Working Document

Brussels, 21.12.2010

INTRODUCTION AND OVERVIEW

Domestic ventilation units were subject to a preparatory study for DG ENER Lot 10[1]. An additional independent study was provided on ventilation units in 2010[2]. Products relevant to this working document include roof, window and wall ventilation units, heat recovery ventilation systems and domestic range hoods, and their controls as appropriate.

Ventilation units include fans with electric power input of less than 125 W, heat recovery systems and range hoods up to 280W. These product groups and power ranges align the scope of this working document with other relevant lots and regulations (Lot 10: comfort fans, Lot 11: ventilation fans, DG ENTR Lot 6: non-residential ventilation systems). These products have been found eligible for Ecodesign and Energy Label measures following Art. 15 of the 2009/125/EC Framework Directive on Ecodesign of Energy-related Products. According to estimates, the inclusion of small extraction units (<30 W) does not bring much extra saving (ca. 10%) but would constitute a significant extra burden, given the large sales numbers. It is thus proposed to exclude single-fan units with power <30 W from the scope of the proposed measures.

Residential dwellings with whole-house mechanical ventilation represent 24% of the total residential building stock. Natural ventilation (windows and infiltration), often supplemented by small exhaust fans in bath/kitchen/toilet, represent 76%. Around 1,5% of EU dwellings in the scope have mechanical ventilation with heat recovery.

Mechanical ventilation units, even without heat recovery, are an important instrument for energy saving through offering more control over the ventilation rate required. Compared to natural ventilation, mechanical ventilation reduces the total ventilation rate of a house (in m^3/h or air changes per hour). Thereby the fresh air that needs to be heated by the space heating system is reduced and space heating energy saving is achieved. At the same time, being largely independent of unpredictable wind and pressure differences, mechanical ventilation systems do a better job in achieving good indoor air quality. In new housing where building regulations prescribe a minimum air-tightness of the building shell, mechanical ventilation is often a necessity.

[1] Final report February, 2009, Preparatory study on the environmental performance of residential room conditioning appliances (airco and ventilation), Study on residential ventilation Philippe RIVIERE, ARMINES, France, Jérôme ADNOT, Laurent GRIGNON-MASSE, Dominique MARCHIO, Philippe RIVIERE, ARMINES, France, Philippe ANDRE, Laurie DETROUX, Jean LEBRUN, Vladut TEODOROSE, Université de Liège (ULg), Belgium, José Luis ALEXANDRE, Emanuel SA, IDMEC, University of Porto, Faculty of Eng., Portugal. Georg BENKE, Thomas BOGNER, Austrian Energy Angency, Austria, Amanda CONROY, Roger HITCHIN, Christine POUT, Wendy THORPE, BRE, UK, Stavroula KARATASOU, IASA, Greece.

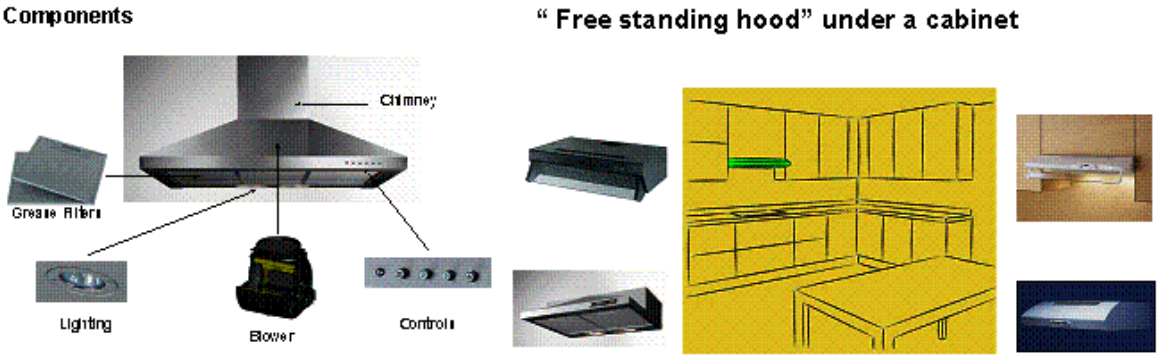
[2] Supplements to Preparatory Study on residential ventilation LOT 10 (mechanical ventilation units with fans < 125W, Claus Händel, Fachinstitut Gebäude-Klima e.V., Danziger Strasse 20, 74321 Bietigheim-Bissingen, Deutchland.

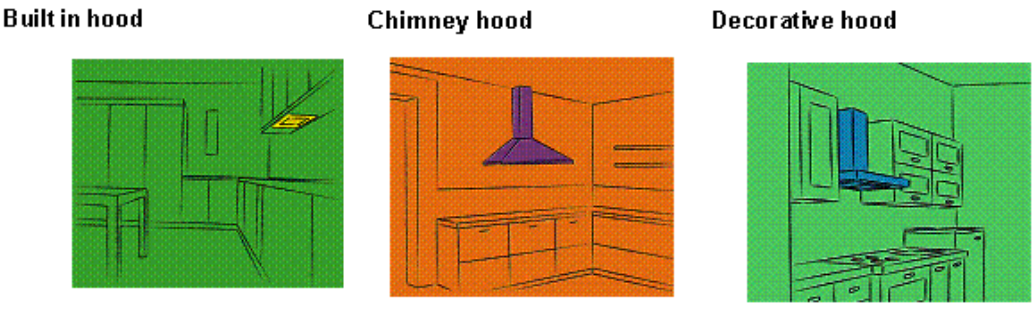
A/F. Boxed fans (exhaust) for central house ventilation (typical 250 m³/h @ 150 Pa).

B/C/D. Rooftop fans (exhaust) for central house, small office, school ventilation. B=centrifugal (radial outlet); C= centrifugal, diagonal outlet. D=mixed flow with vertical outlet.

E. Duct fan.

G. Small central HR ventilation unit (250-500 m³/h).





It is estimated that, even at the currently low market penetration rates, mechanical ventilation is saving around 256 PJ/a[3] (2010) in EU space heating fuel for the residential sector in scope.

[3] 265 PJ/a represents the space heating fuel saving of mechanical ventialtin with respect of natural ventilatioin, as calculated in Annex I of the delegated Regulation.

At the current annual market growth rate of 5-6% this figure will double before 2025, but the saving potential is much larger.

The electricity consumption of domestic ventilation is estimated at 18,7 TWh/a, growing at 5-6% per year. Balancing the primary energy consumption from electricity (2,5[4] * 3,6[5] * 18,7 TWh= 168 PJ) against the fuel saving (256 PJ/a), the current park of domestic ventilation units is producing a net primary energy saving of 88 PJ per year. This results in around 7 Mt CO2 equivalent of net carbon emission savings.

Stock
In 2010, around 7,8 million domestic ventilation units were sold at an industry annual revenue of € 1 billion in units and € 0,9 billion in additional installation-materials (grilles, ducts, etc.). Revenue to installers is over € 2,5 billion per year. Between manufacturers (26%), OEM suppliers (7%), wholesale (3%) and installers (64%) the sector represents the equivalent of 56.000 full-time jobs.

In 2010, EU-consumers spent over € 5,2 billion on the purchase and installation of domestic ventilation units. Over the product life[6], these consumers will be spending a further € 2,5 billion on running costs (electricity, maintenance) but also saving some € 10,7 billion on avoided space heating energy (gas, oil) because of more effective ventilation and ventilation heat recovery.

As to hoods, in 2010, around 6,5 million range hoods were sold at an industry annual revenue of €500 million per year for manufacturers. EU consumers spent around €1,5 billion in 2010 in the purchase and installation of range hoods.

Sales
Two-thirds of domestic ventilation unit sales and less than 15% of revenue relate to small local extraction ventilation units, that are mainly sold as a supplement to natural ventilation (infiltration, airing, passive stack).

Whole-house ventilation systems represent one-third of unit sales and 85% of revenue, mainly in the form of central exhaust units (with natural air supply) and more-and-more central and local heat recovery systems. The market for heat recovery units in Western and Northern Europe is achieving double digit growth rates. Southern and Eastern Europe are lagging behind.

The saving potential of energy efficient units is significant. Economical savings range between 10-20% for local exhaust fans, running up to 90% for central heat recovery ventilation units. For central exhaust systems a substantial saving can be realized through the use of room-based advanced controls.

The main market drivers for these 'invisible' installation products are government regulations. In large parts of the European Union, specific legislation is lacking or not fully implemented in practice. Market barriers relate to infrastructure and to installers and consumers being unfamiliar with the relatively new technologies. A major barrier for rapid retrofit of ducted (central) units is the substantial changes to the dwelling, limiting their application beyond new built dwellings. Renovation-friendlier (local) heat recovery solutions have recently become

[4] Primary energy conversion factor for power generation and distribution.
[5] Conversion TWh (10^{12} Watt hour) to PJ (10^{15} Joules); 1 W= 1 J/s → 1 Wh= 3600 J.
[6] 17 years.

available but are still not well known. The same can be said about the more advanced control options (CO_2-sensors, etc.), which have only recently become affordable for the residential sector.

Policy measures promoting energy-efficient domestic ventilation units and range hoods could combine all available instruments: minimum Ecodesign requirements, Energy Label and – possibly, but outside the scope of the underlying proposal – measures under the Energy Performance of Buildings Directive.

A realistic target is to keep the electricity consumption in 2025 at 2010 levels, which implies, given the current growth rate, an electricity efficiency improvement of about 40-50%. By 2020, around 30% electric efficiency improvement could be realized (about 7 TWh).

For the saving on space heating energy it is realistic to aim for a 50-60% increase beyond the ca. 500 PJ/a already expected in 2025 at a continuation of current trend. This means an extra saving of 300 PJ/a through the above measures.

All in all, the realization of both these targets should give an extra primary energy saving of over 360 PJ (100 TWh primary, for comparison: equivalent to around 40 TWh electric savings). On the long run (2050), savings of up to 150 Mt CO2 are deemed possible. Indirectly, the measures would boost the EU economy and help create many new jobs. No particular negative impacts are foreseen.

The proposed regulations for range hoods are estimated to generate at least 35% of energy saving by 2022, through the gradual replacement of the existing stock (around 65 million units) with new higher efficiency products. Energy saving would be over 2 TWh/year, equivalent to at least 1 Mt CO2.

Draft Working Document on a

COMMISSION REGULATION

implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for domestic ventilation units and range hoods

CONSIDERATIONS

(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 in terms of their environmental impact without entailing excessive costs.

(2) Article 16(2), first 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 an implementing measure for domestic ventilation units and range hoods.

(3) The Commission has carried out a preparatory study to analyse the technical, environmental and economic aspects of domestic ventilation units and range hoods used in residential dwellings. The study has been developed together with stakeholders and interested parties from the Community and third countries, and the results have been made publicly available.

(4) Domestic ventilation units with a single fan and nominal power input smaller than 30 W have particular application characteristics as a supplementary device, represent a considerable administrative burden in terms of market surveillance because of large sales numbers, contribute only to a small portion of the saving potential and should therefore be exempted from the scope of this Regulation. However, considering that they offer similar functionalities as other ventilation units, they could be addressed again at review of the measure.

(5) Large range hoods $\geq$ 280 W shall comply with Commission Regulation XX/XXXX/EC on ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW.

(6) The environmental aspect of the products covered, identified as significant for the purposes of this Regulation, is energy consumption in the use phase. The annual electricity consumption of products subject to this Regulation was estimated at 18,7 TWh in the Community in 2010. Unless specific measures are taken, annual electricity consumption is predicted to be 28,3 TWh in 2020. The saving on space heating energy due to products subject to this Regulation is estimated at 256 PJ in 2010 and projected to reach 425 PJ in 2020. With specific measures, this heating energy saving can be enhanced to reach 730 PJ in 2020. The preparatory study shows that the energy consumption of, and due to the use of, products subject to this Regulation, can be significantly reduced.

(7) The preparatory study shows that requirements regarding other ecodesign parameters referred to in Annex I, Part 1, of Directive 2009/125/EC are not necessary as energy consumption of domestic ventilation units in the use phase is by far the most important environmental aspect.

(8) The energy consumption of products subject to this Regulation should be made more 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 additional environmental impacts during the production phase and the disposal.

(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[7].

(12) In accordance with Article 8 of Directive 2009/125/EC, this Regulation should specify 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 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,

REGULATION ARTICLES

Chapter 1
Subject matter and scope

This Regulation establishes eco-design requirements for the placing on the market of electric mains-operated domestic ventilation units and range hoods that are placed on the market after [*date to be inserted: 12 months after entry into force of the delegated Regulation*].

This Regulation shall not apply to domestic ventilation units [to be specified, relates to special units for hazardous environments] and to domestic exhaust ventilation units < 30W.

[7] OJ L 204, 21.7.1998, p. 37.

Chapter 2

Definitions

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

(1) "*Ventilation Unit*" (VU) means an appliance equipped with a fan, motor and casing intended to replace contaminated air in a dwelling by fresh air;

(2) "*Domestic ventilation unit*" (DVU) is a ventilation unit where the nominal (maximum) power consumption of the individual fan(s) does not exceed 125 W;

(3) "*Exhaust ventilation unit*" (EVU) is a ventilation unit equipped with a single fan, which, for the purpose of this regulation, may be an exhaust fan, supply fan or reversible fan (able to operate in exhaust or supply mode) and which is balanced by natural air supply or extraction;

(4) "*Range hood*" means a motor operated appliance intended to collect contaminated air from above a hob. It includes also a downdraft system which is a ventilation system, intended for installation adjacent to household cooking ranges, hobs and similar cooking appliances, that draws vapour down into an internal exhaust duct. The blower of the range hood may be internal or external, provided that is controlled by the range hood and is defined in the technical documentation and instruction for installation. The filtered air may be discharged back into the room or ducted away.

(5) "*Range hood without motor*" means appliances intended to collect contaminated air from above a hob connected to a ventilation appliance not controlled by the range hood.

(6) *"Specific power input*" (SPI) in $W/m^3/h$ is the ratio between the VU power consumption and the amount of air displaced by the ventilation unit under reference conditions;

(7) "*Balanced ventilation unit*" (BVU) is a ventilation unit equipped with both an exhaust and supply fan, intended to operate in a balanced mass flow;

(8) "*Heat recovery system*" (HRS) is the part of a balanced ventilation unit equipped with a heat exchanger designed to transfer the heat contained in the (contaminated) exhaust air to the (fresh) supply air;

(9) "*Thermal efficiency*" (ηt) of a HRS is the ratio of the supply air temperature gain and the exhaust air temperature loss, both with respect of the outdoor temperature, measured under dry reference conditions and with balanced mass flow;

(10) "*Specific thermal energy consumption*" in $Wh/m^3/h$ is the average enthalpy difference between supply and exhaust air in an average, warmer or colder climate multiplied by the thermal efficiency of a possible HRS and divided by the efficiency of a reference space heating generator;

(11) "*Primary energy equivalent of electricity consumption*" in $Wh/m^3/h$ is the SPI plus the auxiliary electricity consumption per m^3/h of reference flow rate, multiplied by the primary energy efficiency for power generation;

(12) "*Control factor*" is a correction factor relating to the type of control – if any — that is part of the ventilation unit, expressed as a fraction of the total annual operating hours, ranging from 0,45 to 1;

(13) "*Miscellaneous factor*" is a correction factor relating to the performance loss due to air leakage and ventilation effectiveness;

(14) "*Specific energy consumption*" is the sum of specific thermal energy consumption and primary energy equivalent of electricity consumption, taking into account the control factor, miscellaneous factor, heat recovery and the efficiency of a reference space heating generator that is representative for the EU;

(15) *"Energy efficiency index*" (EEI) is the corrected fluid dynamic efficiency of the range hood at its best efficiency point.

(16) "Fluid dynamics efficiency" is defined for the purpose of this regulation as the multiplication of the external static pressure difference (in Pa) and flow rate (in m3/s) divided by the electric power consumption (in W).

Chapter 3
Ecodesign requirements

The specific ecodesign requirements for domestic ventilation units are set out in Annex I.

Chapter 4
Conformity assessment

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.

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.

Where the information included in the technical documentation for a particular ventilation appliance 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 ventilation appliance models where the information included in the technical documentation was obtained on the same basis.

Chapter 5
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.

Chapter 6
Benchmarks

The indicative benchmarks for best-performing ventilation units and range hoods available on the market at the time of entry into force of this Regulation are set out in Annex III.

Chapter 7
Revision

The Commission shall review this Regulation in the light of technological progress no later than five 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 verification tolerances set out in Annex III.

Chapter 8
Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

The specific ecodesign requirements set out in point 1(1) of Annex I shall apply from [*date to be inserted: [2 years after the entry into force of the Regulation*].

The specific ecodesign requirements set out in point 1(2) of Annex I shall apply from [*date to be inserted: [5 year after the entry into force of the Regulation*].

ANNEX I
Ecodesign requirements

1. Specific ecodesign requirements

Domestic ventilation units (with individual fans having a nominal electric power input less than 125 W) shall comply with the following requirements:

(1a) From 2 years after the entry into force of the Regulation:

- the thermal efficiency of heat recovery systems shall be more than or equal to 75%;
- the specific power input shall be less than or equal to 0,23 W/m³ /h for exhaust ventilation units and 0,35 W/m³ /h for balanced ventilation units;
- all balanced ventilation units shall have a heat recovery system;
- all exhaust ventilation units shall have a control factor less than or equal to 0,8 (at least clock timer);
- sound power of no more than 50 dBa re 1pw at reference conditions (measured in duct for central units).

Range hoods shall comply with the following requirements:

(1b) From 2 years after the entry into force of the Regulation:

- The energy efficiency index (EEI@FL) shall be more than or equal to 4.

(2a) From 5 years after the entry into force of the Regulation:

- the thermal efficiency of heat recovery systems shall be more than or equal to 80%;
- the specific power input shall be less than or equal to 0,18 W/m³ /h for exhaust ventilation units and 0,28 W/m³ /h for Balanced Ventilation Units;
- all exhaust ventilation units shall have a control system with a control factor less than or equal to 0,7 (at least main CO2 sensor);
- sound power of no more than 45 dBa re 1pw at reference conditions (measured in duct for central units).

Range hoods shall comply with the following requirements:

(2b) From 5 year after the entry into force of the Regulation:

- The energy efficiency index (EEI@FL) shall be more than or equal to 8.

The test parameters above shall be assessed in accordance with the definitions in Chapter 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.

ANNEX II
Verification procedure for market surveillance purposes

For the purposes of checking conformity with the requirements laid down in Annex I, Member State authorities shall test a single ventilation appliance. If the measured parameters do not meet the declared values within the meaning of Article 4(2) of the manufacturer within the ranges set out in Table 1, the measurements shall be carried out on three more ventilation units. The arithmetic mean of the measured values of these three ventilation units shall meet the requirements within the ranges set out in Table 1.

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

The measured efficiency value shall not be greater than the rated value* of *SPI* by more than 3%. The measured efficiency value shall not be less than the rated value of η by more than 3%.

The measured EEI value for range hoods shall not be less than the rated value by more than 5%.

Member State authorities shall use reliable, accurate and reproducible measurement procedures, which take into account the generally recognised state of the art measurement methods, including methods set out in documents the reference numbers of which have been published for that purpose in the Official Journal of the European Union.

* "*Rated value*" means a value that is declared by the manufacturer.

ANNEX III
Benchmarks

In 2010, the best available technology on the market for domestic ventilation units, in terms of their specific power input SPI is 0,08 W/m³ /h.

Heat recovery ventilation units with declared heat recovery thermal efficiencies up to 95% are on the market, albeit at a higher SPI.

In 2010, the best technology available in standard-sized range hoods <280 W in the EU market in terms of EEI has an EEI of 22 %.

Transitional measurement method (illustrative/ to be discussed)

DRAFT Commission communication in the framework of the implementation of the Commission Regulation (EC) No XX/20XX of …… implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for Domestic Ventilation Units

(1) Publication of titles and references of transitory measurement methods[8] for the implementation of Regulation (EC) No xx/2010, including in particular Annex III of that Regulation.

[Table to be completed during the stakeholder process]

Measured parameter	**Organi-sation**	**Reference**	**Title**
Sound power, ducted, balanced ventilation units with heat recovery	CEN	prEN 13141-7 : June 2010	Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 7: Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings. Section 6.4.1 *Noise radiated through the casing of the unit*; section 6.4.2 *Sound power level in duct connections of the unit*
Sound power, unducted, balanced ventilation units with heat recovery	CEN	prEN 13141-8: July 2010	Ventilation for buildings — Performance testing of components/products for residential ventilation — Part 8: Performance testing of un-ducted mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for a single room. Section 7.4.2. *Radiative sound power in the indoor or outdoor space*
Sound power, ducted, exhaust ventilation units	CEN	EN 13141-6: Jan. 2004	Ventilation for buildings — Performance testing of components/products for residential ventilation — Part 6: Exhaust ventilation system packages used in a single dwelling.
Sound power, classification ventilation units	CEN	prEN 13142: Jan. 2010 (Rev. V7)	Ventilation for buildings — components/products for residential ventilation — required and optional performance characteristics.

[8] 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 2005/32/EC.

Performance range hood	CENELEC	EN 61591:1997 + A1:2006 + A2: 2010	Household range hoods - Method for measuring performances
Sound power, range hoods	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, range hoods	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

Working Document on a possible

COMMISSION DELEGATED REGULATION

implementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of domestic ventilation units and range hoods

CONSIDERATIONS:

(1) Directive 2010/../EU requires the Commission to adopt delegated acts for the labelling of energy related products representing significant potential for energy savings and presenting a wide disparity in performance levels with equivalent functionality.

(2) The energy used by domestic ventilation units and 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 of domestic ventilation units is substantial.

(3) Domestic ventilation units with a single fan and nominal power input smaller than 30 W have particular application characteristics as a supplementary device, represent a considerable administrative burden in terms of market surveillance because of large sales numbers, contribute only to a small portion of the saving potential and should therefore be exempted from the scope of this Regulation. However, considering that they offer similar functionalities as other ventilation units, they should be addressed again at review of the measure.

(4) The information provided on the label should be obtained through reliable, accurate and reproducible measurement procedures, 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[9].

(5) This delegated Regulation should specify a uniform design and content for the label for domestic ventilation units and range hoods.

(6) In addition, this delegated Regulation should specify requirements as to the technical documentation and the fiche for domestic ventilation units and range hoods.

(7) Moreover, this delegated Regulation should specify requirements as to the information to be provided for any form of distance selling, advertisements and technical promotional materials of domestic ventilation units and range hoods.

(8) It is appropriate to provide for a review of the provisions of this delegated Regulation taking into account technological progress.

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[9] OJ L 24, 21.7.1998, p. 37a

CHAPTERS:

Chapter 1
Subject matter and scope

This delegated Regulation establishes requirements for the labelling of, and the provision of supplementary product information concerning, electric mains-operated domestic ventilation units and range hoods including those sold for non-household use, and that are placed on the market after [*date to be inserted: 12 months after entry into force of the delegated Regulation*].

Chapter 2
Definitions

In addition to the definitions laid down in Article 2 of Directive 2010/30/EU, the following definitions shall apply for the purposes of this delegated Regulation:

(1) "*End-user*" means a consumer buying or expected to buy a ventilation unit;

(2) "*Point of sale*" means a location where domestic ventilation units are displayed and/or offered for sale, hire or hire-purchase;

(3) *"Best efficiency point"* (BEP) identifies the range hood operating point with maximum fluid dynamic efficiency;

(4) *"Air flow at the BEP"* in m^3/h, identify the air flow measured according EN 61591 at BEP of the range hood;

(5) *"Static pressure at the BEP"* in Pa identify the pressure measured according EN 61591 at BEP of the range hood;

(6) *"Power of the Hood at the BEP"* in W identifies the power consumption at BEP of the range hood;

(7) *"Lighting efficiency index"* in lx/W is the ratio between the Average illumination according to EN 61591 and the power consumption of lighting system of the range hood;

(8) "Grease efficiency index" means the percentage of grease retained within the range hood grease filters measured according to EN 61591;

(9) *"Sound power"* means the acoustical A-weighted sound power emission of the range hood in dB(A) re 1 pW measured according to EN 60704-3 and EN 60704-2-13;

(10) *"Annual electric consumption"* in kWh/year indentify the annual energy consumption of the range hood calculated considering 1hour/day hood use, including also lighting consumption.

Additionally, the 16 definitions already listed in Chapter 2 of the Ecodesign Regulation shall apply.

Chapter 3
Responsibilities of suppliers

1. Suppliers shall ensure that:

(1a) each ventilation appliance is supplied with a label, stating, as applicable:

(a) the specific energy consumption (*SEC*) class as set out in point 1 of Annex I, and

(b) the design air flow and external pressure drop as set out in Annex II,

(c) the annual electricity consumption, calculated in accordance with point 3 of Annex I,

(d) the annual space heating energy saving, for average, warmer and colder climate, calculated in accordance with point 3 of Annex I ,

(e) the airborne acoustical noise power emissions (measured in duct connections for central units, measured at the casing for local units);

(1b) each range hood is supplied with a label, stating, as applicable:

(a) Supplier's name or trade mark;

(b) Supplier's model identifier which means the code, usually alphanumeric, which distinguishes a specific domestic ventilation appliance model from other models with the same trade mark or supplier's name;

(d) the specific energy consumption (EEI@FL) class, as defined in Annex III, table 1;

(e) the annual electricity consumption, in kWh electric/a, as indicated in Annex III, point 3;

(f) the lighting efficiency index, in lux/Watt as defined in annex III, point 4;

(g) grease filter efficiency, in % as defined in Annex III, point 5;

(n) airborne acoustical A-weighted sound power emissions expressed in dB(A) re 1 pW and rounded to the nearest integer at maximum speed, as indicated in Annex III, point 6;

(2) a product fiche, as set out in Annex II, is made available;

(3) the technical documentation as set out in Annex II is made available on request to the authorities of the Member States and to the Commission;

(4) from [*date to be inserted: 12 months after entry into force of the delegated Regulation*]:

(a) any advertisement for a specific model of domestic ventilation appliance contains the SEC class, if the advertisement discloses energy-related or price information; and

(b) any technical promotional material concerning a specific model of domestic ventilation appliance which describes its specific technical parameters includes the SEC class of that model.

(c) any advertisement for a specific model of range hoods contains the EEI@FL class, if the advertisement discloses energy-related or price information;

(d) any technical promotional material concerning a specific model of range hoods which describes its specific technical parameters includes the EEI@FL class of that model.

2. The energy efficiency classes shall be based on the specific energy consumption calculated in accordance with Annex I.

3. The format of the label shall be as set out in Annex III.

Chapter 4
Responsibilities of dealers

Dealers shall ensure that:

(1) each domestic ventilation appliance unit, at the point of sale, bears the label provided by suppliers in accordance with Article 3(1) on the outside of the front or top of the domestic ventilation appliance unit, in such a way as to be clearly visible;

(2) from [*date to be inserted: 16 months after entry into force of the delegated Regulation*]:

(a) Domestic ventilation units and range hoods offered for sale, hire or hire-purchase where the end-user cannot be expected to see the product displayed, are marketed with the information provided by suppliers in accordance with Article 3(1)-(2) in the format specified in Annex VI;

(b) any advertisement for a specific model of domestic ventilation appliance and range hoods contains a reference to the energy efficiency class, if the advertisement discloses energy-related or price information, and;

(c) any technical promotional material concerning a specific model of domestic ventilation appliance and range hoods which describes its specific technical parameters includes a reference to the energy efficiency class of the model.

Chapter 5
Measurement methods

The information to be provided under Articles 3 and 4 shall be obtained by reliable, accurate and reproducible measurement procedures, which take into account the recognised state of the art measurement methods.

Chapter 6
Verification procedure for market surveillance purposes

When Member States assess the conformity of the declared energy efficiency class, SPI, temperature efficiency, annual energy consumption, and airborne acoustical A-weighted sound power emissions, they shall apply the procedure laid down in Annex I.

Chapter 7
Revision

The Commission shall review this delegated Regulation in light of technological progress no later than five years after its entry into force.

Chapter 8
Transitional provision

Articles 3(1) point 4 and 4(2) shall not apply to printed advertisement and printed technical promotional material published before [*date to be inserted: 16 months after the entry into force of the delegated Regulation*].

Chapter 9 Entry into force

This delegated Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

ANNEX I
Energy efficiency classes, efficiency classes, annual consumption for domestic ventilation units

1. SPECIFIC ENERGY CONSUMPTION CLASSES

The average specific energy consumption (*SEC)* class of domestic ventilation units shall be determined in accordance with its average specific energy consumption *SEC* as set out in Table 1.

Table 1: SEC classes for ventilation units

***SEC* Class**	***SEC in kWh/a @100 m²***
A (most efficient)	**SEC<-4000**
B	**-4000≤SEC<-3000**
C	**-3000≤SEC<-2000**
D	**-2000≤SEC<-1000**
E	**-1000≤SEC<0**
F	**0≤SEC<1000**
G (least efficient)	**1000≤SEC**

2. SPECIFIC ENERGY CONSUMPTION CALCULATION

SEC is calculated by the formula:
SEC= 21,9 ·130 ·CTRL ·MISC ·SPI – 22,22 · (220 – 130 ·CTRL ·MISC ·(1-HR))

Where,
MISC values are 1,33 for exhaust ventilation units, 1,1 for balanced ventilation units >30 W nominal electric power input per fan, 1,21 for balanced ventilation units ≤30 W nominal electric power input;

CTRL values are:
For domestic ventilation units with >30 W nominal electric power input per fan

- CTRL= 1: manual (70% position of 3 speed);
- CTRL= 0,8: clock control (price 50% RF, 50% wired version);
- CTRL=0,7: central CO2-sensor;
- CTRL= 0,5: 3 room-based CO2 satellites (with dampers) , 1 or 2 RH-sensors, Central CPU, RF communication [BAT].

For domestic ventilation units with ≤30 W nominal electric power input per fan

- CTRL= 1; manual (mid-position of 3 speed);

- CTRL= 0,9; manual variable speed drive;
- CTRL= 0,8; clock control;
- CTRL= 0,7; RH-sensor or occupancy sensor only;
- CTRL= 0,5; CO2 + RH sensor + manual override [BAT, but higher ELEC].

Background to the formula:

- SEC is the sum of annual electricity consumption (*primary energy → factor 2,5*) and saving on space heating energy *(@boiler efficiency 75% → factor 1,33*) in a dwelling of 100 m² in an *Average* climate;
- SEC is expressed in kWh primary energy per annum;
- The calculated flow rate of the unit is the key element of the calculation;
- For the calculation of the flow rate of the unit, the starting point is the ventilation requirement of 1,3 m³/h per m² (*flow rate 130 m³/h @100 m²*); Then there is a correction for the control factor CTRL (as earlier) and a fixed correction MISC, which is typical of the typology, i.e. it looks at duct losses, ventilation effectiveness, etc. (*MISC_centralexh= 1,33; MISC_centralHR=1,1 ; MISC_localHR=1,21*);
- The flowrate of the unit is then multiplied with the *SPI (in W/(m³/h))*, 8760 h/a, the *factor 2,5* and a conversion factor 0,001 *(from Wh to kWh)* to find the primary energy equivalent of the annual electricity consumption in kWh/a;
- For the saving on heating, the flowrate of the unit is multiplied with (1-heat recovery thermal efficiency HR) and the <u>difference</u> of the result with natural ventilation (*flow rate 220 m³/h @100 m²*) is determined;
- This <u>difference</u> (in m³/h) is then multiplied with the number of hours of the heating season (*5112 h/a for average climate*), the indoor/outdoor temperature difference in the heating season (*9,5 K in average climate*), specific heat of air per m³ (*0,000344 kWh/m³K*) and the *factor 1,33* to find the annual saving on space heating energy in kWh/a.

3. SPECIFIC ENERGY CONSUMPTION CALCULATION

The energy label requires also indicating the annual electricity consumption (in kWh electric per year) and the annual space heating saved (in kWh fuel gross calorific value per year). The latter not just for the Average climate, but also the Warmer climate (*heating season 4392 h/a, ΔT =5 K*) and the Colder climate (*heating season 6552 h/a, ΔT =14,5 K*).

Applicable equations are:

- Annual electricity consumption = 8,76 · *SPI* · 130 · *CTRL* · *MISC;*
- Annual heating saved Average climate = 22,22 · (220 – 130 · *CTRL* · *MISC* · (1-*HR*));
- Annual heating saved Warmer climate = 10,05 · (220 – 130 · *CTRL* · *MISC* · (1-*HR*));
- Annual heating saved Colder climate = 43,47 · (220 – 130 · *CTRL* · *MISC* · (1-*HR*)).

Energy efficiency classes, efficiency classes, annual consumption for range hood

1. SPECIFIC ENERGY CONSUMPTION CLASSES FOR RANGE HOOD

The energy efficiency index at full load (EEI@FL) of range hoods shall be determined in accordance with its average energy efficiency index EEI@FL as set out in Table 1.

Table 1: EEI@FL classes for range hoods

***EEI@FL* Class**	***EEI@FL at BEP***
A (most efficient)	**EEI@FL>28%**
B	**23%<EEI@FL≤28%**
C	**18%<EEI@FL≤23%**
D	**13%<EEI@FL≤18%**
E	**8%<EEI@FL≤13%**
F	**4%<EEI@FL≤8%**
G (least efficient)	**0%<EEI@FL≤4%**

EEI@FL is calculated by the formula:

$$EEI@FL = \frac{Q^{*}xP^{*}}{W} x\alpha$$

Where:

- EEI@FL= Energy Efficiency Index @ Full Load
- BEP = Best Efficiency Point according EUP Lot 10 study Final Report
- Q*= Air flow (m3/s) at the BEP, measured according EN 61591
- P*= Static pressure (Pa) at the BEP, measured according EN 61591
- W= Power of the Hood (Watts) at the BEP

It has been introduced a reduction coefficient α:

$$\alpha = \frac{100 - 0.0002W^2}{100}$$

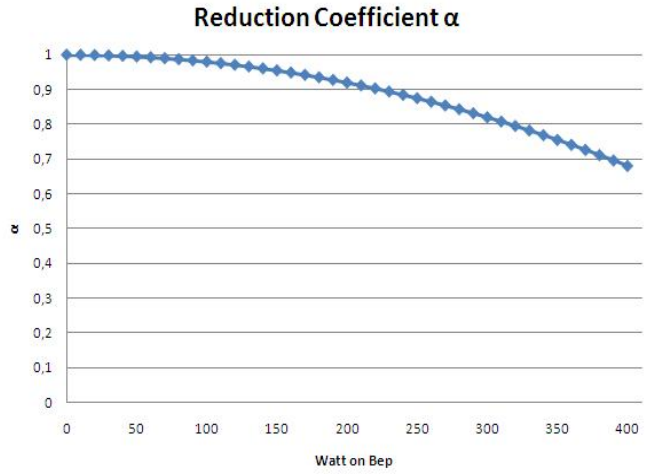


Fig. 1

The α coefficient introduces a penalization in function of the Power@BEP that increases with the power itself; in this way the higher the power consumption , the more difficult it is to reach a good class.

Note that, different from the efficiency assessment for domestic ventilation units, control factors and a differentiation in thermal efficiency, e.g. between re-circulation and exhaust types, are not taken into account with range hoods; these issues may be considered at a later stage.

3. ANNUAL ENERGY CONSUMPTION FOR RANGE HOOD

Indication of kWh/year consumption should be calculated considering 1hour/day hood use, including also lighting consumption, according to the following formula:

Annual energy consumption [kWh] = (WBEP +WLAMP) x 1h x 365gg;

Where:

- WBEP: is the Power Consumption at Best Efficient Point;
- WLAMP: is Nominal Power Consumption of Lamp.

4. LIGHTING EFFICIENCY INDEX FOR RANGE HOOD

The energy label should contain indication of lighting efficiency with a proper class index according to the following formula:

$$LE = \frac{E_{MIDDLE}}{W_{LAMP}}$$

Where

- LE= Lighting Efficiency;
- EMIDDLE[lux] = Average illumination according to EN 61591;
- WLAMP is Nominal Power Consumption of Lamp.

Lighting efficiency class boundaries are the following:

Table 2: LE for range hoods

***LE* Class**	***LE***
A (most efficient)	**LE>24**
B	**20<LE≤24**
C	**16<LE≤20**
D	**12<LE≤16**
E	**8<LE≤12**
F	**4<LE≤8**
G (least efficient)	**0<LE≤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.

5. GREASE FILTERING EFFICIENCY INDEX FOR RANGE HOOD

In order to include information in the energy label related to this important feature it is proposed to add a grease filtering efficiency index - measured according to EN 61591:1997+A1:2006+(A2: in progress) – with the following class division:

Table 3: LE for range hoods

***GEF* Class**	***GFE***
A (most efficient)	GFE>95%
B	85%<GFE≤95%
C	75%<GFE≤85%
D	65%<GFE≤75%
E	55%<GFE≤65%
F	45%<GFE≤55%
G (least efficient)	GFE≤45%

6. NOISE VALUE FOR RANGE HOOD

Indication of hood's maximum noise value in dBA (Sound Power at maximum speed available in normal use) measured according to EN 60704-3 and EN 60704-2-13.

ANNEX II

Fiche for domestic ventilation units

1. The information in the product fiche of the domestic ventilation units shall be given in the order specified in points (a) to (n).

   (a) Supplier's name or trade mark;

   (b) Supplier's model identifier which means the code, usually alphanumeric, which distinguishes a specific domestic ventilation appliance model from other models with the same trade mark or supplier's name;

   (c) specific energy consumption *(SEC)* in kWh/a for 100 m² , as defined in Annex I, point 2;

   (d) specific energy consumption (S*EC)* class, as defined in Annex I, table 1;

   (e) nominal air flow rate at 0 Pa;

   (f) design air flow rate (70% of nominal) in m³ /h at design external pressure drop in Pa;

   (g) air velocity in m/s at design flow rate;

   (h) power factor (cos phi);

   (i) SPI in W/(m³/h);

   (j) thermal efficiency of heat recovery (in %), as appropriate (if 'none' then zero);

   (k) control factor and short control description;

   (l) miscellaneous factor applied;

   (m) for exhaust ventilation systems: instructions to install regulated supply/exhaust grilles in façade for natural air supply/extraction;

   (n) airborne acoustical A-weighted sound power emissions expressed in dB(A) re 1 pW and rounded to the nearest integer at design flow rate, for ducted units determined from in-duct radiative sound power measurements and for unducted units and hoods determined as radiative sound power of the casing;

   (o) annual electricity consumption, in kWh electric/a, as indicated in Annex I;

   (p) annual heating energy saving, in kWh GCV of fossil fuel/a, for average, warmer and colder climate, as indicated in Annex I, Point 3;

   Note that (c), (o), (p) and (q) must be specified per climate (average, warmer, colder) in case of a unit with heat recovery function. Parameter (d) is established for an average climate.

2. One fiche may cover a number of models supplied by the same supplier.

3. The information contained in the fiche may be given in the form of a copy of the label, either in colour or in black and white. Where this is the case, the information listed in point 1 not already displayed on the label shall also be provided.

Fiche for range hoods

1. The information in the product fiche of the range hoods shall be given in the order specified in points (a) to (n).

   (a) Supplier's name or trade mark;

   (b) Supplier's model identifier which means the code, usually alphanumeric, which distinguishes a specific domestic ventilation appliance model from other models with the same trade mark or supplier's name;

   (d) specific energy consumption (*EEI@FL)* class, as defined in Annex III, table 1;

   (e) annual electricity consumption, in kWh electric/a, as indicated in Annex III, point 3;

   (f) lighting efficiency index, in lux/Watt as defined in annex III, point 4;

   (g) grease filter efficiency, in % as defined in Annex III, point 5;

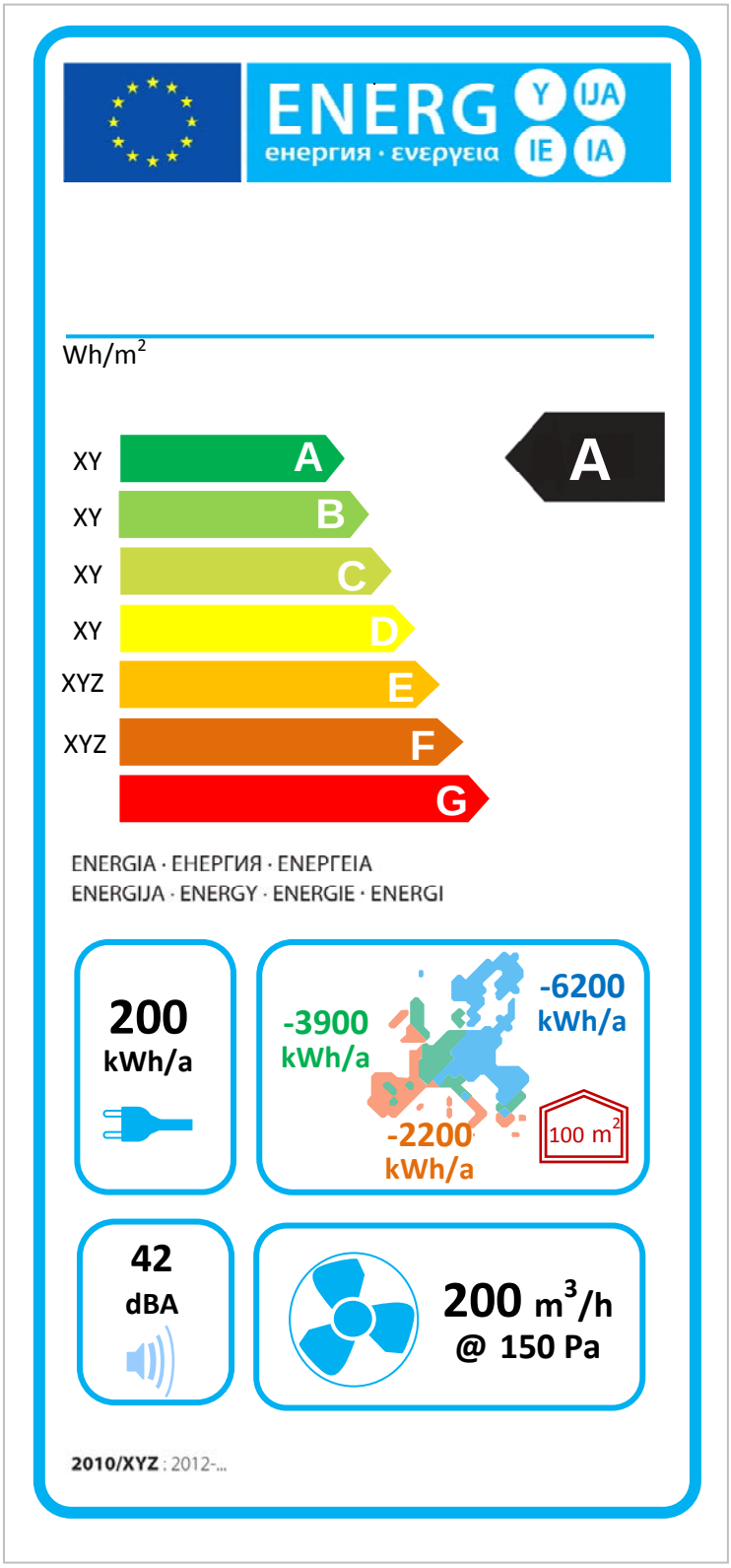
   (n) airborne acoustical A-weighted sound power emissions expressed in dB(A) re 1 pW and rounded to the nearest integer at maximum speed, as indicated in Annex III, point 6.

2. One fiche may cover a number of models supplied by the same supplier.

3. The information contained in the fiche may be given in the form of a copy of the label, either in colour or in black and white. Where this is the case, the information listed in point 1 not already displayed on the label shall also be provided.

ANNEX III

Label Design for domestic ventilation units (example)



Label Design for domestic Range Hoods (example)