in Europe, generally by medium to large size companies. Several technical parts such as burners, igniters, heating elements etc. are purchased from specialized manufacturers. Most ovens and hobs are electrically heated. The market share of electrical appliances is increasing, but the market share of gas appliances is still significant. About 16% of domestic ovens and 36% of domestic hobs are gas heated.

The base-line impact analysis shows very slow migration of products to more efficient models without regulatory action. Due to the fairly large amount of units in stock and new units sold per year, the benefits for Europe in terms of energy saving and reduction of CO₂ will be significant if regulations are introduced.

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 savings³ 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.

5. International dimension

Most of the sales are made by European manufacturers and there are some Asian imports. Neither the preparatory study nor the stakeholders provided quantitative data on the origin of equipment. Eurostat shows significant imports of relatively low cost ovens, probably imported from low cost countries near the European Union.

6. Impact on other EU legislation

No impact on other EU legislation has been identified.

² Excluded from EN 60350 and defined in EN 61817

³ consisting of 10% for ovens, 24% for hobs and 66% of range hoods

I. Ecodesign requirements

The proposed ecodesign requirements are set out based on the recommendations of the preparatory studies, further discussions with the industry, discussion of the Ecodesign Consultation Forum on 18th April 2012 and further Commission calculations.

The preparatory studies propose to cover microwave ovens; however, the worst and the best performing ovens are close to each other. Portable ovens⁴ having a mass of less than 18kg and small cavity dimensions are not part of the scope of this working document. From safety point of view, amendment 11 to EN standard 60335-2-6 (ovens and hobs) requires significant reduction of surface temperature of ovens. This safety requirement will result in improvement of design of ovens, e.g. better insulation, with a high impact on energy consumption of portable ovens.

The Lot 10 preparatory study showed that although large household range hoods with motor input power $\geq 280\text{W}$ already have to comply with Commission Regulation (EU) No 327/2011 (on ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW), the draft Labelling Regulation should be applied to all household range hoods since it addresses in particular the overall energy consumption of the household range hoods.

For grills, which were part of the preparatory study of lot 23, no performance requirements are proposed, since this category consists of a wide variety of different appliances with different purposes and there is no consistent data available currently.

1. Definitions

Domestic ovens, hobs, and range hoods are considered as ErPs within the meaning of Article 2(1) of Directive 2009/125/EC.

For the purposes of this working document the following definitions shall apply:

- 'Domestic' means for household use;
- 'Oven' means an appliance or part of an appliance which incorporates one or more cavities using gas and/or electricity to operate;
- 'Cavity' means the enclosed compartment in which the temperature can be controlled for preparation of food;
- 'Microwave heating' is heating of food using microwave radiation to transfer heat.
- 'Hob' means an 'electric hob', 'gas hob' or a combination of both;
- '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;
- 'Electric hob' means an appliance or part of an appliance which incorporates one or more cooking zones heated by electricity;

⁴ Excluded from EN 60350 and defined in EN 61817

- 'Gas hob' means an appliance or part of an appliance which incorporates one or more cooking zones, heated by gas burners;
- 'Cooker' or 'Cooking Range' means an appliance consisting of at least one oven and a hob using gas or electricity;
- '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 vapour 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;
- '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.
- 'Conventional mode' means the operation mode of an oven only using natural convection for circulation of heated air;
- 'Fan-forced mode' means a mode when a built-in fan circulates heated air inside the cavity of the oven;
- 'Operation mode' means the status of the oven, hob or grill during use;
- '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) for e.g. humidity, temperature, etc.;
- 'Cycle' means the period of heating a standardised load starting at room temperature and ending at set temperature;
- 'Energy consumption' means the energy consumption per measured cycle of the appliance;
- 'Heat source' means the main energy form for heating an oven, hob or grill;
- '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.
- 'EEI_{oven}' is the energy efficiency index of a domestic electric oven;
- 'EE_{hob}' is the energy efficiency of a cooking zone in a domestic hob;
- 'Fluid Dynamic Efficiency' (FDE) is the fluid dynamic efficiency of the domestic range hood at its best efficiency point (BEP);
- 'Best efficiency point' (BEP) identifies the domestic range hood operating point with maximum fluid dynamic efficiency;
- 'Air flow at the BEP' (Q_{BEP}), identifies the air flow at best efficiency point of a domestic range hood (in m³/h);
- 'Static pressure at the BEP' (P_{BEP}) identifies the pressure at best efficiency point of a domestic range hood (in Pa);

- 'Electric power consumption at BEP' (W_{BEP}) identifies the electric power consumption at best efficiency point of a domestic range hood (in Watt);
- 'Annual Energy Consumption' (AEC_{hood}) is the annual energy consumption of the domestic range hood in kWh/year;
- 'Standard Annual Energy Consumption' ($SAEC_{hood}$) is the standard annual energy consumption of the domestic range hood in kWh/year;
- 'Energy Efficiency Index hood' (EEI_{hood}) is the ratio between AEC_{hood} and $SAEC_{hood}$;
- '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 Council⁵;
- '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;
- '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;
- 'Information or status display' is a continuous function providing information or indicating the status of the equipment on a display, including clocks.

2. Ecodesign requirements (including information requirements)

The preparatory studies showed that energy consumption in the use-phase dominates the life-cycle impact of domestic kitchen appliances. Accordingly, this working document proposes minimum energy efficiency requirements and benchmarks mainly in relation to energy consumption in the use phase.

This working document proposes minimum energy efficiency ecodesign requirements for domestic hobs, and electric mains-operated domestic range hoods also when used for non-domestic purposes and domestic ovens including when incorporated in cookers.

For domestic ovens and hobs, mandatory minimum energy efficiency requirements are proposed 1, 3 and 5 years after the entry into force of the Regulation. Mandatory requirements on power management under the Standby Regulation will be applicable from 2013 (2nd tier standby requirements).

For domestic range hoods, mandatory minimum requirements on Energy Efficiency Index (EEI_{hood}) and Fluid Dynamic Efficiency (FDE)⁶ are proposed 1, 3 and 5 years after the entry into force of the regulation. Although domestic range hoods are excluded from the scope of the Standby Regulation, mandatory requirements on power management are also proposed after 2 and 5 years after the entry into force of the regulation. Additionally this working

⁵ OJ L 390 of 31.12.2004, p. 24.

⁶ A range hood is a dynamic system, which energy consumption is dependent of the resistance of the air flow, e.g. due to installation of the hood. The energy consumption is measured with pressure and resistance at the best performance level of the hood.

document also proposes ecodesign requirements for domestic range hoods on the limitation of the exhaust air.

Products falling under the definitions of the paragraph "Definitions" above in this document shall meet the ecodesign requirements set out in Annex I of the draft ecodesign working document.

2.1. Domestic ovens

In ovens, the input energy is transformed to thermal energy. The net energy heats up the wet load (food) and evaporates water. The rest of the energy is heat stored in materials, and impact on the surroundings due to exhaust gas, radiation and thermal conduction. The net energy is similar for gas and electric ovens, therefore direct comparison of input energy at the system border is allowed.

Domestic ovens (including when incorporated in cookers) shall meet the ecodesign requirements set out below and be classified according to the measurements and calculations set out in Point 3 (Measurement method).

a) Minimum energy efficiency requirement

Table 1: Minimum energy efficiency requirements for domestic ovens - Energy Efficiency Index (EEI_{oven})		
	Electricity	Gas fired
1 year after entry into force	EEI _{oven} < 120 [<i>phase out of class D</i>]	EEI _{oven} < 105 [<i>phase out of class C</i>]
3 years after entry into force	EEI _{oven} < 105 [<i>phase out of class C</i>]	EEI _{oven} < 95 [<i>phase out of class B</i>]
5 years after entry into force	EEI _{oven} < 95 [<i>phase out of class B</i>]	EEI _{oven} < 75 [<i>phase out of class A</i>]

Both the conventional or the fan forced mode may be used to determine the Energy Efficiency Index (EEI).

b) Power consumption requirement

i) Power consumption in off mode:

Power consumption of domestic appliances in any off mode condition shall not exceed 0.50 W.

ii) Power consumption in standby mode(s):

The power consumption of domestic appliances 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 domestic appliances 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.

iii) Availability of off mode and/or standby mode:

Domestic appliances shall, except where this is inappropriate for the intended use, 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.

iv) Power management⁷:

When the domestic appliance is not providing the main function, or when other energy-using product(s) are not dependent on its functions, the appliance shall, unless inappropriate for the intended use, offer a power management function, or a similar function, that switches the domestic appliance after the shortest possible period of time appropriate for the intended use of the domestic appliance, 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 domestic appliance is connected to the mains power source.

The power management function shall be activated before delivery.

c) Product information requirement

The technical documentation of domestic ovens shall include:

	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_{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_{gas}	X.X	kWh/cycle
Energy Efficiency Index	$E_{\text{EEI oven}}$	X.X	%

2.2. Domestic hobs

⁷ The definition of power management is written in general terms to secure that all different ways of switching off or stand-by are covered.

Domestic hobs shall meet the ecodesign requirements set out in below and be classified according to the measurements and calculations set out in Point 3 (measurement method).

a) Minimum energy efficiency requirement

Table 2: Minimum energy efficiency performance requirements for domestic hobs – Energy Efficiency (EE_{hob})		
	Electric	Gas fired
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 %

b) Power consumption requirement

i) Power consumption in off mode

Power consumption of domestic appliances in any off mode condition shall not exceed 0.50 W.

ii) Power consumption in standby mode(s)

The power consumption of domestic appliances 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 domestic appliances 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.

iii) Availability of off mode and/or standby mode

Domestic appliances shall, except where this is inappropriate for the intended use, 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.

iv) Power management

When the domestic appliance is not providing the main function, or when other energy-using product(s) are not dependent on its functions, the appliance shall, unless inappropriate for the intended use, offer a power management function, or a similar function, that switches the domestic appliance after the shortest possible period of time appropriate for the intended use of the domestic appliance, 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 domestic appliance is connected to the mains power source. The power management function shall be activated before delivery.

c) Product information requirement

The technical documentation of domestic hobs shall include:

	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 _{hob}	X.X	%

2.3. Domestic range hoods

Domestic range hoods shall meet the ecodesign requirements set out below and be classified according to the measurements and calculations set out in Point 3 (Measurement method).

a) Minimum energy efficiency requirements

Table 3: Minimum energy efficiency performance requirements		
Energy Efficiency Index (EEI_{hood}) and Fluid Dynamic Efficiency (FDE_{hood})		
Parameter	EEI _{hood}	FDE _{hood}
1 year after entry into force	EEI _{hood} < 108 [<i>phase out of class F</i>]	FDE _{hood} > 4 [<i>phase out of class G</i>]
3 years after entry into force	EEI _{hood} < 101 [<i>phase out of class E</i>]	FDE _{hood} > 8 [<i>phase out of class F</i>]
5 years after entry into force	EEI _{hood} < 94 [<i>phase out of class D</i>]	FDE _{hood} > 13 [<i>phase out of class E</i>]

The Fluid Dynamic Efficiency Index and the Energy Efficiency Index of domestic range hoods are calculated as described in Annex II of the draft Regulation.

b) Power consumption requirement

(1) [*From 2 years after the entry into force of the Regulation*]

i) Power consumption in 'off mode'

The power consumption in any off-mode condition shall not exceed 1.00 W.

ii) 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.

iii) 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.

(2) *[From 5 years after the entry into force of the Regulation]:*

i) *Power consumption in 'off mode'*

The power consumption in any off mode condition shall not exceed 0.50 W.

ii) *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.

iii) 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.

iv) *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.

c) Limitation of the exhaust air

From *[12 months 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 m³/h shall automatically revert to an air flow lower than or equal to 650 m³/h in a time *t* as defined in Annex II.

d) Product information requirement

The technical documentation of domestic range hoods shall include:

	Symbol	Value	Unit
Model identification			
Type of hood			
Annual Energy Consumption	AEC_{hood}	X.X	kWh/year
Increase factor	f	X.X	
Fluid Dynamic Efficiency	FDE_{hood}	X.X	%
Energy Efficiency Index	EEl_{hood}	X.X	%
Measured air flow at best efficiency point	Q_{BEP}	X.X	m ³ /h
Measured air pressure at best efficiency point	P_{BEP}	X.X	Pa
Maximum air flow	Q_{max}	X	m ³ /h
Measured power at best efficiency point	W_{BEP}	X.X	W
Nominal power of the lighting system	W_L	X.X	W
Illumination of the lighting system at the middle of the cooking surface	E_{middle}	X	lux
Lighting Efficiency	LE_{hood}	X.X	lux/W
Grease Filtering Efficiency	GFE_{hood}	X.X	%
Measured power consumption in standby mode	P_s	X.XX	W
Description of how the standby mode is selected or programmed			
Measured power consumption off mode	P_o	X.XX	W
Description of how the off mode is selected or programmed			
Notes regarding operation of the equipment			

3. Measurement methods

Efficiency of domestic ovens, hobs and range hoods shall be tested in accordance with the methods described in Annex II of the Ecodesign working document. The selected test method shall be of “low uncertainty”, and shall be stated in the documentation of the given appliance.

Tolerance levels on various parameters are indicated in Annex III of the ecodesign working document and Annex VII of the labelling working document. These levels are indicative and could be suggested to be reduced (by 30%) in accordance with the increased level of quality of test measurements observed recently.

IEC 60350-1: 2011	Electric cooking ranges, ovens, steam ovens and grills for household use - Methods for measuring performance
IEC 60350-2: 2011	Electric hobs for household use - Methods for measuring performance
EN 30-2-1	Domestic cooking appliances burning gas – Part 2-1: Rational use of energy – General
EN 30-2-2	Domestic cooking appliances burning gas – Part 2-2: Rational use of energy – Appliances having forced – convection ovens and/or grills
IEC 61591	Household range hoods and other cooking fume extractors – Methods for measuring performance
IEC 60704-2-13	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-13: Particular requirements for range hoods
EN 15181	Measuring method of the energy consumption of gas fired ovens

3.1) Ovens

Measurement method is based on standard EN 60350-1, respectively EN 15181.

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 (of hydrated Hipor bricks with outside width x length x height dimensions of 114 x 230 x 64 mm) 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 per 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 per 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 per cycle, expressed in kWh

3.2) Hobs

Domestic electric hob

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 4. The water is heated from 293K to 363K.

Table 4: Sizes and water amount for measuring efficiency of domestic electric hobs				
Diameter* useful surface area (mm)	Diameter pan (mm)	Height pan (mm)	Thickness bottom of pan (mm)	Quantity of water (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

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 5. The water is heated from 293K to 363K.

Table 5: Sizes and water amount for measuring efficiency of domestic gas hobs		
Maximum power of the cooking zone (kW)	Internal diameter pot (mm)	Quantity of water (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

3.3) 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

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 ($SAEC$) of a domestic range hood shall be calculated, in kWh/year and rounded to the first decimal places, as:

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

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:

$$AEC = \left[\frac{W_{BEP} \times 60 \times f}{60 \times 1.000} + \frac{W_L \times t_L}{2 \times 60 \times 1.000} + \frac{P_o \times (440 - 60 \times f)}{2 \times 60 \times 1.000} + \frac{P_s \times (440 - 60 \times f)}{2 \times 60 \times 1.000} \right] \times 365$$

ii) for all other domestic range hoods:

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

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 point⁸, in m³/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 m³/h shall automatically revert to an air flow lower than or equal to 650 m³/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 m³

⁸ 'best efficiency point' (BEP) identifies the domestic range hood operating point with maximum fluid dynamic efficiency

- $Q(t)$ 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 650m³/h (booster or intensive mode) in m³/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 100m³ 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 100m³, 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 (100m³)

The mere presence of a manual switch or setting decreasing the appliance air flow to a value lower than or equal to 650 m³/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_{hood})

The Lighting Efficiency (LE_{hood}) of a domestic range hood means the ratio between the average illumination and the nominal power consumption of the lighting system. It shall be calculated in lux per Watt and rounded at the first decimal place, as:

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

Where:

- E_{middle} = average illumination of the lighting system on the cooking surface in lux and rounded to the first decimal place
- W_L = Power consumption of the lighting system in W and rounded to the first decimal place

e) Calculation of the Grease Filtering Efficiency (GFE_{hood})

The Grease Filtering Efficiency⁹ (GFE_{hood}) of a domestic range hood means the percentage of grease retained within the domestic range hood grease filters and shall be calculated as:

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

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_{WA}) of a household range hood at the highest setting for normal use, intensive or boost excluded.

4. Conformity Assessment

A conformity assessment shall be carried out according to Article 8(2), and Annex IV (Internal design control) or Annex V (Management system for assessing conformity) of Directive 2009/125/EC.

5. Market surveillance

When performing the market surveillance checks referred to in Directive 2009/125/EC, Article 3(2), Member State authorities shall apply the verification procedure set out in Annex II of the ecodesign working document.

6. Benchmarks

The preparatory studies were unable to identify the best available technology for grills and domestic hobs covered by this working document because of unavailability of data. The best available technology on the market in terms of their energy performance for domestic electric ovens including when incorporated in cookers corresponds to $EEI=67.5$ and for domestic gas ovens $EEI=72.7$ (including energy losses of gas ovens).

The best available technology in domestic range hoods (<280W) on the EU market has an index of fluid dynamic efficiency (FDE) equal to 22.

The best available technology in domestic range hoods (>280W) on the EU market has an index of fluid dynamic efficiency (FDE) equal to 24.5.

The best available technology in domestic range hoods on the EU market in terms of:

- noise in normal use setting is 51dB (normal use) at 550 m³/h;

⁹ measured according to EN 61591

- noise in boost/intensive setting is 57 dB (booster) at 750 m³/h;
- grease filtration efficiency is 91%;
- lighting efficiency is 29 (LED lighting).

The best available technology on the market for domestic hobs and ovens including when incorporated in cookers in terms of their energy performance is identified below:

Domestic ovens	Electric	EEI _{oven} = 66.2
	Gas	EEI _{oven} = 63.7
Domestic hobs	Electric	
	Gas	
Domestic range hoods	< 280 W	FDE _{hood} = 22
	≥ 280 W	FDE _{hood} = 24.5
	Noise	51dB at 550 m ³ /h ; 57 dB at 750 m ³ /h
	Grease	GFE _{hood} = 91%
	Lighting	LE _{hood} = 29%

7. Review

A review of the proposed requirements shall be presented to the Consultation Forum depending on technological progress and not later than seven years after its entry into force.

II. Energy labelling requirements

The working document proposes an energy label for gas ovens. This label is a common label for gas and electric ovens, in accordance with one of the approaches suggested by the Lot 22 preparatory study. Each cavity of the oven, falling under the scope of this regulation, shall be labelled.

This working document also proposes an energy label for domestic range hoods (also when used for non-domestic purposes). The energy used by household range hoods accounts for a significant part of total household energy demand in the European Union. In addition to the energy efficiency improvements already achieved, the scope for further reducing the energy consumption is substantial. Therefore a uniform design and content for the label, together with requirements as to the technical documentation and the product fiche and requirements as to the information to be provided for any form of distance selling, advertisements and technical promotional materials are proposed.

The analysis of the Lot 23 preparatory study of the current and best available products showed that although hobs and grills may have disparities in the relevant performance levels, early measurements based upon the draft test standard show little differentiation (15%) in the energy consumption of electric hobs (solid plates, radiant plates and induction) and standards and measurement methods still have to be developed for grills.

1. Definitions

For the purposes of this working document the following definitions shall apply:

'Appliance' means an apparatus with a specific function using energy.

'Domestic' means for household use;

'Oven' means an appliance or part of an appliance which incorporates one or more cavities using gas and/or electricity to operate;

'Cavity' means the enclosed compartment in which the temperature can be controlled for preparation of food;

'Cooker' means an appliance consisting of an oven and a hob using gas or electricity;

'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 vapour 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;

'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;

Definitions for the purposes of the Annexes of the draft Regulation are provided in Annex I, Point 1 of the attached draft working document on energy labelling.

2. Labelling classes

2.1. Energy Efficiency classes for domestic ovens and hoods

Domestic electric and gas ovens

Table 6: Ovens - Energy efficiency classes of domestic electric and gas ovens (EEI_{oven})	
<i>Energy Efficiency Class</i>	<i>Energy Efficiency Index</i>
A+++ (most efficient)	$EEI_{oven} < 40$
A++	$40 \leq EEI_{oven} < 55$
A+	$55 \leq EEI_{oven} < 75$
A	$75 \leq EEI_{oven} < 95$
B	$95 \leq EEI_{oven} < 105$
C	$105 \leq EEI_{oven} < 120$
D (least efficient)	$120 \leq EEI_{oven}$

Domestic hoods

Table 7: Hoods - Energy Efficiency classes for domestic range hoods (EEI_{hood})	
<i>Energy Efficiency Class</i>	<i>Energy Efficiency Index</i>
A	$EEI_{hood} < 80$
B	$80 \leq EEI_{hood} < 87$
C	$87 \leq EEI_{hood} < 94$
D	$94 \leq EEI_{hood} < 101$
E	$101 \leq EEI_{hood} < 108$
F	$108 \leq EEI_{hood} < 115$
G (least efficient)	$EEI_{hood} \geq 115$

2.2. Fluid Dynamic Efficiency Classes – Domestic range hoods

The fluid dynamic efficiency class of a household range hood shall be determined in accordance with its Fluid Dynamic Efficiency (FDE_{hood}) as in the following Table 8.

Table 8: Fluid Dynamic Efficiency classes for domestic range hoods	
<i>Fluid Dynamic Efficiency Class</i>	<i>Fluid Dynamic Efficiency</i>
A (most efficient)	$FDE_{hood} > 28$
B	$23 < FDE_{hood} \leq 28$
C	$18 < FDE_{hood} \leq 23$
D	$13 < FDE_{hood} \leq 18$
E	$8 < FDE_{hood} \leq 13$
F	$4 < FDE_{hood} \leq 8$
G (least efficient)	$FDE_{hood} \leq 4$

2.3. Lighting Efficiency Classes - Hoods

The lighting efficiency class of a range hood shall be determined in accordance with its Lighting Efficiency (LE_{hood}) as in the following Table 9.

Table 9: Lighting Efficiency classes for household range hoods (LE_{hood})	
<i>Lighting Efficiency Class</i>	<i>Lighting Efficiency</i>
A (most efficient)	$LE_{hood} > 28$
B	$20 < LE_{hood} \leq 28$
C	$16 < LE_{hood} \leq 20$
D	$12 < LE_{hood} \leq 16$
E	$8 < LE_{hood} \leq 12$
F	$4 < LE_{hood} \leq 8$
G (least efficient)	$LE_{hood} \leq 4$

[Note that light sources that are not classified as ‘special purpose’ are subject to current and upcoming Commission Regulations on non-directional and directional light sources.]

2.4. Grease Filtering Efficiency Class - Hoods

The grease filtering efficiency class of a household range hood shall be determined in accordance with its Grease Filtering Efficiency (GFE_{hood}) as in the following Table 4:

Table 10: Grease Filtering Efficiency classes for household range hoods (GFE_{hood})	
<i>Grease Filtering Efficiency Class</i>	<i>Grease Filtering Efficiency (%)</i>
A (most efficient)	$GFE_{hood} > 95$
B	$85 < GFE_{hood} \leq 95$
C	$75 < GFE_{hood} \leq 85$
D	$65 < GFE_{hood} \leq 75$
E	$55 < GFE_{hood} \leq 65$
F	$45 < GFE_{hood} \leq 55$
G (least efficient)	$GFE_{hood} \leq 45$

3. Measurement standards

Efficiency of domestic gas and electric ovens and domestic range hoods shall be tested in accordance with the methods described in Annex II. The selected test method shall be of “low uncertainty”, and shall be stated in the documentation of the given appliance. A compensation factor for the ventilation necessary for gas appliances was introduced.

IEC 60350-1: 2011	Electric cooking ranges, ovens, steam ovens and grills for household use - Methods for measuring performance
EN 30-2-2	Domestic cooking appliances burning gas – Part 2-2: Rational use of energy – Appliances having forced – convection ovens and/or grills
IEC 61591	Household range hoods and other cooking fume extractors – Methods for measuring performance
IEC 60704-2-13	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-13: Particular requirements for range hoods
EN 15181	Measuring method of the energy consumption of gas fired ovens

All the tests and the tools necessary for calculating power consumption in standby and off mode condition are already defined in EN 50564:2011.

For range hoods, all the tests and the tools necessary for calculation of Fluid Dynamic Efficiency (FDE) and Energy Efficiency Index (EEI_{hoods}) are already defined in EN 61591:1997 + A:2006+A2:2011.

An updating of EN 61591 to add the definition of Best Efficiency Point introduced with this regulation is suggested.

Calculation of the Fluid Dynamic Efficiency (FDE), Energy Efficiency Index (EEI_{hood}), Annual Energy Consumption (AEC) and Lighting Efficiency Index (LE) is defined in Annex II of the draft ecodesign regulation.

4. Review

A review of the proposed labelling requirements shall be presented depending on technological progress and not later than seven years after its entry into force.

Annex - Transitional measurement method for domestic range hoods

Publication of titles and references of transitory measurement methods¹⁰ for the implementation of Regulation (EC) No xx/2012, including in particular Annex III of that Regulation.

Measured parameter	Organisation	Reference	Title
Electric power consumption at the BEP	CENELEC	EN 61591:1997 + A1:2006 + A2: 2011	Domestic range hoods - Method for measuring performances
Light power consumption			Total nominal power consumption of lamps
Light luminance value	CENELEC	EN 61591:1997 + A1:2006 + A2: 2011	Domestic range hoods - Method for measuring performances
Air flow	CENELEC	EN 61591:1997 + A1:2006 + A2: 2011	Domestic range hoods - Method for measuring performances. (air flow is measured at a pressure of 15 Pa (in m ³ /h).
Air flow at the BEP	CENELEC	EN 61591:1997 + A1:2006 + A2: 2011	Domestic range hoods - Method for measuring performances
Static Pressure at the BEP	CENELEC	EN 61591:1997 + A1:2006 + A2: 2011	Domestic range hoods - Method for measuring performances
Grease Efficiency	CENELEC	EN 61591:1997 + A1:2006 + A2: 2011	Domestic range hoods - Method for measuring performances
Sound power	CENELEC	EN 60704-2-13:2000 + A1:2006 + A2:2008	Household and similar electrical appliances – Test code for determination of airborne acoustical noise. Part 2 particular requirements for range hoods
Sound power	CENELEC	EN 60704-3:2006	Household and similar electrical appliances – Test code for determination of airborne acoustical noise. Part 3: Procedure for determining and verifying declared emission values
Standby Power consumption	CENELEC	EN50564:2011	Household and similar electrical appliances – Measurement of standby power

¹⁰ These transitory measurement methods are meant to be replaced by harmonised standard(s). When available, the reference(s) of harmonised standard(s) will be published in the Official Journal of the European Union in accordance with Articles 9 and 10 of Directive 2009/125/EC.