

Working Document on a Draft

COMMISSION DELEGATED REGULATION (EU) No .../..

of XXX

**supplementing Directive 2010/30/EU of the European Parliament and of the Council
with regard to energy labelling of residential ventilation units**

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2010/30/EU of the European Parliament and of the Council on the indication by labelling and standard product information of the consumption of energy and other resources by energy related products¹, and in particular Article 10 thereof,

Whereas:

- (1) Directive 2010/30/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 residential ventilation units 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 residential ventilation units is substantial.
- (3) Unidirectional residential ventilation units with 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) Harmonised provisions on labelling and standard product information regarding the energy efficiency of residential ventilation units should be laid down in order to provide incentives for manufacturers to improve the energy efficiency of these units, to encourage end-users to purchase energy-efficient products and to contribute to the functioning of the internal market.
- (5) As the sound power level of a residential ventilation unit can be an important consideration for end-users, information on sound power levels should be included on the label.

¹ OJ L 153, 18.6.2010, p. 13

- (6) The combined effect of the this Regulation and Commission Regulation (EU) No ... of ... implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for ventilation units², is expected to result in an aggregated saving increase by 1300 PJ (45%) to a level of 4130 PJ in 2025.
- (7) The information provided on the label should be obtained through reliable, accurate and reproducible measurement and calculation procedures which take into account recognised state-of-the-art measurement and calculation methods including, where available, harmonised standards adopted by the European standardisation bodies in accordance with the procedures laid down in Regulation (EU) 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation³, for the purpose of establishing ecodesign requirements.
- (8) The verification tolerances set in Annex IX should be applied only for conformity verification purposes by Member State authorities, representing the variations of the measurement results of the verification tests compared to the values of the declared or published parameters. Tolerances should not be used by the supplier in establishing the values in the technical documentation or in interpreting these values with a view to achieving a better labelling classification or to communicate better performance by any means. All parameters declared or published by the supplier should not be more favourable for the supplier than the values contained in the technical documentation.
- (9) This delegated Regulation should specify a uniform design and content for the label for residential ventilation units.
- (10) In addition, this delegated Regulation should specify requirements as to the technical documentation and the fiche for residential ventilation units.
- (11) Moreover, this delegated Regulation should specify requirements in respect of the information to be provided in the case of any form of distance selling, advertisements and technical promotional materials of Ventilation Units.
- (12) It is appropriate to provide for a review of the provisions of this delegated Regulation taking into account technological progress.

HAS ADOPTED THIS REGULATION:

Chapter 1
Subject matter and scope

1. This Regulation establishes energy labelling requirements for the placing on the market of residential ventilation units.
2. This Regulation shall not apply to ventilation units which are:
 - (a) unidirectional (exhaust or supply) and equipped with one or more individual fans with a nominal electric power input less than 30 W
 - (b) specified to operate exclusively in potentially explosive atmosphere as defined in Directive 94/9/EC of the European Parliament and of the Council⁴;

² OJ [...] [...], [...], [...].

³ OJ L 316, 14.11.2012, p. 12.

⁴ OJ L 100, 19.4.1994, p.1

- (c) specified to operate exclusively for emergency use only, at short-time duty, with regard to basic requirements for construction works on safety in case of fire as set out in Regulation (EU) 305/2011⁵;
- (d) specified to operate exclusively:
 - (1) where operating temperatures of the air being moved exceed 100 °C;
 - (2) where the operating ambient temperature for the motor, if located outside the air stream, driving the fan exceeds 65 °C;
 - (3) where the annual average temperature of the air being moved and/or the operating ambient temperature for the motor, if located outside the air stream, are lower than -40 °C;
 - (4) with a supply voltage > 1 000 V AC or > 1 500 V DC;
 - (5) in toxic, highly corrosive or flammable environments or in environments with abrasive substances;
- (e) units including a heat exchanger or a heat pump for heat recovery, whereby the purpose of the unit is predominantly heating or cooling.

Chapter 2

Definitions

In addition to the definitions set out in Article 2 of Directive 2010/30/EU, the following definitions shall apply for the purpose of this Regulation:

- (1) 'Ventilation unit' or 'VU' means an electric mains-operated appliance equipped with at least a fan, motor, fan housing and a casing of the appliance intended to replace utilised air by fresh air in a building or part of a building;
- (2) 'Residential ventilation unit' or 'RVU' means a ventilation unit where the maximum flow rate as defined in Annex I or the nominal flow rate as defined in Annex II do not exceed 1000 m³/h or is between 250 and 1000 m³/h and the manufacturer does not declare its intended use exclusively for a non-residential ventilation application;
- (3) 'Non-residential ventilation unit' or 'NRVU' means a ventilation unit where the maximum flow rate as defined in Annex I or the nominal flow rate as defined in Annex II exceed 1000 m³/h or is between 250 and 1000 m³/h and the manufacturer declares its intended use exclusively for a non-residential ventilation application;
- (4) 'Unidirectional ventilation unit' or 'UVU' means a ventilation unit with air treatment producing an air volume flow only in one direction, either from indoors to outdoors (exhaust) or from outdoors to indoors (supply), operating in a building ventilation system where the mechanically produced air flow is balanced by natural air supply or extraction provisions;
- (5) 'Bidirectional ventilation unit' or 'BVU' means a ventilation unit producing a mass air flow between indoors and outdoors and which is equipped with both exhaust and supply fans;
- (6) 'Central ventilation unit', or 'ducted ventilation unit', means a ventilation unit intended to ventilate more than one enclosed spaces in a building through the use of air-ducts, equipped with appropriate means for duct-connection.

⁵ OJ L 88, 4.4.2011, p. 5

- (7) 'Local ventilation unit', or 'non-ducted, or room based ventilation unit', means a ventilation unit intended to ventilate a single enclosed room or space in a building, not equipped with appropriate means for duct-connection.
- (8) 'End-user' means a consumer buying or expected to buy a Ventilation Unit;
- (9) 'Point of sale' means a location where residential ventilation units are displayed and/or offered for sale, hire or hire-purchase.

Chapter 3
Responsibilities of suppliers and timetable

1. From 1 January 2016, suppliers placing residential ventilation units on the market shall ensure that:
 - (a) each residential ventilation unit conforming to the energy efficiency classes as set out in Annex II is provided with a printed label complying to the format and containing information as set out in Annex III. The printed label must be provided at least in the packaging of unit;
 - (b) a product fiche, as set out in Annex IV, is made available. The product fiche must be provided at least in the packaging of unit;
 - (c) technical documentation as set out in Annex V is made available electronically on request to the authorities of the Member States and to the Commission;
 - (d) any advertisement for a specific model of a residential ventilation unit shall contain the energy efficiency class, if the advertisement discloses energy-related or price information. Information in the cases where end-users cannot be expected to see the product displayed, except on the Internet, is to be provided as set out in Annex VI;
 - (e) any technical promotional material concerning a specific model of a residential ventilation unit which describes its specific technical parameters shall include the energy efficiency class of that model as set out in Annex II;
 - (f) instructions for use are made available;
 - (g) an electronic label in the format and containing the information set out in Annex III shall be made available to dealers for each model of a residential ventilation unit;
 - (h) an electronic product fiche as set out in Annex IV shall be made available to dealers for each model of a residential ventilation unit.
2. The energy efficiency class shall be determined as set out in Annex II.
3. The format of the label set out in Annex III shall be applied according to the following timetable:
 - (a) for ventilation units placed on the market from 1 January 2016, labels shall be in accordance with label 1 of Annex III;
 - (a) UVUs shall use label 1 a;
 - (b) BVUs shall use label 1 b.
 - (b) for ventilation units placed on the market from 1 January 2018, labels shall be in accordance with label 2 of Annex III.

- (a) UVUs shall use label 2 a;
- (b) BVUs shall use label 2 b.

Chapter 4 **Responsibilities of dealers**

Dealers shall ensure that:

- (a) residential ventilation units, at the point of sale, bear the label provided by suppliers in accordance with Chapter 3(1) on the outside of the front or top of the appliance, in such a way as to be clearly visible;
- (b) residential ventilation units 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 Annexes V and VI, except where the offer is made through the Internet in which case the provisions of Annex VII shall apply;
- (c) any advertisement for a specific model of a residential ventilation unit contains a reference to the energy efficiency class, if the advertisement discloses energy-related or price information;
- (d) any technical promotional material concerning a specific model which describes the technical parameters of a residential ventilation unit includes a reference to the energy efficiency class of the model and the instructions for use provided by the supplier;

Chapter 5 **Measurement methods**

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

Chapter 6 **Verification procedure for market surveillance purposes**

When Member States assess the conformity of the declared energy efficiency class and the specific energy consumption, the thermal efficiency of heat recovery, the reference flow rate, the sound power level (L_{WA}), the annual electricity consumption, and the annual heating energy saving consumption, they shall apply the procedure laid down in Annex IX.

Chapter 7 **Review**

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 provisions**

From 1 January to 1 April 2016 dealers may apply Chapter 4(b) of this Regulation to specific residential ventilation units that fall under that provision.

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*.

It shall apply from 1 January 2016. However, Chapter 4(b) to 4(d) shall apply from 1 April 2016. This delegated Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, [...]

For the Commission
On behalf of the President

[Position]

ANNEX I

Definitions applicable for Annexes II to IX

'*Specific Energy Consumption*' or 'SEC' is a specific coefficient for RVUs to describe the energy consumed for ventilation per m² heated floor area of a dwelling or building, calculated using the appropriate formula in Annex VIII;

'*Sound power level*' or 'L_{WA}' means the casing radiated A-weighted sound power level expressed in decibels (dB) with reference to the sound power of one picowatt (1pW), transmitted by the air, at reference air flow for non-ducted ventilation units, in the room where the UVU or BVU is located.

'*Multi-speed drive*' means a fan motor that can be operated at 3 or more fixed speed steps plus zero ('off');

'*Variable speed drive*' or 'VSD' means an electronic power converter integrated — or functioning as one system — with the motor and the fan, that continuously adapts the electrical power supplied to the electric motor in order to control the mechanical power output of the motor according to the torque-speed characteristic of the load being driven by the motor, excluding variable voltage controllers where only the supply voltage for the motor is varied.

'*Heat Recovery System*' or 'HRS' means the part of a Bidirectional Ventilation Unit equipped with a heat exchanger designed to transfer the heat contained in the (contaminated) exhaust air to the (fresh) supply air;

'*Thermal efficiency of a residential HRS*' or ' η_t ' means the ratio of the supply air temperature gain and the exhaust air temperature loss, both with respect of the outdoor temperature, measured under dry conditions of the HR, and standard air conditions, with balanced mass flow, an indoor-outdoor temperature difference of 13 K and no correction for thermal heat gain from fan motors and no specific restrictions on internal leakage;

'*Internal leakage rate*' means the fraction of extract air in the supply air of ventilation units with HRS as a result of leakage between extract and supply air flows inside the casing when the unit is operated at reference air volume flow, measured at the ducts

'*External leakage rate*' means the fraction of reference air volume flow escaping from the casing of a unit when it is subject to a pressure test.

'*Mixing*' means the immediate recirculation or short-circuiting of airflows between discharge and intake ports at both the indoor and outdoor terminals and is thus not contributing to the effective ventilation of a building space, when operated at reference air volume rate.

'*Mixing rate*' means the fraction of extract air flow, as part of the total reference air volume, that is recirculating between discharge and intake ports at both the indoor and outdoor terminals and is thus not contributing to the effective ventilation of a building space, when operated at reference air volume measured at 1 m distance from indoor supply duct reduced by the internal leakage rate.

'*Effective power input*' in W means the electric power input at reference flow rate and corresponding external total pressure difference and includes the electrical demand for fans, controls (including remote controls) and (if integrated) any heat pump;

'*Specific Power Input*' or 'SPI' in W/(m³/h) means the ratio of the electric power input in W and reference flow rate in m³/h;

'flow rate/pressure diagram' means a set of curves for flow rate (horizontal axis) and pressure difference of an unidirectional RVU or the supply side of a bidirectional RVU, whereby each curve represents one fan speed with at least 8 equidistant test-points and the number of curves is given by the number of discrete fan speed options (1, 2 or 3 speed) or, in case of a variable fan speed drive, includes at least a minimum, maximum and an appropriate intermediate curve close to the reference air volume and pressure difference for SPI testing;

'Maximum flow rate' is the declared maximum air volume flow rate of a ventilation unit that can be achieved with integrated and/or separately co-supplied controls at standard air conditions 20 °C and 101325 Pa, whereby the unit is installed complete (e.g. including clean filters) and according to manufacturer instructions (e.g. with wall-ducts and grills for non-ducted units as appropriate) and for ducted RVUs relates to the air flow at 100 Pa of external static pressure difference and for non-ducted RVU relates to the air flow at the lowest achievable total pressure difference to be chosen from a set of values of 10 (minimum)-20-50-100-150-200-250 Pa, whichever is equal or just below the measured pressure difference value;

'Reference flow rate' in m³/s is the abscissa value to a point on a curve in the flowrate/pressure diagram which is on or closest to a reference point at least at 70% of the maximum flow rate and exactly at 50 Pa for ducted units and at a minimum pressure for non-ducted units. For bidirectional ventilation units the reference air volume flow rate applies to the air supply outlet;

'Control factor' or 'CTRL' means a correction factor relating to the type of control that is part of the ventilation unit following the description in Table 1;

'Control parameter' means a measurable parameter or set of measurable parameters that are assumed to be representative of the ventilation demand, such as the level of relative humidity (RH), carbon-dioxide (CO₂) or other gases, motion or occupancy detection from infrared body heat, motion or occupancy from reflection of ultrasonic waves, electric signals from human operation of electric lights or equipment;

'Manual control' means any control type that does not use demand control;

'Demand control' means a device or set of devices, part of the ventilation unit product package placed on the market, that measures a control parameter and uses the result to automatically regulate the flow rate of the ventilation unit and/or the flow rates of the air terminals that are part of the ventilation unit package placed on the market;

'Clock control' means a clocked (daytime-controlled) human interface to control the fan speed/ flow-rate of the ventilation unit, with at least 7 weekday manual settings of the adjustable flow-rate for at least 2 or more setback periods, i.e. periods where a reduced or no flow rate applies;

'Demand controlled ventilation' or 'DCV' means a ventilation unit that uses demand control;

'Central demand control' means a demand control that allows the regulation of its fan speed(s) and flow rate based on at least one sensor;

'Local demand control' means a demand control of a ducted ventilation unit that allows the regulation of the overall fan speed(s) and the individual regulation of flow rates in at least three different enclosed spaces serviced by the ventilation unit.

'Single variable demand control' means a demand control that is able to continuously detect the rate of deviation of a control parameter from a set value and regulate flow rate proportionally;

'Multi-variable demand control' means a demand control that is able to continuously detect the rate of deviation of at least two different control parameters from set values, and regulate flow rate proportionally;

'Static pressure' or p_{sf} means the total pressure minus the fan dynamic pressure;.

'Total pressure' or p_f means the difference between the stagnation pressure at the fan outlet and the stagnation pressure at the fan inlet.

'Stagnation pressure' means the pressure measured at a point in a flowing gas if it were brought to rest via an isentropic process.

'Dynamic pressure' means the pressure calculated from the mass flow rate, the average gas density at the outlet and the unit outlet area.

'Recuperative heat exchanger' means a heat exchanger intended to transfer thermal energy from one air stream to another without moving parts, such as plate or tubular heat exchangers with parallel flow, cross flow or counter flow or a combination of these as well as plate or tubular heat exchanger with vapour diffusion.

'Regenerative heat exchanger' means a rotary heat exchanger incorporating a rotating wheel for the purpose of transferring thermal energy from one air stream to the other, including material allowing latent heat transfer, a drive mechanism, a casing or frame as well as seals to reduce bypassing and leakage of air from one stream or another, with the characteristic that the regenerative heat exchangers have varying degrees of moisture recovery depending on the material used.

'Airflow sensitivity to pressure variations' of a non-ducted RVU is the ratio of the maximum deviation from the maximum RVU flow rate at +20 Pa and at -20 Pa external total pressure difference.

'Indoor/outdoor air tightness' of a non-ducted RVU is the flow rate in m^3/h between indoor and outdoor when the fan(s) is(are) switched off.

ANNEX II
Energy efficiency classes

SPECIFIC ENERGY CONSUMPTION CLASSES

The specific energy consumption (*SEC*) class of residential ventilation units shall be determined on the basis of measurements and calculations set out in Annex VIII. SEC classes shall be defined as given in Table 1.

Table 1

SEC classes for ventilation units

<i>Mandatory as of 1 January 2016</i>		<i>Mandatory as of 1 January 2018</i>	
<i>SEC Class</i>	<i>SEC in kWh/a.m²</i>	<i>SEC Class</i>	<i>SEC in kWh/a.m²</i>
		A+ (most efficient)	SEC < -44
A (most efficient)	SEC < -40	A	-44 ≤ SEC < -40
B	-40 ≤ SEC < -30	B	-40 ≤ SEC < -30
C	-30 ≤ SEC < -20	C	-30 ≤ SEC < -20
D	-20 ≤ SEC < -10	D	-20 ≤ SEC < -10
E	-10 ≤ SEC < 0	E	-10 ≤ SEC < 0
F	0 ≤ SEC < 10	F	0 ≤ SEC < 10
G (least efficient)	10 ≤ SEC		

ANNEX III
The label

The following information shall be included in the label:

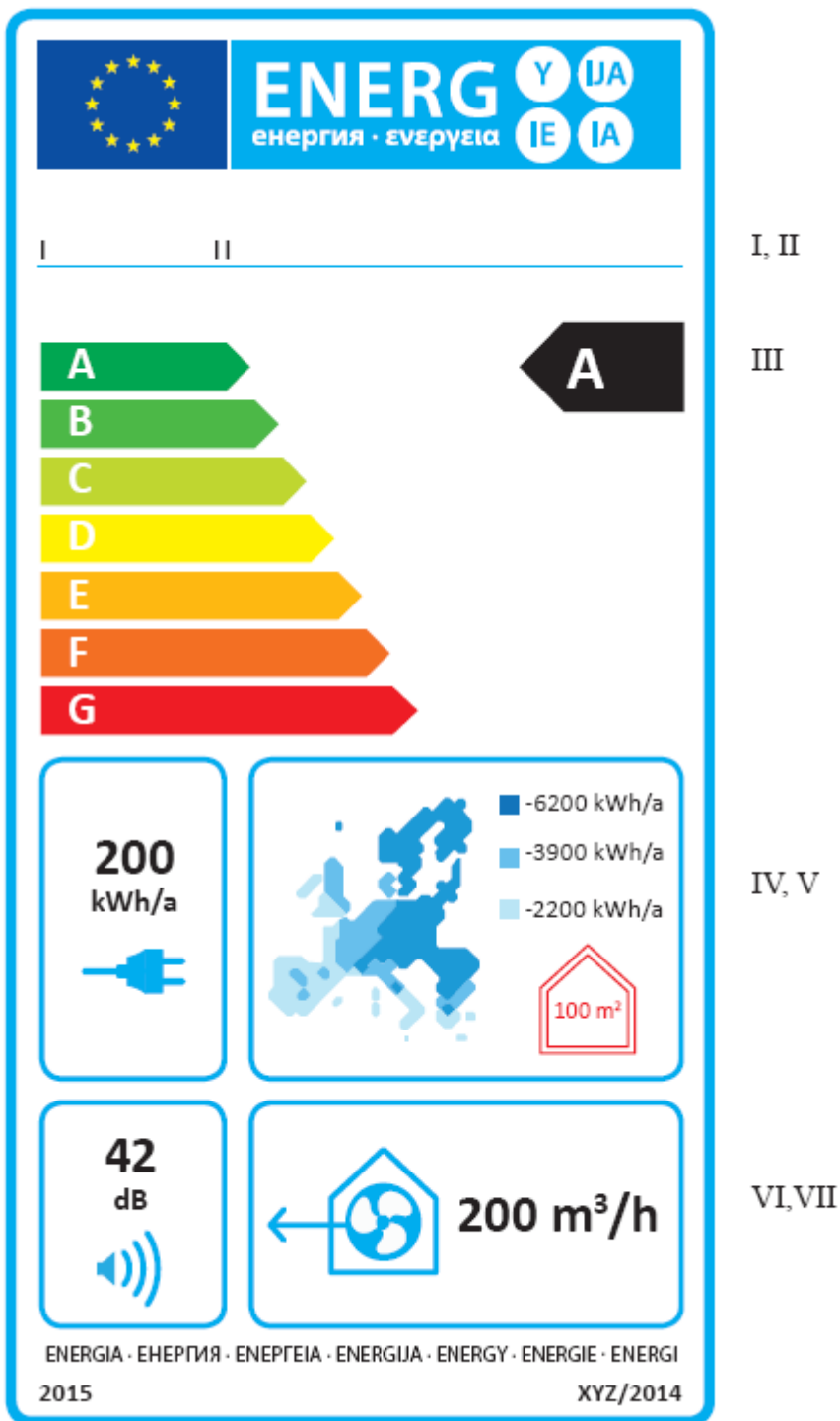
- I supplier's name or trade mark;
- II supplier's model identifier;
- III energy efficiency; the head of the arrow containing the energy efficiency class of the appliance shall be placed at the same height as the head of the arrow of the relevant energy efficiency class. Energy efficiency is indicated for the Average climate.
- IV annual electricity consumption AEC, expressed in kWh/a, rounded to the nearest integer, as defined in Annex VIII;
- V annual heating saved AHS, expressed in kWh/a, rounded to the nearest integer; as defined in Annex VIII, together with an European map with a display of three indicative heating seasons and corresponding colour squares, accompanied by a 'house' symbol with the text '100 m²';
- VI sound power level (L_{WA}), in dB, rounded to the nearest integer;
- VII maximum flow rate in m³/h, rounded to the nearest integer, accompanied by a 'fan in a house' symbol with one arrow representing UVUs (label 1 a or 2 a), and respectively with two arrows in opposite directions representing BVUs (label 1 b or 2 b);

All requested values shall be determined in accordance with Annex VIII.

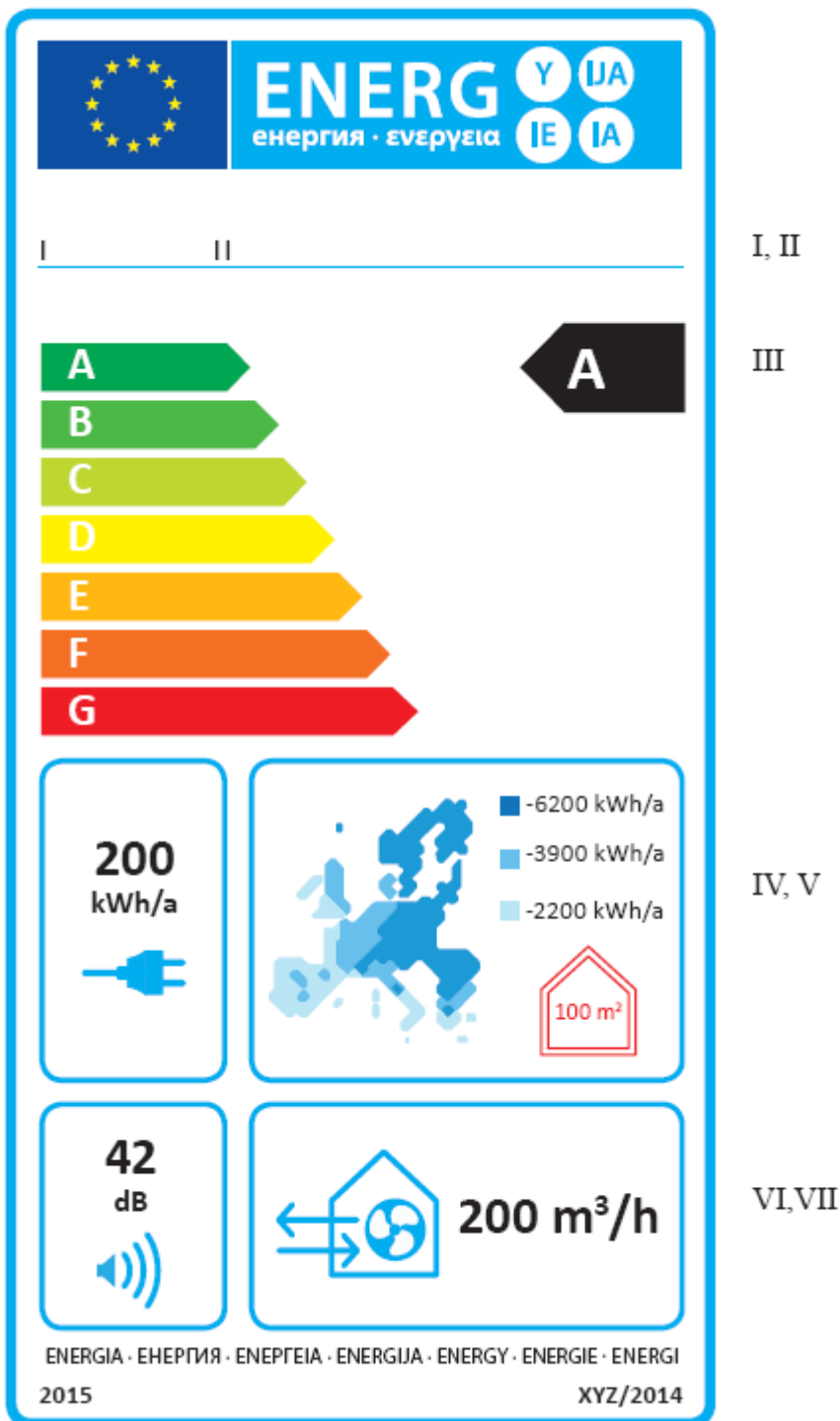
- (a) The design of the label shall be in accordance with the requirements in this Annex. By way of derogation, where a model has been granted an 'EU eco-label' under Regulation (EC) No 66/2010 of the European Parliament and of the Council ⁽⁶⁾, a copy of the EU eco-label may be added.
- (b) The design of the label for residential ventilation units shall be the following:

⁶ OJ L 27, 30.1.2010, p.1

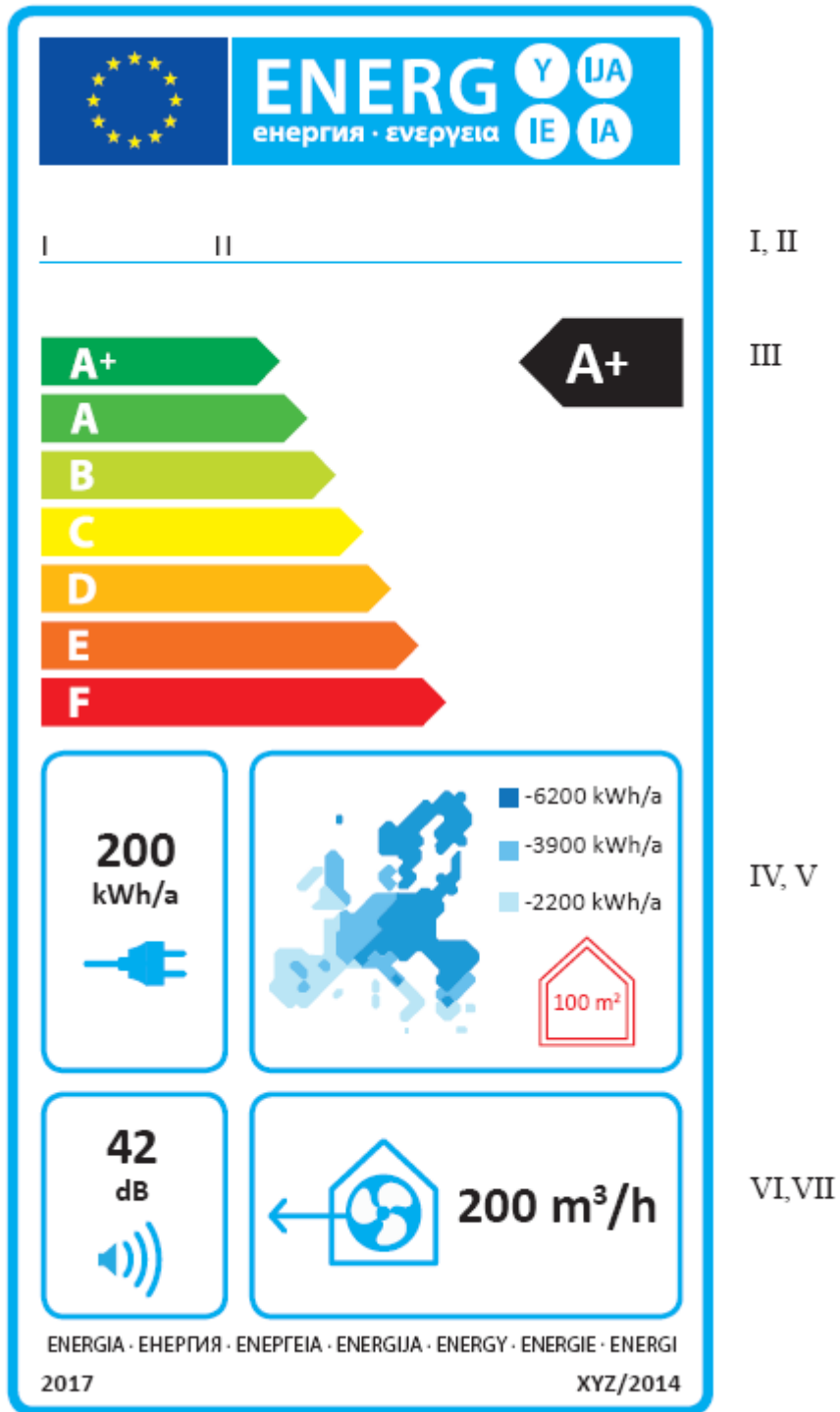
Label 1 a for UVUs:



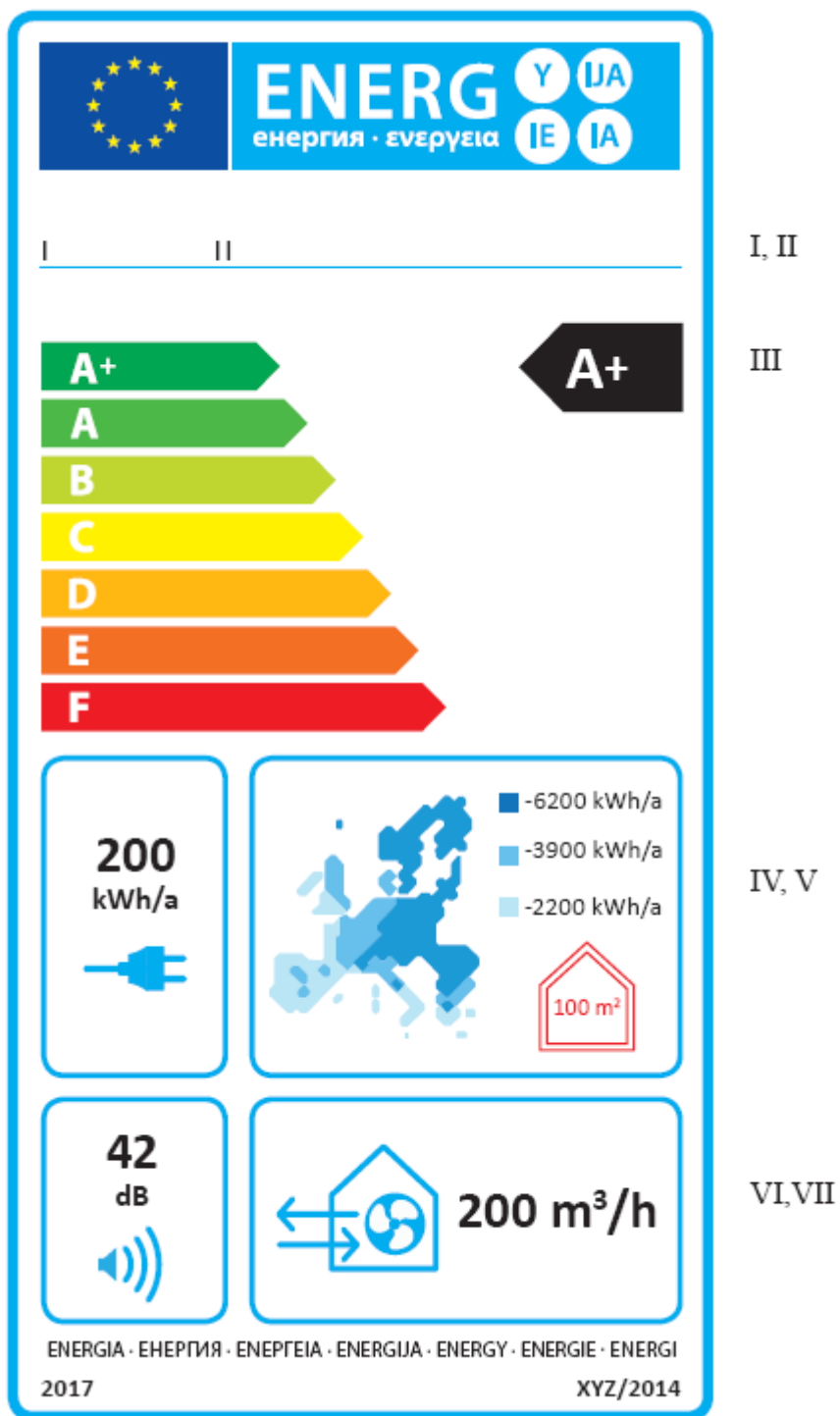
Label 1 b for BVUs:



Label 2 a for UVUs:



Label 2 b for BVUs:



[graphics section to be completed]

ANNEX IV
Product fiche

1. The information on RVUs set out in points 2(a) to (v) shall be visibly displayed on:
 - (a) the technical documentation of RVUs;
 - (b) free access websites of RVU suppliers.
2. The information in the product fiche of the residential ventilation units shall be given in the order specified in points (a) to (y).
 - (a) supplier's name or trade mark.
 - (b) supplier's model identifier which means the code, usually alphanumeric, which distinguishes a specific residential ventilation unit model from other models with the same trade mark or supplier's name.
 - (c) specific energy consumption (SEC) in kWh/a.m²;
 - (d) declared typology in accordance with art. 2 of this Regulation (unidirectional or bidirectional, ducted/central or non-ducted/local/room-based) ;
 - (e) type of drive installed (multi-speed drive or variable speed drive);
 - (f) type of heat recovery system (recuperative, regenerative, none);
 - (g) thermal efficiency of heat recovery (in %), as appropriate (if 'none' then zero);
 - (h) maximum flow rate in m³/s;
 - (i) electric power input of the fan drive, including any motor control equipment, at maximum flow rate (W);
 - (j) sound power level (L_{WA}), rounded to the nearest integer;
 - (k) reference flow rate in m³/s at design external pressure drop in Pa;
 - (l) reference RVU pressure difference in Pa;
 - (m) SPI in W/m³/h;
 - (n) control factor (decimal number) and control typology in accordance with relevant definitions and classification in Annex I;
 - (o) internal and external leakage factors (%) for bidirectional ventilation units and external leakage factor (%) for ducted unidirectional ventilation units;
 - (p) mixing rate of local bidirectional ventilation units with fixed air terminals;
 - (q) position and description of visual filter warning for RVUs intended to be used with filters, including text pointing out the importance of regular filter change for performance and energy efficiency of the unit;
 - (r) for unidirectional ventilation systems: instructions to install regulated supply/exhaust grilles in façade for natural air supply/extraction;
 - (s) electronic internet address to (pre-) disassembly instructions on the free access manufacturer's website as set out in point 5.
 - (t) for non-ducted units only, the airflow sensitivity to pressure variations at +20Pa and -20 Pa;
 - (u) for non-ducted units only, the indoor/outdoor air tightness in m³/h;

- (v) for non-ducted units only, the airborne sound insulation.
- (w) annual electricity consumption, in kWh electric/a, as indicated in Annex VIII;
- (x) annual heating energy saving consumption, in kWh GCV of fossil fuel/a, for average, warmer and colder climate, as indicated in Annex VIII;

Note that (c), (w) and (x) must be specified per climate (average, warmer, colder) in case of a unit with heat recovery function. The SEC class is established for an average climate.

- (1) One fiche may cover a number of models supplied by the same supplier.
- (2) 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.
- (3) Detailed instructions including the required tools for the manual (pre-)disassembly from the ventilation unit of electronics parts (printed wiring boards/printed circuit boards and displays >10 g or > 10 cm²), batteries and larger plastic parts (>100 g) for the purpose of efficient materials recycling shall be available on the free access website of the manufacturer.

ANNEX V
Technical documentation

The technical documentation referred to in Chapter 3 (1)(c) shall include at least the following items:

- (a) the name and address of the supplier;
- (b) a general description of the appliance model, sufficient for it to be unequivocally and easily identified;
- (c) where appropriate, the references for the harmonised standards applied;
- (d) where appropriate, the other calculation methods, measurement standards and specifications used;
- (e) identification and signature of the person empowered to bind the supplier;
- (f) where appropriate the technical parameters for measurements, established in accordance with Annex VIII:
- (g) overall dimensions;
- (h) specification of the type of residential ventilation unit;
- (i) the energy efficiency class of the model as defined in Annex II;
- (j) the specific energy consumption SEC;
- (k) sound power level (L_{WA}) in dB(A), rounded to the nearest integer;
- (l) the results of calculations performed in accordance with Annex VIII.

Suppliers may include additional information at the end of the above list.

ANNEX VI

Information to be provided in the cases where end-users cannot be expected to see the product displayed, except on the Internet



Information to be provided in the cases where end-users cannot be expected to see the product displayed

1. The information referred to in Chapter 4(b) shall be provided in the following order:
 - (a) the energy efficiency class of the model as defined in Annex II;
 - (b) the specific energy consumption SEC;
 - (c) the maximum flow rate (in m³/h);
 - (d) the annual electricity consumption AEC (in kWh electricity/a);
 - (e) the annual heating saved AHS (in kWh primary energy/a) for Average, Warm and Cold climate;
 - (f) sound power levels (L_{WA}) in dB(A), rounded to the nearest integer.
2. Where other information contained in the product information fiche is also provided, it shall be in the form and order specified in Annex IV.
3. The size and font in which all the information referred in this Annex is printed or shown shall be legible.

ANNEX VII

Information to be provided in the case of sale, hire or hire-purchase through the Internet

1. For the purpose of points 2 to 5 of this Annex the following definitions shall apply:
 - a) ‘display mechanism’ means any screen, including tactile screen, or other visual technology used for displaying internet content to users;
 - b) ‘nested display’ means visual interface where an image or data set is accessed by a mouse click, mouse roll-over or tactile screen expansion of another image or data set;
 - c) ‘tactile screen’ means a screen responding to touch, such as that of a tablet computer, slate computer or a smartphone;
 - d) ‘alternative text’ means text provided as an alternative to a graphic allowing information to be presented in non-graphical form where display devices cannot render the graphic or as an aid to accessibility such as input to voice synthesis applications.
2. The appropriate label made available by suppliers in accordance with Chapter 3(1)(g) shall be shown on the display mechanism in proximity to the price of the product in accordance with the timetable set out in Chapter 3(3). The size shall be such that the label is clearly visible and legible and shall be proportionate to the size specified in Annex III. The label may be displayed using a nested display, in which case the image used for accessing the label shall comply with the specifications laid down in point 3 of this Annex. If nested display is applied, the label shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the image.
3. The image used for accessing the label in the case of nested display shall:
 - (a) be an arrow in the colour corresponding to the energy efficiency class of the product on the label;
 - (b) indicate on the arrow the energy efficiency class of the product in white in a font size equivalent to that of the price; and
 - (c) have one of the following two formats:


4. In the case of nested display, the sequence of display of the label shall be as follows:
 - a) the image referred to in point 3 of this Annex shall be presented to the end-user at the first and subsequent instances of showing information on the price of the product;
 - b) the image shall link to the label;
 - c) the label shall be displayed after a mouse click, mouse roll-over or tactile screen expansion on the image;
 - d) the label shall be displayed by pop up, new tab, new page or inset screen display;
 - e) for magnification of the label on tactile screens, the device conventions for tactile magnification shall apply;

- f) the label shall cease to be displayed by means of a close option or other standard closing mechanism;
 - g) the alternative text for the graphic, to be displayed on failure to display the label, shall be the energy efficiency class of the product in a font size equivalent to that of the price.
5. The appropriate product fiche made available by suppliers in accordance with Chapter 3(1)(h) shall be shown on the display mechanism in proximity to the price of the product. The size shall be such that the information is clearly visible and legible. The product fiche may be displayed using a nested display, in which case the link used for accessing the fiche shall clearly and legibly indicate 'Product fiche'. If nested display is used, the product fiche shall appear on the first mouse click, mouse roll-over or tactile screen expansion on the link.

ANNEX VIII
Measurements and calculations

1. For the purposes of compliance and verification of compliance with the requirements of this Regulation, measurements and calculations shall be made using harmonised standards the reference numbers of which have been published in the Official Journal of European Union, or other reliable, accurate and reproducible method, which takes into account the generally recognised state of the art methods, and whose results are deemed to be of low uncertainty.

2. The specific energy consumption SEC is calculated with the following equation:

$$SEC = t_a \cdot p_{ef} \cdot q_{net} \cdot MISC \cdot CTRL^x \cdot SPI - t_h \cdot \Delta T_h \cdot \eta_h^{-1} \cdot c_{air} \cdot (q_{ref} - q_{net} \cdot CTRL \cdot MISC \cdot (1 - \eta_t)) + Q_{defr}$$

where

- *SEC* is Specific Energy Consumption for ventilation per m² heated floor area of a dwelling or building [kWh/m².a];
- *t_a* is annual operating hours [h/a];
- *p_{ef}* is primary energy factor for electric power generation and distribution [-];
- *q_{net}* is net ventilation rate demand per m² heated floor area [m³/h.m²];
- *MISC* is an aggregated general typology factor, incorporating factors for ventilation effectiveness, duct leakage and extra infiltration [-];
- *CTRL* is ventilation control factor [-];
- *x* is an exponent that takes into account non-linearity between thermal energy and electricity saving, depending on motor and drive characteristics [-];
- *SPI* is Specific Power Input [kW/(m³/h)];
- *t_h* is total hours heating season [h];
- *ΔT_h* is the average difference in indoor (19°C) and outdoor temperature over a heating season, minus 3K correction for solar and internal gains [K];
- *η_h* is the average space heating efficiency [-];
- *c_{air}* is the specific heat capacity of air at constant pressure and density [kWh/(m³ K)];
- *q_{ref}* is the reference natural ventilation rate per m² heated floor area [m³/h.m²];
- *η_t* is the thermal efficiency of heat recovery [-];
- *Q_{defr}* is the annual heating energy per m² heated floor area [kWh/m².a] for defrosting, based on a variable electric resistance heating.

$$Q_{defr} = t_{defr} \cdot \Delta t_{defr} \cdot c_{air} \cdot q_{net} \cdot p_{ef},$$

where

- *t_{defr}* is the duration of defrosting period, i.e. when the outdoor temperature is below -4°C [h/a], and
- *Δt_{defr}* is the average difference in K between the outdoor temperature and -4°C during the defrosting period.

Q_{defr} applies only to bidirectional units with recuperative heat exchanger; for unidirectional units or unit with regenerative heat exchanger is $Q_{defr}=0$.

SPI and η_t are values derived from tests and calculation methods.

Other parameters and their defaults are given in Table 1. The SEC for label classification is based on the ‘Average’ climate.

3. The annual electricity consumption per 100 m² floor area AEC (in kWh/m².a electric per year) and the annual space heating saved per 100 m² floor area AHS (in kWh fuel gross calorific value per year) is calculated as follows, using the definitions in point 2, and the default values given in Table 1, for each of the three given climates Average, Warm and Cold:

$$AEC = t_a \cdot p_{ef} \cdot q_{net} \cdot MISC \cdot CTRL^x \cdot SPI + Q_{defr};$$

$$AHS = t_h \cdot \Delta T_h \cdot \eta_h^{-1} \cdot c_{air} \cdot (q_{ref} - q_{min} \cdot CTRL \cdot MISC \cdot (1 - \eta_t)).$$

Table 1.

SEC calculation parameters

<u>general typology</u>						MISC
<u>Bidirectional ventilation units</u>						1,1
<u>Unidirectional ventilation units</u>						1.21
<u>ventilation control</u>						CTRL
Manual control (no DCV)						1
Clock control (no DCV)						0,95
Central DCV single variable (ducted units)						0,85
Central DCV multi-variable (ducted units), Local DCV single variable (non-ducted units)						0,65
Local DCV multi-variable (non-ducted units, ducted units with local flow rate control)						0,5
<u>motor & drive</u>						x-value
on/off & single speed						1
2-speed						1,2
3-speed						1,5
variable speed						2
<u>Climate</u>	t_h in h	ΔT_h in K	t_{defr} in h	ΔT_{defr} in K	Q_{defr} * in	
Cold	6552	14,5	1003	5,2	5,82	
Average	5112	9,5	168	2,4	0,45	
Warm	4392	5	-	-	-	
* Defrosting applies only to bidirectional units with recuperative heat exchanger and is calculated as $Q_{defr} = t_{defr} \cdot \Delta T_{defr} \cdot c_{air} \cdot q_{net} \cdot p_{ef}$. For unidirectional units or unit with regenerative heat exchanger is $Q_{defr}=0$						
<u>Defaults</u>						value
specific heat capacity of air, c_{air} in kWh/m ³						0,000344
net ventilation requirement per m ² heated floor area, q_{net} in m ³ /h.m ²						1,3
reference natural ventilation rate per m ² heated floor area, q_{ref} in m ³ /h.m ²						2,2
annual operating hours, t_a in h						8760
primary energy factor electric power generation & distribution, p_{ef}						2,5

space heating efficiency, η_h

75%

ANNEX IX

Verification procedure for market surveillance purposes

For the purposes of checking conformity with the requirements laid down in Annex II, Member State authorities shall test a single Residential Ventilation Unit. If the measured or calculated values based on measured values do not meet the declared values within the meaning of Chapter 3 of the manufacturer within the ranges set out in Table 1, the measurements shall be carried out on three more Residential 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 Residential Ventilation Unit models shall be considered not to comply with the requirements laid down in Annex II.

Member States authorities shall use the measurement and calculation methods in Annex VIII.

Table 1

<u>Measured parameter</u>	<u>Verification tolerances</u>
SEC	The measured value shall not be greater than 1.07 times the maximum required value
Sound power level	The measured value shall not be greater than the maximum required value plus 2 dB