

EVIA/Eurovent Guidance Document on Ecodesign requirements for ventilation units

Commission Regulation (EU) No 1253/2014 of 7 July 2014 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for ventilation units

Commission Delegated Regulation (EU) No 1254/2014 of 11 July 2014 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of residential ventilation units

Preface:

This EVIA/Eurovent Guidance is intended to contribute to a better understanding of EU Regulations 1253 and 1254/2014 and their more uniform and coherent implementation across different sectors and product groups within the EU Common Market and in countries following EU legislation. It is addressed, for instance, to the industry, European Commission, EU Member States, enforcement bodies and others who need to be informed of the provisions of these Regulations (e.g. trade and consumer associations standardisation bodies, manufacturers, importers, distributors, conformity assessment bodies and trade unions).

Disclaimer: This document is intended solely as a Guidance Document – only the text of the Union harmonisation act itself has legal force. In certain cases, there may be differences between the provisions of a Union harmonisation act and the contents of this Guidance, in particular where slightly divergent provisions in the individual Union harmonisation act cannot be fully described in this Guide. The binding interpretation of EU legislation is the exclusive competence of the Court of Justice of the European Union. The views expressed in this Guidance Document cannot prejudice the position that the European Commission or the EU Member States might take before the Court of Justice. Neither EVIA and Eurovent nor any person acting on behalf of these associations are responsible for the use which might be made of the following information.

This EVIA/Eurovent Guidance was supplemented by many aspects given by the final draft of the European Commission Technical Assistance Study for the Ventilation Units Product Group dated 21 December 2015. Nevertheless, later modifications are possible.

During the second Stakeholder Meeting on 17 December 2015, the European Commission has pointed out that their FAQs avoid to go into any detail. However, the industry demands answers to many different applications of Ventilation Units. Therefore, this EVIA/Eurovent Guidance Document goes into much more detail.

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For better identification and reference each Q&A is numbered and and coloured.

This document contains information and quotation from:

- Original regulation text EU 1253/2014 and 1254/2014 highlighted in green
- EU-commission FAQ draft 21st October highlighted in blue
Numbered in the same system **Q1 to Q33**
- EVIA/Eurovent comments
Numbered starting **E100**

This document is split into three chapters:

1. General Questions and Answers
2. Residential Ventilation
3. Non-Residential Ventilation

General Questions and Answers

PLACING ON THE MARKET – PUTTING INTO SERVICE

Questions:

Q1. What is it exactly meant for placing a product on the market? What is the difference with putting it into service?

Answer:

For the definitions of "placing on the market" and "putting into service", please refer to the Ecodesign Directive 2009/125, in particular Article 2. Further explanations can be found in the "Blue Guide"¹, in particular under sections 2.2. and 2.3, according to which placing a product on the market refers to making it available for the first time on the Union market. The operation is reserved either for a manufacturer or an importer i.e. the manufacturer and the importer are the only economic operators who place products on the market. A product is made available on the market when supplied for distribution, consumption or use on the Union market in the course of a commercial activity, whether in return for payment or free of charge.

Concerning the differences between "placing on the market" and "putting into service", please refer to the Frequently Asked Questions (FAQ) on the Ecodesign Directive and its Implementing Regulations, question 1 pg3.

Question:

E114. What is applicable: placing on the market or putting into service?

Answer:

Placing on the market is relevant.

"Putting into service" is used, as the EU legislation also needs to cover products, which are "physically" never placed on the market, but installed directly at the end-user's place.

Putting into service is relevant, when a unit is completed and/or assembled on site with components relevant for ErP performance and as a result, this unit will be a ventilation unit in the meaning of the regulation. In consequence the assembler is responsible for declaration of performance according ErP.

In the following cases "putting into service is relevant" (not exhaustive list):

- Complete assembled unit on site, which was never placed on the market before.
- BVU without heat recovery completed on site with heat recovery.
- UVU's added with heat recovery (see Question E117)
- Units without fans and completed on site with fans.

PLACING ON THE MARKET – SPECIFIC CASES

Questions:

Q2.1 Would a company be able to manufacture non-compliant products after 01/01/2016, if an order before 31/12/2015 is received?

Q2.2 What happens to non-compliant products which fail after 01/01/2016, but are still in their warranty period?

Q2.3 Does Regulation 1253/2014 apply to ventilation units, to be installed in buildings which are already under construction on the day this Regulation entered into force?

Answer:

As a general rule, it is the moment when a product is placed on the market which determines the applicable legal requirements. Products placed on the market after the date an Ecodesign Regulation is applicable (1253/2014, in our specific case), need to comply with its provisions. Moreover, any private contract needs to respect the applicable legal framework. The placing on the market takes place when the product is supplied for distribution, consumption or use and it is in any event necessary that the product has been manufactured and its conformity has been assessed. A contract which has been signed to manufacture a particular product, where this product still does not exist, cannot be construed as placing on the market. Therefore, the Regulation 1253/2014 cannot be interpreted as excluding from its scope products in the situations hereby described.

"SEPARATE DELIVERY" AND CE-MARKING

Questions:

Q3.1 Who is responsible for the CE marking when the ventilation unit is delivered without control system? The manufacturer of the ventilation unit, or the one who connects the control system?

Q3.2. How to label a RVU sold without control system?

Q3.3 How to deal with partly delivered (separate components) and/or installed units?

Answer:

It is not fully clear by the expression "control system", if the "indoor climate control system" is meant, or the "motor control system". The first one is e.g. related, for RVUs, to the choice of the control factor, (Annex IV-1-n of Regulation 1253/2014), whereas the second one is related to the declared type of drive (Annex IV-1-e (for RVUs) or Annex V-1-d (for NRVUs)). Specific categories of drive are explicitly addressed by the Ecodesign Regulation 1253/2014: as an effect of the provisions laid down in annex II for RVUs and Annex III for NRVUs, ventilation units have to be equipped with a multi-speed drive or variable speed drive. In case it is opted for the variable speed drive (VSD), as from definition 4 of Annex I (of Regulation 1253/2014), the VSD can be a separate delivery. Concerning the "indoor climate control systems", specifically for RVUs, several options are possible (e.g. "manual control", "demand control", etc.).

If a ventilation unit is placed on the market without the "indoor climate control system" or the "motor control system", the manufacturer has to provide the information on which system has to be installed on the ventilation unit, so that it complies with the requirements when putting it into service.

The manufacturer has to CE-mark the product showing he has complied with all his obligations. The installer is responsible for ensuring that the product is put into service in accordance with the information provided by the manufacturer pursuant to Annex IV or V. Suppliers also need to supply an energy label when placing residential ventilation units on the market, even if without indoor climate control system(s), in which case the calculation of the label class needs to take into account the information provided by the manufacturer pursuant to Annex IV-1-n of the ecodesign regulation.

Where other components might be delivered separately, an approach similar to the abovementioned situation can be adopted.

Question:

E100. What is meant by ‘separate delivery’?

Answer:

It means the delivery of the completed VU in different separate orders. This way can be possible a minimum of two separate deliveries: one for the VU, another for the VSD and, possibly or linked together, the sensor device or set of sensor devices that measures the parameters used for the demand controlled ventilation.

Justification:

A single RVU can be adjusted to the customers needs as it can be sold as system packages:

- RVU+ VSD + Humidity sensor ,
- same RVU+VSD+CO₂ sensor
- same RVU+Clock Control, etc.

Furthermore, the sensor control device can be linked together with the VSD in a ‘separate delivery’.

A set of declarations has to be delivered for each valid combinations.

Example:

	Control Option					
	manual		clock		Local demand	
CTRL	1		0,95		0,65	
	SEC	Class	SEC	Class	SEC	Class
Unit xxx	-37	A	-38	A	-43	A+
Unit yyy	-26	B	-28	B	-37	A
Unit zzz	-22	D	-24	C	-34	A

This is also applicable for multi speed drive (Annex I.1 (3)).

CE-MARKING

Question:

Q4. Allegedly, there are some third countries (outside the EU) which require, to products to be sold on their markets, compliance with some EU directives, e.g. the Machinery directive. Some ventilation units can be in scope to the machinery directive, but they are also impacted by a specific ecodesign regulation (Regulation 1253/2014). Therefore, to affix the CE mark the manufacturer shall assess compliance of the product with the requirements of these two directives. With this said, the question is as follows:

When selling the product outside of EU, these manufacturers want to know if they can affix a kind of "partial CE mark", i.e. a CE mark only showing compliance with the Machinery directive (and not with Ecodesign Regulation 1253/2014). Is this possible?

Answer:

The fact that the CE marking is affixed on a product that is placed on the market of a non-EU/EEA market shall not change its meaning, and this is to indicate conformity with all the requirements laid down by the EU harmonisation legislation in question.

Please note that further Q&As on ventilation units are also present in the Frequently Asked Questions (FAQ) on the Ecodesign Directive and its Implementing Regulations, pp75-77.

Question:

E101. How to fix CE-mark if the product fulfils not all relevant EU-Regulation?

Answer:

The Declaration of conformity includes only the fulfilled criteria and EU-Regulation.

CE mark possible based on the fulfilled regulation plus declaration of incorporation if needed based on other regulation (for example Machine Directive)..

ARTICLE 1 SUBJECT MATTER AND SCOPE (Regulation 1253/2014)

Regulation text:

2. This Regulation shall not apply to ventilation units which:

- (a) are unidirectional (exhaust or supply) with an electric power input of less than 30 W, except for information requirements;
- (b) are bidirectional, with a total electric power input for the fans of less than 30 W per air stream, except for information requirements;

Question:

Q5. Under what operating conditions, flow/pressure difference, is the electric power input determined?

Answer:

The electric power input is measured at the declared maximum flowrate and the pressure difference related to the maximum flowrate. For BVUs, the total electric power input is the sum of the electric power input measured per individual fan including controllers but without frost protection. Accordingly, the '30 W per air stream', cf. Article 1 (b), means that the Regulation 1253/2014 shall not apply to BVUs with a total electric power input of less than 60 W except for information requirements. The limit of '30 W per air stream' also applies to alternating BVUs. *For maximum flowrate, see the question: 'What is the flowrate (maximum, reference or nominal) for an alternating BVU?'*

Electric power input is:

- **not** power in the Best Efficiency Point (BEP) according EU 327/2011 (Fan Regulation);
- **not** maximum power written on the name plate of the fan within the unit;
- **not always** the same as the power on the name plate of the entire unit, because this may also include the power of additional components like pre- and after-heater etc.

Please note that the scope of the energy labelling Regulation 1254/2014, is not excluding BVUs with electric power input less than 30 W per air stream, see Frequently Asked Questions (FAQ) on the Ecodesign Directive and its Implementing Regulations, pp75-77.

Question:

Q6. What is meant by 'toxic, highly corrosive or flammable or in environments with abrasive substances', Article 1 (f), (v)?

Answer:

- 'toxic, highly corrosive or flammable' can be considered referring to those environments where the handling of toxic, highly corrosive or flammable gases or vapours takes place as set out in Regulation (EC) No 1272/2008 and its adaptations;

Remark: These gases shall be classified and labelled acc. to 1272/2008

- 'in environments with abrasive substances' can be considered to be in line with the FAQ for Regulation (EU) No 327/2011:

E102. Clarification on toxic, highly corrosive or flammable or in environments with abrasive substances

Abrasion is the process of wearing away a surface by friction. If a particle can cause wear on a surface, depends on the hardness of the particle and of the surface material. Based on this approach, a stream of air contains abrasive particles, if the transported particles are harder than the typical materials the fans are made of.

An abrasive application requires special solutions for fans like special linings for reducing the abrasion of the impeller material. This is generally necessary for more than 100 milligrams of dust with large particles of minimum 5 Mohs hardness per cubic meter of air.

The following are examples of applications where abrasive substances are present:

- Cement industry
- Asphalt industry
- Ceramic industry
- Cereal milling sector (pneumatic transport in mills)
- Glass sector
- Steel sector (air supply for burners and extraction of fumes)
- Brick products sector (air supply for burners' circulation' extraction of fumes)
- Woodworking sector (filtration' dust removal)
- Suction of material by leaf vacuums.

2. (g) - Combination with other heaters

2. This Regulation shall not apply to ventilation units which:

(g) include a heat exchanger and a heat pump for heat recovery or allowing heat transfer or being additional to that of the heat recovery system, except heat transfer for frost protection or defrosting;

Q7. How to deal with units combining multiple functions of which some might be regulated by other Ecodesign Regulations?

For NRVUs a distinction is made between ventilation components and additional non-ventilation components. Additional non-ventilation components can be heating or cooling coils that are not part of the reference configuration and therefore corrected for in the calculation of SFP_{int}. Ventilation components include for a BVU among others a HRS. If this is combined with a heat pump for heat recovery, the BVU does not fall under Regulation 1253/2014. However, if an air-to-water heat pump uses exhaust air from the ventilation unit by using a coil (that can be considered additional non-ventilation component not affecting heat recovery), the ventilation unit falls under the Regulation 1253/2014. The air-to-water heat pump must comply with the relevant Ecodesign Regulation as well. Examples of such products are shown in Figure 1 (see EU FAQ document).

Concerning RVUs, it is considered that BVUs equipped with a heat pump for heat recovery only (same as 'heat transfer being additional to heat recovery') do not fall under Regulation 1253/2014. Figure 2 (see EU FAQ document) show an example of such product.

RVU multifunctional products/systems, such as UVU including exhaust air-to-water heat pumps, do not fall under Regulation 1253/2014 as long as the component(s) that constitutes a ventilation unit is integrated into the rest of the system and is not commercialised/delivered separately. As an example, if the ventilation unit is delivered separately (able to operate) and it is up to the final user to potentially integrate it with the heat pump, this ventilation unit will be compliant with Regulation 1253/2014).

The unit's main function may be heating or cooling (or water heater function). In this case, the product must fulfil other relevant Ecodesign Regulations, if this is the case.

Question:

EVIA and Eurovent see the need for further clarifications. A detailed answer to any combination shall be done on the base of a case by case analysis.

E103. What about if the ventilation unit casing includes more functional components which might be regulated by other ErP regulations?

For example a ventilation unit casing includes a separate heat pump, or gas boiler etc.

Answer:

If the ventilation and heat recovery function has no energy related connection with the additional components (except defrosting) the ventilation part is covered by the regulation.

Examples:

1. Ventilation unit and brine-water heat pump for heating in one casing or casing parts with no heat transfer in the air stream except brine circuit for defrosting. The ventilation part is covered by the regulation
2. Ventilation unit and exhaust air to water heat pump. The ventilation part is covered by the regulation
3. Ventilation unit with heat recovery plus exhaust to supply air heat pump. This unit is excluded because the combined heat recovery of heat exchanger and heat pump is not defined.

Question:

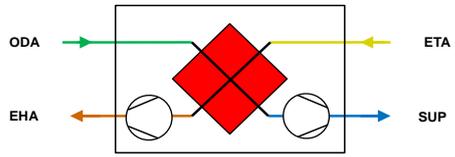
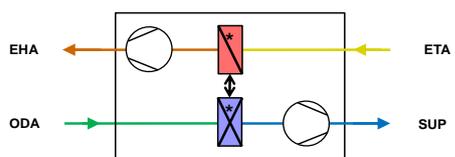
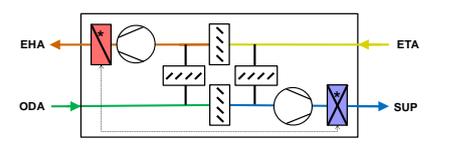
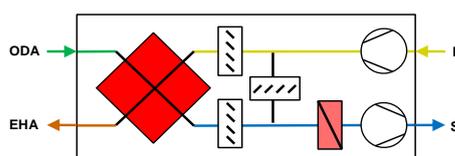
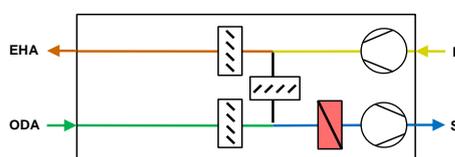
E104. Which ventilation units are not in the scope?

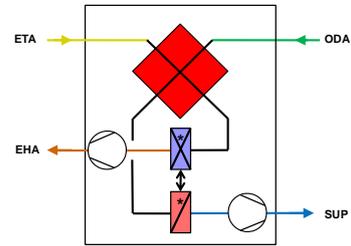
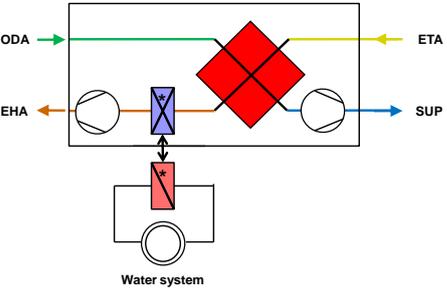
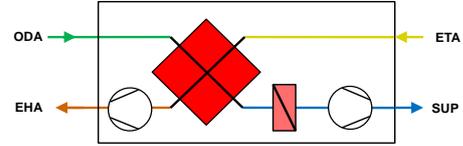
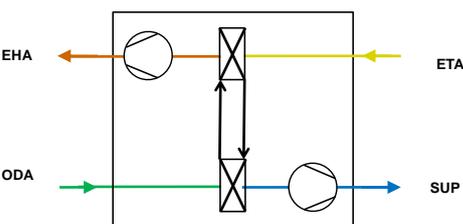
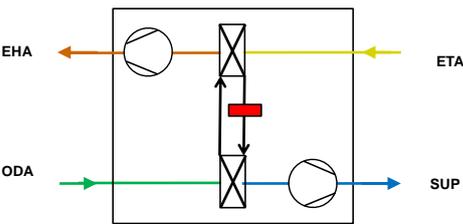
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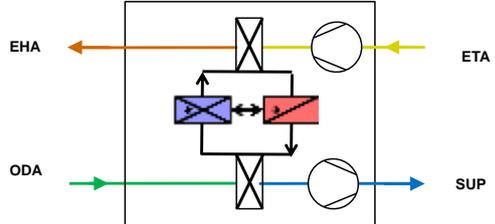
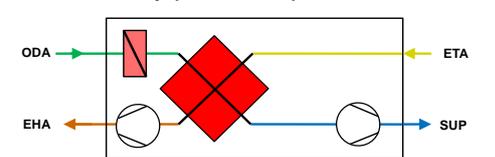
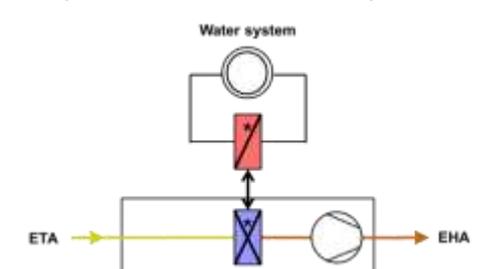
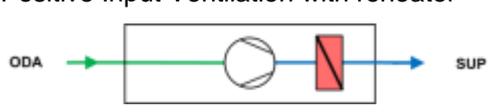
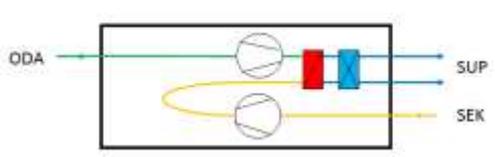
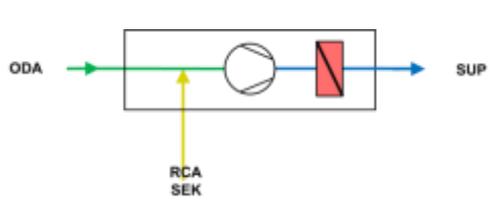
See following table for further explanations.

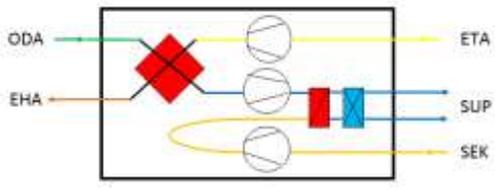
Justification:

The core of the regulation is to specify the ventilation function of a unit. If the unit provides additional functions in combination with heat pumps or by using recirculation or secondary air the main function might not be ventilation.

#	Unit design	Comments	EU 1253 1254/2014
1	Heat recovery only 		Included
2	Air to air Heat pump only 	<p>No performance data available for ventilation units with a heat pump for heat recovery only.</p> <p>This system allows heat transfer being add. to heat recovery</p> <p>This system shall be regulated in LOT 21. No double regulation</p> <p>Predominantly heating or cooling</p>	Excluded
3	Heat pump only 4 damper rooftop 	<p>No performance data available for ventilation units with a heat pump for heat recovery only.</p> <p>This system allows heat transfer being add. to heat recovery</p> <p>This system shall be regulated in LOT 21. No double regulation</p> <p>Predominantly heating or cooling</p>	Excluded -
4	Heat recovery + 3 damper – heating 	<p>The additional heating and mixing does not affect the heat recovery</p> <p>SFP INT shall be calculated with SUP and ETA air volume flow as follows:</p> $SPF_{int} = SPF_{all} \times \left(1 - \frac{\Delta p_{s,ext}}{\Delta p_{s,fan}}\right) \text{ with } SPF_{all} = \frac{q_{v,ETA \text{ or } SUP}}{P_{el,ETA \text{ or } SUP}}$	Included
5	3 damper only 	<p>No longer allowed in NRV, because BVU shall have heat recovery, if the purpose of the unit is predominantly ventilation.</p> <p>Remarks: See question on recirculation air</p>	Included

#	Unit design	Comments	EU 1253 1254/2014
6		Clearly specified as an exclusion in case the heat pump is supporting the heat-recovery function in winter (heating) mode.	Excluded
		In case were the heat pump is only operation in cold production mode (summer only), condenser and evaporator (or linked water coils) are treated as additional components.	Included
7		The Unit can be specified without impact of water heat pump NRVU: The condenser/evaporator is considered as additional component and not included in SFP int. RVU: The condenser/evaporator is not included in SFI.	Included
8		The additional heating does not affect the heat recovery NRVU: The heating coil is add. Component RES. The impact of the re heater on the electrical power input should be corrected	Included
9		Heat recovery only	Included
10		The RAC can be measured without add. heating or cooling inside the water/brine circuit	Included

#	Unit design	Comments	EU 1253 1254/2014
11	Run around Coil + add heat pump in the water/brine circuit 	The RAC can be measured without add. heat pump inside the water/brine circuit.	Included
12	Heat recovery plus frost protection 		Included
12	UVU plus Hot Water Heat Pump 	The evaporator/condenser in the air stream has no impact on ventilation function and shall be considered as an additional component.	Included
13	Positive Input Ventilation with reheater 		Included
14	Secondary air fan-coil with outdoor air and 2 fans. 	Is predominantly a fan coil Using some outdoor air LOT 21	SEK Excluded ODA included
15	Secondary air fan-coil with outdoor air and 1 fan 	Is predominantly a fan coil if outdoor air flow is minor (<10%) Covered in LOT 21 ODA included if air volume flow is significant (>=10%)	SEK and RCA Excluded ODA included if significant (>=10%)

#	Unit design	Comments	EU 1253 1254/2014
16	Ventilation unit with add. secondary air 	See above including cooling	SEK Excluded ODA and EHA included

Question:

Q9. What about VUs for marine/cruise ship applications. Are they within scope?

Answer:

Article 2 (1) says ‘ventilation unit (VU)’ means an electricity driven appliance equipped with at least one impeller, one motor and a casing and intended to replace utilized air by outdoor air in a building or a part of a building;

Article 1 (3) of the Ecodesign Directive 2009/125/EC stipulates that the Directive does not apply to means of transport for persons or goods.

ARTICLE 2 – DEFINITIONS

Regulation text:

(1) - Ventilation Unit

(1) ‘ventilation unit (VU)’ means an electricity driven appliance equipped with at least one impeller, one motor and a casing and **intended to replace utilised air by outdoor air** in a building or a part of a building;

Question:

Q10. What is meant by ‘to replace utilised air by outdoor air’?

Answer:

In a building or part of a building designed for human occupancy, the purpose of the ventilation unit is to replace utilised air by outdoor air. In this respect, the utilised air is the polluted air due to the presence of human beings and their use of the building including emissions from materials, equipment, internal and external heat gains. The Regulation should not apply to a product intended to be used in a building or part of a building not designed for human occupancy or to a product that is not intended, **as its primary function**, to replace utilised air (as specified above), unless the same product is also designed to only replace utilised air (as specified above) and thus, should

comply with all relevant requirements of the ecodesign measure (bearing in mind the exclusions of scope of the Regulation itself).

To determine which units are not ventilation units, please refer to the decision tree within E10. The following application could be outside the scope:

- Data centres, server rooms
- Agricultural applications
- Exhaust from professional kitchen hoods or ceilings
- Machine exhaust
- Recirculation units in clean rooms
- Heat dissipation, e.g. compressor rooms, generator rooms, CHP-rooms, Televisions and other studios with high lighting heat load
- Foundries, forging processes
- Welding processes
- Halls with industrial furnaces
- Paper production

Q11. Are products designed for recirculation considered as ventilation units?

Answer:

If the product is not designed for replacing utilised air with outdoor air, it is not a ventilation unit, unless the same product is also designed to replace only utilised air, and thus it should comply with all relevant requirements of the ecodesign measure. In case the product has a connection to the outdoor with a supply/exhaust air flowrate in regular operation (not in heat up modus etc.) **of minimum 10%** of the total declared supply air flowrate, the unit is considered a ventilation unit and falls under Regulation 1253/2014.

The declaration shall be as following example:

- BVU with fixed or controlled outdoor air volume flow:
The heat recovery shall fulfil the minimum requirement at maximum outdoor air volume flow for outdoor air $\geq 10\%$.
SFP_{int} shall be calculated using the nominal operation point of the fan (see example unit design 4 above).

Question:

Q13. What is a 'housing' in terms of Regulation 327/2011, and what is a 'casing' in terms of Regulation 1253/2014 and Delegated Regulation 1254/2014?

Answer:

'Regulation 1253/2014 shall not apply to ventilation units which are axial or centrifugal fans only equipped with a housing in terms of Regulation (EU) No. 327/2011', Article 1 (c). This implies, that such products are considered 'fans' and shall be treated according to Regulation 327/2011.

A working draft from CEN TC 156 WG 17 'Fans – Procedures and methods to determine the energy efficiency for the electrical input power range of 125 W up to 500 kW – Complementary element' describes the term housing in detail as a casing around the impeller that guides the gas stream towards, through and from the impeller. The housing may include an inlet bell, an inlet guide vane, an outlet guide vane or an outlet diffuser. For examples of boundaries for different fan types (in line with the draft working document), see sketches (a) to (f) in Figure 3. A fan can be with or without housing. Protective guards are not included in the measurements of fans (are removed for testing).

Ventilation units are by definition equipped with a casing, Article 2 (1), which, according to the above, is additional to the housing in terms of Regulation 327/2011. This implies the casing is defined as all parts of the ventilation unit additional to the housing that interfere with the airflow. For a ventilation unit including a fan without housing, there will only be the casing interfering with the airflow. Products that would normally be called 'box-fans' or 'roof-fans' are ventilation units. For examples of ventilation units within the scope of Regulation 1253/2014, see sketches (g) and (h) in Figure 3.

Figure 3 (see EU FAQ document):

Article 2 Definitions (5) UVU

Regulation text:

(5) 'unidirectional ventilation unit' (UVU) means a ventilation unit producing an air flow in one direction only, either from indoors to outdoors (exhaust) or from outdoors to indoors (supply), where the mechanically produced air flow is balanced by natural air supply or exhaust;

Question:

E105. What is the difference between a fan and an UVU?

E106. What is part of an UVU and what is an external component?

Answer:

A fan (rotor and stator) integrated in a casing is considered as an UVU. This casing provides functional parts guiding the air but **does not include additional components in the air stream** (means air passing through): such as

- Dampers, butterfly dampers → external pressure
- Rain guards → external pressure
- Sound attenuators (not parts of casing) → add. component or ext. pressure
- Etc.

UVU's shall be divided in

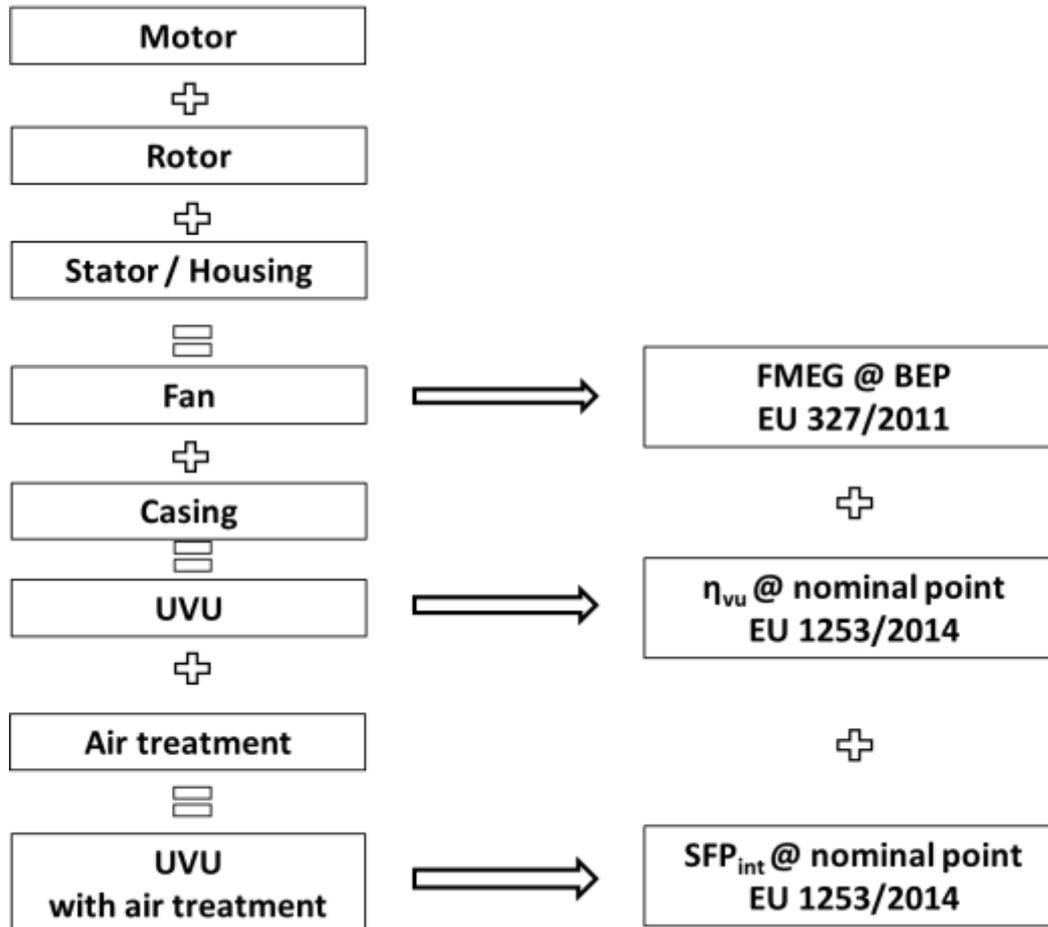
- UVU **with** air treatment → unidirectional air handling units
containing for example in the casing::
 - Filters → reference and add. component
 - Heating cooling coils → add. component
 - Sound attenuator → add. component
 - Humidifiers, dehumidifiers etc. → add. component
 - Condensers/ evaporators of heat pumps → add. component
- UVU **without** air treatment → ventilation fan units

Justification:

EU 327/2011 and the review is defining a fan including motor, rotor and stator (previously called housing).

EU 1253/2014 is defining a ventilation unit, which contains minimum a fan in a casing suitable for ventilation purposes.

The following chart describes the requirements for fans and UVU depending on the additional functional designs.



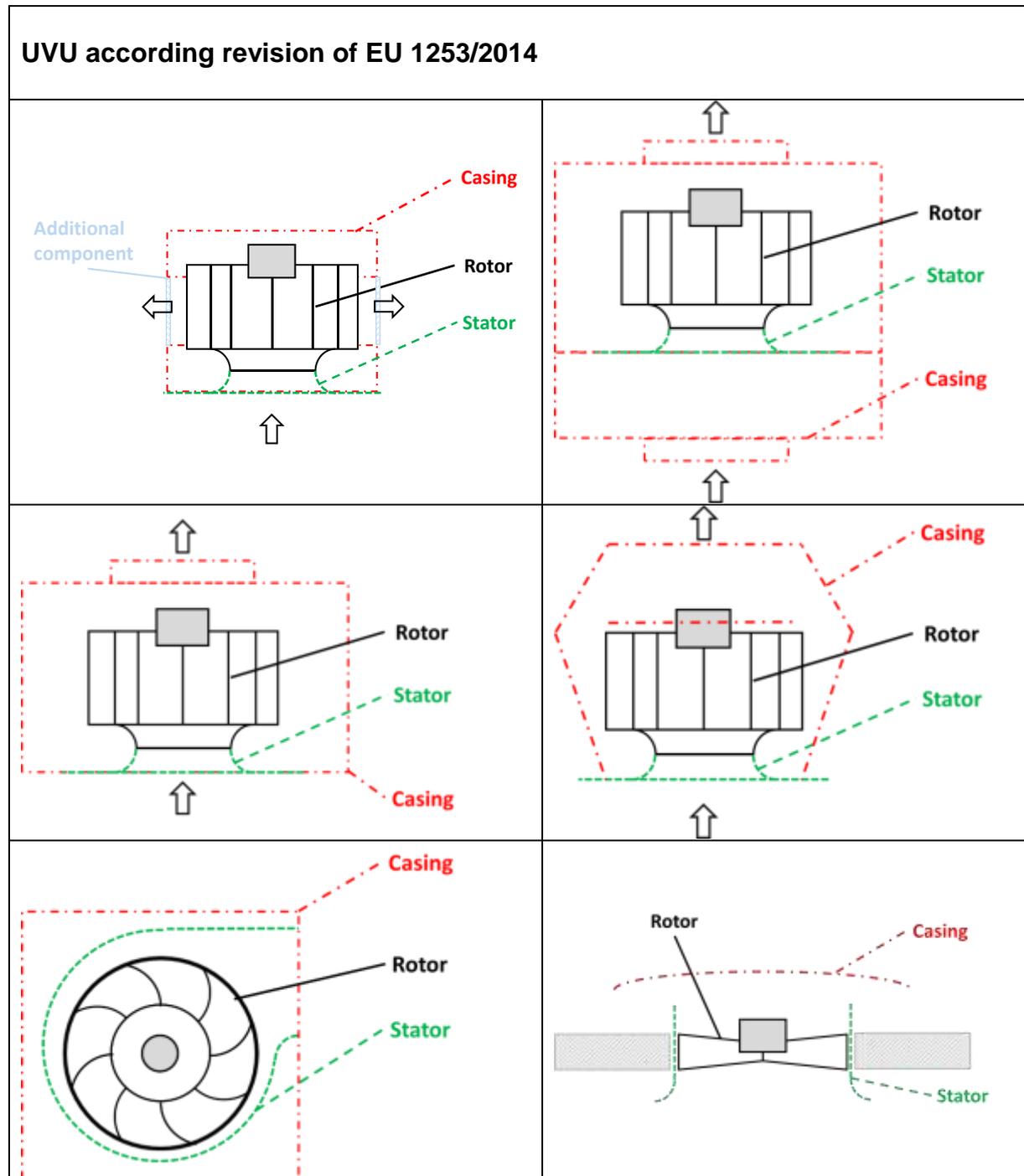
Remark:

EVIA and Eurovent would like to point out, that UVU without air treatment (box, roof-fans, etc.) is not treated in a correct way within the regulation EU 1253/2014. These units are normally considered, tested and placed on the market as fans. This means, that normally they do not have a declared nominal operation point and a correct way would be to declare η_{vu} at Best Efficiency Point (BEP) in analogy with EU 327/2011. Furthermore, the requirement of η_{vu} for UVU with air treatment will lead to a confusing and overregulated triple regulation for this units:

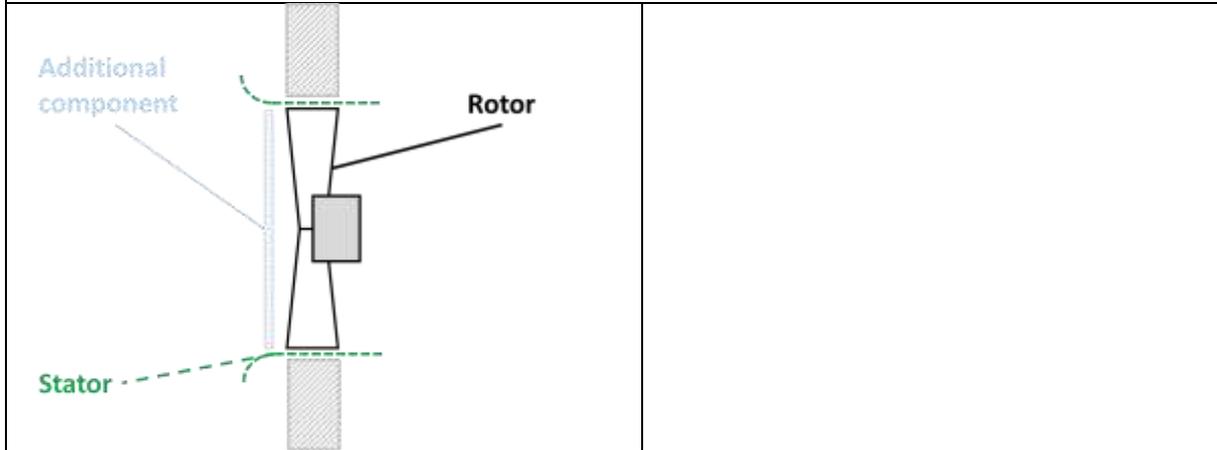
1. FMEG of fan EU 327/2011
2. η_{vu} considering integration aspect of fan EU 1253/2014
3. SFP_{int} EU 1253/2014

UVU with air treatment have the same design principles like BVU, for which η_{vu} is not required.

Examples of Casings and UVU's:



Fan according EU 327/2014



Article 2 Definitions (2), (3) RVU - NRVU 250 to 1000 m³/h

Regulation text:

For the purposes of this Regulation the following definitions shall apply:

(2) 'residential ventilation unit' (RVU) means a ventilation unit where:

- (a) the maximum flow rate does not exceed 250 m³/h;
- (b) the maximum flow rate is between 250 and 1 000 m³/h, and the manufacturer declares its intended use as being exclusively for a residential ventilation application;

(3) 'non-residential ventilation unit' (NRVU) means a ventilation unit where the maximum flow rate of the ventilation unit exceeds 250 m³/h, and, where the maximum flow rate is between 250 and 1 000 m³/h, the manufacturer has not declared its intended use as being exclusively for a residential ventilation application;

Q14. According to which conditions/parameters shall a ventilation unit be declared a 'non-residential ventilation unit' (NRVU) or a 'residential ventilation unit' (RVU)?

Definitions 2 and 3 of Article 2 of Regulation 1253/2014 give the necessary information in reply to this question. The following table summarises the information.

Maximum flowrate ≤250 m ³ /h	250 m ³ /h < maximum flowrate < 1000 m ³ /h	Maximum flowrate ≥1000 m ³ /h
RVU	RVU (if the manufacturer declares the ventilation unit's intended use as being exclusively for a residential ventilation application)	NRVU
	NRVU (if the manufacturer does not declare the ventilation unit's intended use as being exclusively for a residential ventilation application)	

Note: For NRVUs, the maximum flowrate and corresponding external pressure are chosen by the manufacturer (i.e., there are no lower pressure requirements). Thus, the same ventilation unit design can for a maximum flowrate 250 m³/h < maximum flowrate < 1000 m³/h either be declared as a NRVU with a higher air flowrate and lower corresponding pressure (maximum flowrate at a pressure under 100/50 Pa*) or as a RVU (maximum flowrate at 100/50 Pa*)

Questions:

- a) **E107. Who declares 'residential' and 'non-residential' ventilation units in the range between 250 and 1000 m³/h?**
- b) **E108. What does this mean for a unit applicable for both and fulfilling criteria for both?**
- c) **E109. Does every VU installed in a residential application need to have an energy label?**
- d) **E110. Can a RVU be installed in a non- residential building??**
- e) **E111. Can an energy label for NRVU be delivered on request if used in residential application?**
- f) **E112. As the reference flow rate for RVU is specified at 50Pa, is it possible to place a unit in the market, that is not able to reach 50Pa?**

Answers

- a) The manufacturer declares.
- b) As double declaration as RV and NRV is not allowed, units fulfilling both requirements and the performance data shall be declared with different type names and documentation.
- c) No. If the unit is declared only as Non-Residential, no Label is allowed. This means a NRV (typically >1.000 m³/h) installed in a residential building shall not have a label.
In analogy also NRV Units between 250 and 1000 declared as a NRV.
- d) Yes. The manufacturer declares, he cannot check the use of the unit in the real building.
- e) No Label allowed for NRV units.
- f) Yes, there is no legal requirement in the EU 1253/2014 to reach 50 Pa minimum. As a consequence, these units cannot be rated with the methods specified in the regulation. These units shall be declared according Annex IV but not labelled according EU 1254/2014.

ARTICLE 3 ECODESIGN REQUIREMENTS – DATES

Article 3 Ecodesign requirements

1. From 1 January 2016 RVUs shall comply with the specific ecodesign requirements set out in Annex II, point 1.
2. From 1 January 2016 NRVUs shall comply with the specific ecodesign requirements set out in Annex III, point.1.
3. From 1 January 2018 RVUs shall comply with the specific ecodesign requirements set out in Annex II, point 2.
4. From 1 January 2018 NRVUs shall comply with the specific ecodesign requirements set out in Annex III point 2.

Question:

E113. When shall serial and individual produced Ventilation units comply with the requirements?

Answer (view of the European Commission):

The requirements for serial and individual products shall be fulfilled, when the unit is placed on the market.

Question:

Q23. Is an EC-motor for a fan (no sensor or external controller connected, only 0-10 V input option for setting the speed) considered to be a VSD?

Answer:

According to the specific ecodesign requirements of Regulation 1253/2014, Annexes II and III, ventilation units must be equipped with a multi-speed drive or a variable speed-drive (VSD).

EC (electronically commutated) motors are not mentioned specifically as VSDs, but they are drives consisting of a motor and an integrated motor control able to vary the speed over a wide range by means of typically an external control signal (0-10 V). The Regulation 1253/2014 do not specify requirements for external control signals or sensors for VSDs. In this respect, **EC motors** (including integrated motor control) **can be considered VSDs**. Please note, that for RVUs, demand control requires device(s) that measure a control parameter and uses the result to regulate automatically the flow rate(s).

Annex I.1. Definitions (35) - Thermal by-pass facility - Fans OFF

Regulation text:

(35) 'thermal by-pass facility' means any solution that circumvents the heat exchanger or controls automatically or manually its heat recovery performance, without necessarily requiring a physical airflow bypass (for example: summer box, rotor speed control, control of air flow);

Q19. Is 'one fan switched off' a by-pass facility for bi-directional RVUs?

'One fan switched off' during the summer (non-heating) can generally not be considered as a thermal by-pass facility. It is only accepted as a bypass facility if the air volume flow in by-pass mode is supported by supply/exhaust grilles in the facade (openings) in analogy with UVU ventilation systems, and the same information requirements for instructions to installation of these are followed as described in Annex IV (r).

For bi-directional RVUs using 'one fan switched off' as bypass facility, it is deemed necessary:

- the CTRL factor for central demand control (for the calculation of SEC) can only be used if these openings are also regulated by the control system of the units. The main fan(s) performance and opening(s) to be controlled according to the central demand.
- the CTRL factor for local demand control (for the calculation of SEC) can only be used if these openings are also regulated by local demands by the control system of the unit. The main fan(s) performance and openings to be controlled according to local demands

Question:

E115. Is one fan switched off a by-pass facility? Is both fans switched off a by-pass facility?

Answer:

One fan switched off during summer season (non-heating) can generally not be considered as a thermal by-pass facility.

It may only be accepted as a bypass facility if air volume flow is balanced by designed openings in the facade in analogy with UVU ventilation systems (see annex IV (r)).

Note: For central non residential ventilation units not possible

Two fans off is not a thermal by-pass.

A physical bypass of heat recovery shall be able to bypass at least 90% of air volume flow.

Justification:

Annex IV:

(r) for unidirectional ventilation systems, instructions to install regulated supply / exhaust grilles in the façade for natural air supply / extraction;

ANNEX IV and V - INFORMATION REQUIREMENTS

Question:

E116. How to deal with the language and translation of these documents?

Is it mandatory to have the information in the language of the country where the unit is sold, or is one English document enough?

Answer:

The language(s) of the country where the unit is placed on the market.
The abbreviations are allowed in English.

Q28. Is switching off the VU (maintenance switch or equal) enough for 'off' -mode regarding Annex I, 1. Definitions (3) 'multi-speed drive'?

Answer:

The definition is 'multi-speed drive' means a fan motor that can be operated at three or more fixed speeds plus zero ('off');
The maintenance switch 'off' or equal is adequate for the 'off'-mode. A door switch or a circuit breaker is adequate too.

Q29 How can the latent (humidity bound) energy (efficiency) be considered in the regulation?

Answer:

The regulations does not take the latent energy / efficiency into consideration.
According to definition 6 of Annex I, Part 1 and definition 11 of Annex I, Part 2, the thermal efficiency shall always be measured under dry conditions – no condensation in the HRS, in accordance to EN308/ EN13141-7.
If a manufacturer has a product which exploits the latent energy when operating, the manufacturer is free to have technical specifications regarding latent energy in their own information documents.

Article 2 Definition (5) (6):

(5) 'unidirectional ventilation unit' (UVU) means a ventilation unit producing an air flow in one direction only, either from indoors to outdoors (exhaust) or from outdoors to indoors (supply), where the mechanically produced air flow is balanced by natural air supply or exhaust;

(6) 'bidirectional ventilation unit' (BVU) means a ventilation unit which produces an air flow between indoors and outdoors and is equipped with both exhaust and supply fans;

ANNEX IV Information requirements for RVUs as referred to in Article 4(1)

(r) for unidirectional ventilation systems, instructions to install regulated supply/exhaust grilles in the façade for natural air supply/extraction;

Question:

E117. Is it possible to install one UVU for supply and one UVU for exhaust in a building or part of a building?

Answer:

Yes. EU 1253/2014 is a product regulation. The product shall comply when placed on the market the first time. In consequence no product and no manufacturer knows, how the products will be combined in buildings and how they interact, if there is no mechanical design aspect, which has to be considered in the product design.

For RVU the declaration shall provide information about the needed grilles. This is necessary, because the labelling refers to a complete set of solution.

In NRUVU no declaration on this topic is needed. This is necessary, because the air flow balance in these buildings depend very much on their use and operation.

In consequence,

the following combinations of units shall be considered as a BVU:

- Two or more units combined with a RAC heat recovery system
- Two or more units directly (without building sided ductwork) connected with a mixing chamber.

If two or more units in the meaning above are combined on site in the building by a third party (for example installer), a BVU (based on CE-marked UVU's) will be "**putted into service**". This means the third party has to declare the product conformity as a BVU and CE mark.

Residential Ventilation

Question:

Q24. Is a cowl considered a ventilation unit?

Answer:

In 13141-5:2004 a cowl is defined as 'air terminal device with or without moving component, intended to be fitted on top of an exhaust duct, with aim, by creating negative pressure depending on the wind speed, to avoid reverse flow and to increase the extracted flow'. Further, it is defined that an assisted cowl is a 'cowl fitted with an auxiliary device using other energy sources than wind to compensate for lack of suction effect'. The auxiliary equipment can be a fan.

A cowl, assisted or not, fulfilling the above definitions is not considered a ventilation unit under Regulation 1253/2014. However, the auxiliary device may be subject to Ecodesign regulation. Depending on the specific auxiliary device, this can be the case where:

1. the auxiliary device can be considered a ventilation unit itself, under Regulation 1253/2014
2. the auxiliary device falls under the fan regulation 327/2011

E118. How to deal with intermittent ventilation unidirectional Units?

Answer:

There is no special requirement for intermittent units.

Unidirectional units below 30W have no minimum requirements and no Label, but all informational data shall be provided (Annex IV).

This includes SEC for each climate zone, SPI, etc..

Article 2 Definitions (4) - maximum flow rate for RVU

Regulation text:

4) 'maximum flow rate' is the declared maximum air volume flow rate of a ventilation unit that can be achieved with integrated or separately co-supplied controls at standard air conditions (20 °C) and 101 325 Pa, where the unit is installed complete (e.g. including clean filters) and according to the manufacturer's instructions, for ducted RVUs the maximum flow is related to the air flow at 100 Pa of external static pressure difference, and for non-ducted RVUs 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;

Question:

Q15. What is the reference flowrate for a non-ducted RVU?

Answer:

For a non-ducted RVU the reference flow can be understood as 70% of the maximum flow or the next higher volume flow.

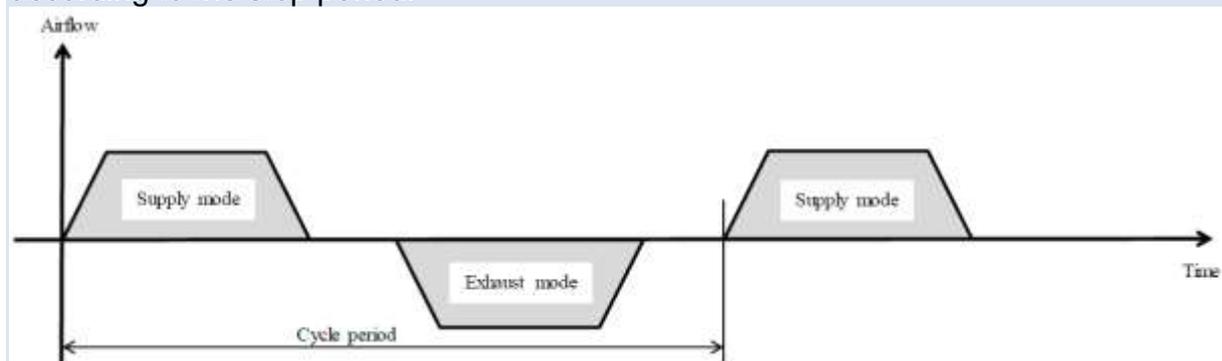
Question:

Q16. What is the flowrate (maximum, reference or nominal) for an alternating BVU?

Answer:

In this type of unit, the exhaust airflow and supply airflow are sequential. Thus, the direction of the flow will change from exhaust to supply with a stop period in between. This must be taken in consideration and measured according to EN 13141.8 as described in draft Commission communication VERSION OF 21/12/2015, Section 4.1, Determination of the reference and maximum flow for ducted RVUs.

The airflow rate is the actual average flow rate over a cycle period as indicated by the grey area in Figure 5 (in EU-FAQ). In short, it is described as the mean value of the average measured airflow (without signs \pm) in first one direction (e.g., supply) and then in the other direction (extract), divided by two, where both airstreams are corrected according to the stop period.



Question:

Q17. What is the maximum flowrate for a non-ducted RVU that is not able to achieve 10 Pa?

Answer:

Article 2, Definitions, (4), states that the maximum flowrate is related to the airflow 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. In case a nonducted RVU cannot deliver 10 Pa, the maximum flowrate is determined at the actual pressure and, according to the Regulation, the minimum pressure is declared '10 Pa' instead of the actual pressure (as in EN 13141-4 Section 3.5)

Question:

E119. How is the maximum flow rate defined if 100 Pa cannot be reached?

Answer:

According EN 13141-7:

To set the declared maximum air volume flow, the declared total pressure shall correspond to 100 Pa, or to a lower total pressure if the intended use declared by the manufacturer is less than 100 Pa.

Non ducted RVU shall be declared at 0 Pa external static pressure.

Article 2 Definitions (5) - (6) - Alternating heat recovery systems

Regulation text:

Article 2 Definitions

For the purposes of this Regulation the following definitions shall apply:

(5) 'bidirectional ventilation unit (BVU)' means a ventilation unit producing an air flow between indoors and outdoors and which is equipped with both exhaust and supply fans;

(6) 'equivalent ventilation unit model' means a ventilation unit with the same technical characteristics according to the applicable product information requirements, but placed on the market as a different ventilation unit model by the same manufacturer, authorized representative or importer.

Question:

E120. Is a Ventilation unit with alternating flow directions a UVU or a BVU?

Answer:

1. Alternating Ventilation Units placed on the market as pairs and tested according EN 13141-8 are bidirectional Ventilation Units BVU. Heat recovery is possible and shall be corrected due to wind impact according Table 10 EN 13141-8 by using η_5 for SEC and AHS calculation.
2. One single airflow unit is a UVU. If placed on the market as a UVU the unit needs instructions for supply/exhaust grilles. Heat recovery can, if partial possible, not be measured according EN 13141-8.

Justification:

ANNEX IV Information requirements for RVUs as referred to in Article 4(1):

(r) for unidirectional ventilation systems, instructions to install regulated supply/exhaust **grilles in the façade for natural air supply/extraction;**

Annex I.1 Definitions (10) (11) – Mixing rate

Regulation text:

(10) 'mixing' means the immediate recirculation or short-circuiting of airflows between discharge and intake ports at both the indoor and outdoor terminals so that they do not contribute to the effective ventilation of a building space, when the unit is operated at reference air volume rate;

(11) 'mixing rate' means the fraction of extract airflow, as part of the total reference air volume, that recirculates between discharge and intake ports at both the indoor and outdoor terminals and thus does not contribute to the effective ventilation of a building space, when the unit is operated at reference air volume (measured at 1 m distance from the indoor supply duct), less the internal leakage rate;

Question:

E121. How to determine the mixing rate for residential ventilation units?

Answer

Outdoor and indoor mixing of air flows shall be declared for non-ducted residential ventilation units (see Annex IV.1.p), where distances of air inlets and outlets are small.

Justification EN 13141-8 and draft prEN 13142:

Due to the small dimensions of a single room unit the distance between the air inlets and outlets can be very small and thus there is a great risk of mixing fresh outdoor air with used indoor air.

Tests are not necessary when the maximum air flow rate is according or below the values mentioned in EN 13141-8 Table 2. Outdoor mixing of ducted units.

Annex 1.1 Definitions (15) – reference flow rate – RVU

Regulation text:

(15) 'reference flow rate' (expressed in m³/s) is the abscissa value to a point on a curve in the flow rate/pressure diagram which is on or closest to a reference point at 70 % at least of the maximum flow rate and 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;

Question:

E122. How to determine reference flow rate for RVU?

Answer:

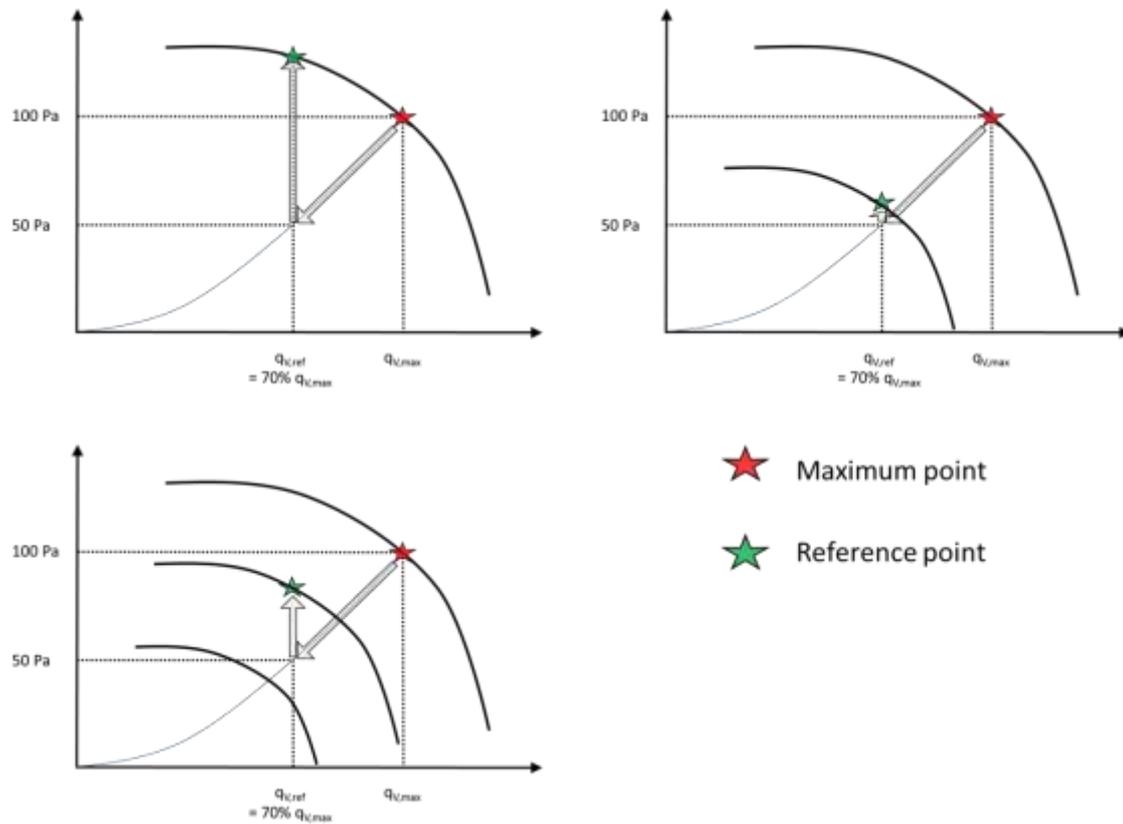
All data shall be specified at reference flow rate and corresponding static pressure (reference point)

For ducted units, the reference flow rate shall be determined as follows (see example down):

1. The fan speed at maximum setpoint of the unit at 100 Pa defines the maximum flow rate (maximum point).
2. Go down on the ideal load curve to 70% of maximum flow rate, which is reference flow rate.
3. Go vertical up to the next available fan curve
4. Intersection specifies reference point.
5. All data shall be based on reference flow (SPI, heat recovery, leakage, acoustic etc.) shall be determined at reference point.

For unducted units reference flow is 70% of maximum flow at 0 Pa external pressure.

Based on RVU the maximum flow rate shall be determined at 100 Pa external at the theoretical load curve. See following graphs.



Annex I.1 Definition (16) – (21) CTRL and control parameter

Regulation text:

(16) 'control factor (CTRL)' means a correction factor for the SEC calculation depending on the type of control that is part of the ventilation unit, according to the description in Annex VIII Table 1;

(17) 'control parameter' means a measurable parameter or set of measurable parameters that are assumed to be representative of the ventilation demand, e.g. the level of relative humidity (RH), carbon dioxide (CO₂), volatile organic compounds (VOC) or other gases, presence, motion or occupancy detection from infrared body heat or from reflection of ultrasonic waves, electrical signals from human operation of lights or equipment;

(18) 'manual control' means any control type that does not use demand control;

(19) 'demand control' means a device or set of devices, integrated or as a separate delivery, that measures a control parameter and uses the result to regulate automatically the flow rate of the unit and/or the flow rates of the ducts;

(20) 'clock control' means a clocked (daytime-controlled) human interface to control the fan speed/flow rate of the ventilation unit, with at least seven weekday manual settings of the adjustable flow rate for at least two setback periods, i.e. periods in which a reduced or no flow rate applies;

(21) 'demand controlled ventilation (DCV)' means a ventilation unit that uses demand control;

Question:

E123. How to specify CTRL factors?

Answer:

The CTRL factors shall be specified by the manufacturer considering the following aspects:

1. **Occupancy or presence sensors,**
or sensors for other parameters that are representative for the ventilation demand (but not IAQ sensor):
A measurable parameter or set of measurable parameters that are assumed to be representative of the ventilation demand and are not an IAQ sensor. For example :
 - a. Detection of presence
 - b. Detection of motion or occupancy from infrared body heat or from reflection of ultrasonic waves
 - c. Electrical signals from human operation of lights or equipment

Other parameters that are representative of the ventilation demand

2. **IAQ sensor** (CO₂, VOC, humidity, etc.) :
 A measurable parameter or set of measurable parameters that are assumed to be representative of the ventilation demand and that can measure the concentration of gas or humidity or other “pollutant” which have an impact on the indoor air quality. For example :
 - a. Detection of the level of relative humidity (RH),
 - b. Detection of the level of carbon dioxide (CO₂),
 - c. Detection of the level of volatile organic compounds (VOC)
 - d. Detection of the level of other gases or other parameters that influence the well human being.

3. **Demand control:**
 A device or set of devices, integrated or as a separate delivery, that measures a control parameter and uses the result to regulate automatically the flow rate of the unit and/or the flow rates of the ducts.

The CTRL factors shall be specified by the manufacturer based on the following aspects:

	Description	CTRL	
		Central units	Single room units
Manual control	any control type that does not use demand control	1	1
Clock control	a clocked (daytime-controlled) human interface to control the fan speed/flow rate of the ventilation unit, with at least seven weekday manual settings of the adjustable flow rate for at least two setback periods, i.e. periods in which a reduced or no flow rate applies	0,95	0,95
Central demand control	a demand control of a ducted ventilation unit that continuously regulates the fan speed(s) and flow rate based on one sensor (type O or I) for the whole ventilated building or part of the building at central level	0,85	-
Local demand control	a demand control for a ventilation unit that continuously regulates the fan speed(s) and flow rates based on more than one sensor (type O or I) for a ducted ventilation unit or one sensor for a non-ducted unit	0,65	0,65

Q30. What is the difference between local and central demand control?

According to the Regulation 1253/2014, the definitions for local and central demand control are as follows (annex I, part 1):

(24) 'central demand control' means a demand control of a ducted ventilation unit that continuously regulates the fan speed(s) and flow rate based on one sensor for the whole ventilated building or part of the building at central level;

(25) 'local demand control' means a demand control for a ventilation unit that continuously regulates the fan speed(s) and flow rates based on more than one sensor for a ducted ventilation unit or one sensor for a non-ducted unit;

By these definitions, the Regulation 1253/2014 states that the difference between local demand and central demand is not only by the number of sensors but also by the difference in the flow rate which is controlled (rate / rates)

Therefore, it is understood that local demand control for ducted BVUs means at least two sensors placed local in zones/rooms or in the airstream to/from the room/zones where the airflow to the individual rooms/zones is regulated according to the local demands measured by the sensors in/to/from the room/zone. The local flow to/from the room/zones is normally regulated by dampers if it is ducted centralised ventilation and if it is local ventilation by the device which is a part of the total unit. The total flow provided by the fans in the unit is operated according to the sum of the individual local demands, usually by pressure sensor(s).

For single local placed non-ducted units Regulation 1253/2014 only requires, for the local demand control, one sensor and the regulation of the entire flow of the unit as it is placed locally in the room/ zone.

EVIA comment:

E124. How is local demand control specified?

The definition in the regulation is very clear on this topic. There is no requirement for dampers in the ventilation system. Any other solution with two sensors, regulation air flows is possible.

Q27. What is meant by ‘continuously regulates the fan speed(s) and flowrates’?

Answer:

The question relates to the definition given in Annex I for ‘Central demand control’ and ‘Local demand control’

The word ‘continuously’ refers to the continuous measurement of the control parameter. The control should regulate continuously and therefore, the motor drive must also be able to continuously adapting the electrical power.

Q32 How to measure the “casing-radiated” noise in a single room ventilation unit not intended to be equipped with duct connections?

Answer:

The emitted casing-radiated noise for ventilation units without duct connections can be measured using the sound intensity method as described in ISO 13347-4. This makes it possible to separate the emission of sound from different (partial) surfaces of the casing. Thus a surface including openings (inlet or outlet) can be subtracted. With high air velocities some caution must be observed like using windscreens and larger measurement distances.

Please note that the total noise from a non-ducted unit should include the noise from the openings to be a usable measure of the sound in the room with the unit installed. If measurements are done only using sound pressure methods, testing ducts with efficient silencers may be a remedy for reducing the duct noise, but at the same time it may influence the pressure loss / air velocity and thus the sound made by the fan etc. This is not a problem when using the sound intensity method. (See also ISO 9614-2)

EVIA and Eurovent Comment:

Casing radiated noise in an unducted single room ventilation unit is the total noise from the unit radiated into the room. Although the wording itself need clarification the EN 13141-8 and EN 13142 clearly mention this value. Furthermore, for most of the unit design, these values cannot be measured separate.

Q33. How to measure the airflow sensitivity to pressure variations for small uni-directional units?

Answer:

For small uni-directional (exhaust or supply) RVUs with an electric power input of less than 30 W (not in scope to Regulation 1253/2014 except for information requirements), in the measurement of the airflow sensitivity to pressure variations at + 20 Pa and – 20 Pa, the pressure variation will influence the airflow rate in a large degree, as the test pressure often exceeds the units maximum provided pressure.

Therefore, on this specific

Non-Residential Ventilation

Question:

Q8. Are professional range hoods in scope to Regulation 1253/2014?

Answer:

It is intended that professional range hoods are not within the scope of Regulation 1253/2014.

Question:

Q12. What about ventilation equipment for ‘cleanrooms’? Cleanrooms can be found in hospitals, research centers, pharmaceutical and certain other manufacturing plants. The ventilation units used for clean rooms treat large volumes of air, with limited replacement of the treated air by new air. One objective is to ensure overpressure in the cleanrooms so that the level of pollutants (dust, microbes...) is kept at minimal or controlled. Are they within scope?

Answer:

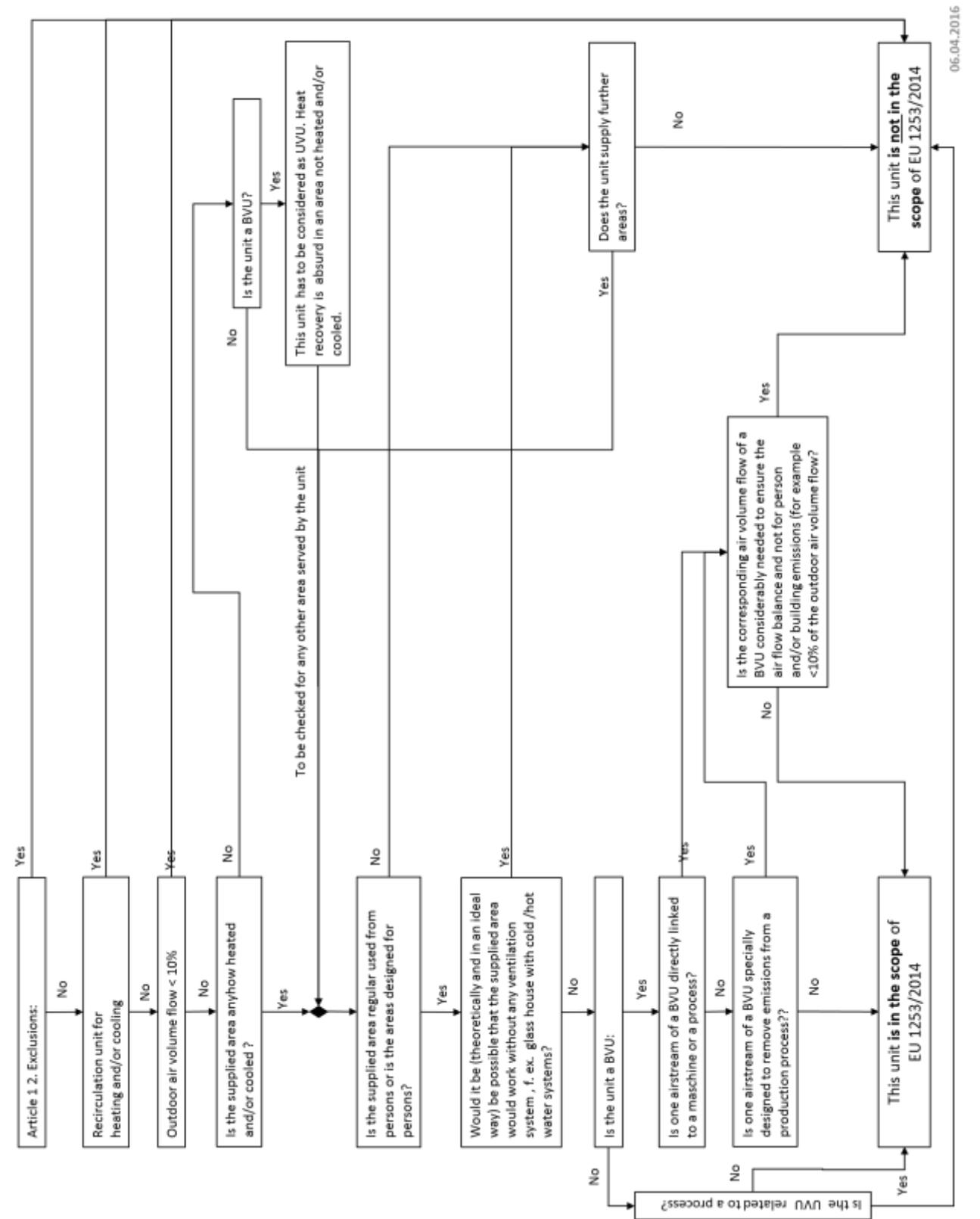
As long as:

1. These products can be defined as ventilation units, in line with definition 1 of article 2 of the Regulation 1253, i.e. "an electricity driven appliance intended to replace air by outdoor air in a building")
2. These products are not between the scope exclusions

they fall in scope to Regulation 1253/2014 and, if RVUs, to Regulation 1254/2014. Please also bear in mind the clarifications given in the FAQs "What is meant by 'to replace utilised air by outdoor air'?" and "Are products designed for recirculation considered ventilation units?"

Remark: For a detailed answer to this question, please refer to Q10 and Q11

E125. The definition “to replace utilised air by outdoor air” leads to a case by case analysis, which unit in which application is covered by the regulation. The following decision tree give guidance on a possible way to decide.



ANNEX I – DEFINITIONS (Regulation 1253/2014)

Question:

The Regulation describes a number of issues regarding fan efficiency for non-residential ventilation units (NRVUs).

Q18. How is the fan efficiency of a NRVU defined and for what operational point must it fulfil the ecodesign requirements?

Answer:

For the calculation of internal specific fan power, SFP_{int} :

- if internal pressure measurements can be performed, the internal fan efficiency is to be used as defined and described in draft Commission communication VERSION OF 21/12/2015 Section 5.2.
- alternatively, where internal pressure measurements cannot be performed, the external fan efficiency is to be used for SFP_{int} determination for NRVU as defined and described under Section 5.2 in draft Commission communication VERSION OF 21/12/2015

In case of UVUs, the Regulation distinguishes between UVUs in general and UVUs intended to be used with a filter. UVUs intended to be used with a filter must fulfil requirements concerning maximum internal specific fan power SFP_{int_limit} .

All UVUs (both intended and not intended to be used with a filter) must fulfil the minimum fan efficiency of ventilation units, η_{vu} . The fan efficiency of UVU is determined as described in draft Commission communication VERSION OF 21/12/2015 at the declared (nominal) flow and pressure of the reference configuration. This implies that pressure losses due to the casing is taken into account. Please note, that the operational point is not by definition the best efficiency point of the fan but the nominal conditions of the ventilation unit as stated in Annex 1, 2 (2).

Annex I.1 Definitions (4) –variable speed drive and separate delivery:

Regulation text:

(4) 'variable speed drive (VSD)' means an electronic controller, integrated or functioning as one system or as a separate delivery with the motor and the fan, which continuously adapts the electrical power supplied to the motor in order to control the flow rate;

Question:

E126. Is an EC (Electronically Commuted) fan considered as including a VSD?

Answer:

Yes, a fan equipped with EC motor is considered as equipped with VSD and thus fulfils the VSD requirement.

Question:

E127. How to handle effective power, SFP and η_{v_u} of BVU and UVU (e.g. roof fans) if the controller for Multi Speed drive is not part of delivery?

Answer:

The values of SFP_{int} and η_{v_u} shall be corrected in analogy with the Factor C_c EU 327/2011.

Justification:

Fan regulation EU 327/2011 is defining:

(12) 'Part load compensation' C_c is a correction factor with one of the following values:

$C_c=1$ for a motor without a variable speed drive;

$C_c=1,04$ for a motor with a variable speed drive and $P_e \geq 5$ kW;

$C_c = - 0,03 \ln(P_e) + 1,088$ for a motor with a variable speed drive and $P_e < 5$ kW;

(8) 'Fan efficiency' (η_f) is the ratio of the fan gas power output P_u and the electric power input P_e , both expressed in W and determined at bep, multiplied with correction factor part load compensation C_c , following the expression:

$$\eta_f = C_c \cdot P_u / P_e$$

Correction adapted to Ventilation Units:

Default correction if no specified variable speed drive is considered in the performance data P_{el} and SFP_{int} :

- $C_{drive} = \frac{1}{C_c} = 1$: fan and motor and variable speed drive
 $C_{drive} = \frac{1}{C_c} = \frac{1}{1,04} = 0,96$: fan and motor without variable speed drive and $P_{el} \geq 5kW$
 $C_{drive} = \frac{1}{C_c}$: $C_c = - 0,03 \ln(P_e) + 1,088$ for $P_e < 5 kW$

$$P_{el} = \frac{P_m}{C_{drive}} = P_m \cdot C_c$$

- P_m : Electrical power of fan and motor without drive
 P_{el} : Electrical power of fan and motor and drive

$$SFP_{int} = SFP_{int,no\ drive} \cdot C_c$$

The documentation shall include:

- Advice to install a specified drive and
- a description of additional items (multi speed drive or variable speed drive) used when determining the fan energy efficiency and SFP_{int} that are not supplied with the fan or

The ventilation unit shall have CE-mark according EU 1253/2014

Remark:

Variable voltage controllers where only the supply voltage for the motor is varied shall not be corrected (in analogy with EU 327/2011).

Annex 1.1 Definitions (7) internal leakage:Regulation text:

(7) 'internal leakage rate' means the fraction of extract air present in the supply air of ventilation units with HRS as a result of leakage between extract and supply airflows inside the casing when the unit is operated at reference air volume flow, measured at the ducts; the test shall be performed for NRVUs at 250 Pa;

Question:**How to determine the internal leakage rate?**Answer:

The 'internal leakage rate' corresponds to the 'Internal exhaust air leakage' as defined in EN 308 and to EATR (see prEN 16798-3), see definition below (see also Eurovent Comments 27th April 2015).

Internal leakage test, if not an EATR test, shall be performed with a pressure difference of 250 Pa between supply and extract air side on the building side, the higher pressure on supply air side; $\Delta p_{22-11}=250$ Pa. All NRVU connections shall be closed during the leakage test. The supply air side is pressurised to 250 Pa with an external fan. The extract air side is connected to a flow measurement device and then to a suction fan. The pressure in the extract air is adjusted to be 0 Pa in order to avoid extract air side external leakage. The measured air flow will be the internal leakage.

Run-around HRS are connected through a heat transfer system and are not allowed to have any internal leakage, if there is a common wall between the supply and extract air side, then the leakage shall be tested with a differential pressure of 250 Pa in accordance with EN 308 and the leakage have to be negligible (less than 0.1 %). Recuperators can be tested with 250 Pa pressure difference in accordance with EN 308 or with an EATR test. EATR shall be tested for regenerators. EATR is defined as:

Extract Air Transfer Ratio (EATR) [%]: percentage of the extract air transferred to the supply air. With $q_{m,22,net}$ the portion of the supply air mass flow that originated as outdoor air (net supply air mass flow), EATR is defined as:

$$EATR = \frac{q_{m,22} - q_{m,22,net}}{q_{m,22}} = 1 - \frac{q_{m,22,net}}{q_{m,22}}$$

EATR is measured by gas concentrations of inert gas and represents the extract air leakage to the supply airflow, which is in general described as internal extract air leakage.

Annex 1.1 Definitions (8) carry over:

Regulation text:

(8) carry over' means the percentage of the exhaust air which is returned to the supply air for a regenerative heat exchanger according to the reference flow;

Question:

E129. How to determine carry over?

Answer

The carry over flow will be zero if the purging sector works in an ideal manner. Carry over will be present if insufficient or lack of purging sector. More information can be found in Eurovent 6/8, page 53. There is always a carryover from outdoor air to exhaust air.

Annex 1.1 Definitions (9) external leakage

Regulation text:

(9) 'external leakage rate 'means the leakage fraction of the reference air volume flow to or from the inside of the casing of a unit to or from the surrounding air when it is subjected to a pressure test; the test shall be performed at 400 Pa for NRVUs, for both under and over pressure;

Question:

E130. How to determine external leakage?

For the external leakage rate, the class according EN 1886 could always be used. If the leakage rate has to be declared as a fraction of the nominal air flow the following methodology can be used:

- compute the external surface of the unit
- calculate the maximum leakage of the unit at 400 Pa for the claimed leakage class
- take the ratio of maximum external leakage and nominal air flow of the unit
- specify "external leakage rate lower than" this calculated ratio
-

Justification: It is impossible to specify exactly the external leakage rate of a real unit. Any exact value would not make sense. A maximum value however is realistic and predictable!

Answer:

The external leakage class shall be declared according to EN 1886 for non residential ventilation units.

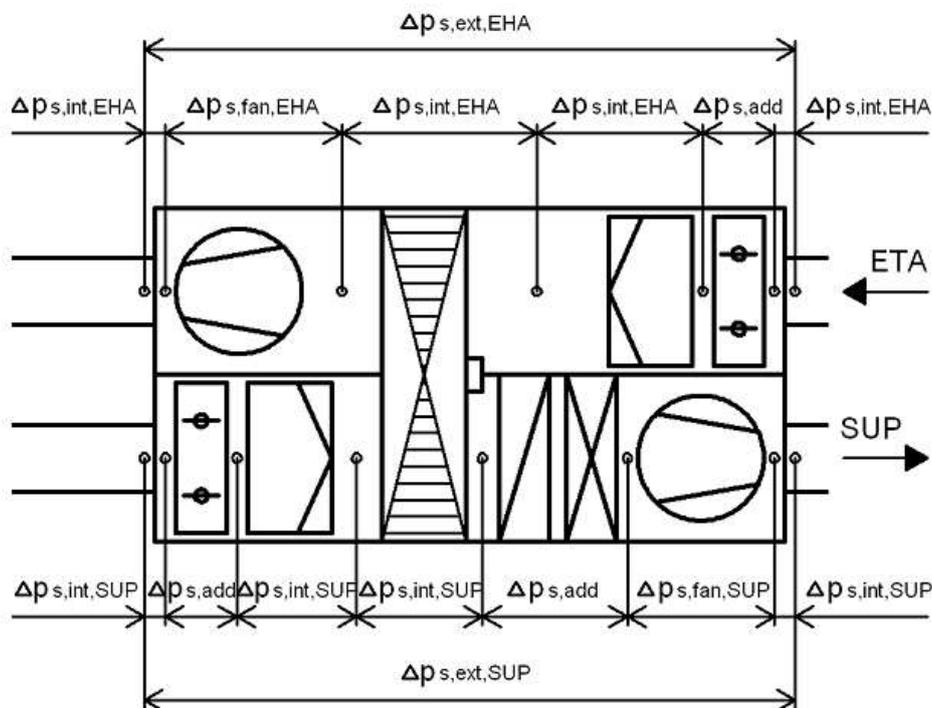
Annex I.2 Definitions for NRVU (12) - internal specific fan power

Regulation text:

(12) 'internal specific fan power of ventilation components (SFP_{int})' (expressed in $W/(m^3/s)$) is the ratio between the internal pressure drop of ventilation components and the fan efficiency, determined for the reference configuration;

Question:

E131. How to determine SFP_{int} ?



The **specific fan power, SFP_{int}** is the electric power supplied to a fan and related to the internal pressure of all ventilation components (Filters, heat recovery and related casing including flow entrance and exit) divided by the air flow expressed in m^3/s under design load conditions.

The **specific fan power, SFP_{add}** is the electric power supplied to a fan and related to the internal pressure of all internal additional ventilation components (coolers, heaters, humidifier, etc.) divided by the air flow expressed in m^3/s under design load conditions. The **specific fan power, SFP_{ext}** is the electric power supplied to a fan and related to the external pressure divided by the air flow expressed in m^3/s under design load conditions.

$$P_{SFP, SUP} = P_{SFP, SUP, int} + P_{SFP, SUP, add} + P_{SFP, SUP, ext}$$

$$P_{SFP, EXT} = P_{SFP, EXT, int} + P_{SFP, EXT, add} + P_{SFP, EXT, ext}$$

$$P_{SFP,all} = \frac{\Delta p_{int,stat}}{\eta_{stat}} + \frac{\Delta p_{add,stat}}{\eta_{stat}} + \frac{\Delta p_{ext,stat}}{\eta_{stat}}$$

The requirement of the regulation is the sum of both air streams:

Question:

How to calculate SFP_{int} and eta t with unbalanced units?

Answer:

Limits:

The limits Annex III SFP_{int,limit} shall be calculated with the average flow SUP and EXT

$$q_{V,nom} = \frac{q_{V,SUP} + q_{V,EXT}}{2}$$

η_t at supply air volume flow

Real Unit:

SFP real shall be calculated with the real values for supply air and extract air and added, using the principles above:

$$P_{SFP,int} = P_{SFP, SUP, int} + P_{SFP, EXT, ,int}$$

η_t at supply air volume flow.

ANNEX V - INFORMATION REQUIREMENTS FOR NRVUs

Question:

Q20. How to declare a NRVU where the working point is not known at the time of placing the product on the market, e.g., in the case of mass-produced NRVUs?

Answer:

Mass-produced NRVUs are normally designed for a wide range of working points and are mostly produced in large quantities. Their capacity is generally given in ranges and they can optionally be used in different buildings and/or applications. Below a suggestion of **an optional method on how to declare** such products.

Alternatively, the manufacturer can choose a specific working point and assess compliance with Regulation 1253/2014 with the standard approach

Declaration of a mass-produced NRVU (optional)

If the working point is not specified by the customer, which can be the case for a mass-produced NVRU, the manufacturer can declare an area (graph) of nominal airflows with associated 'nominal external pressure ($\Delta p_{s,ext}$)', see Figure 6 of EU FAQ.

Question:

E132. Shall Non residential BVU be declared at one point or as a valid area?

Answer:

The manufacturers are under a legal obligation to ensure that any ventilation unit (i.e., deriving from any possible product combination) within the scope of the Ecodesign Regulation, shall meet the requirements within that regulation.

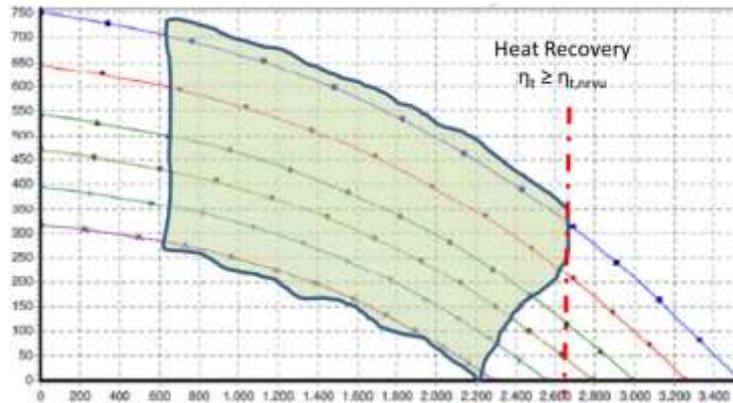
NVRU consists of two main groups, i.e. tailor-made NVRUs and mass-produced standardised compact NVRUs. They deviate in the matter of working point. A tailor-made NVRU is designed for specific working points but a compact NVRU is typically used for a wide range of working points.

If the working point is not specified by the customer, which can be the case for a mass-produced compact NVRU, one can declare a field (graph) of nominal airflows with associated 'nominal external pressure ($\Delta p_{s,ext}$)', SFP_{int} and $\eta_{t,nrvu}$ (thermal efficiency).

The customer could then be allowed to use the NRVU if the design working point is within the declared field.

The area of the **allowed** working points can be specified as follows :

1. Calculate SFP_{int} for each combination of pressure and air volume flow. The allowed area is $SFP_{int} \leq SFP_{limit}$
The limitation on the right side is either:
 - a. The SFP_{limit} and/or
 - b. The limit of heat recovery efficiency or
 - c. Both



= SFP_{int} requirements fulfilled = allowed operation area

ANNEX V

Information requirements for NRVUs as referred to in Article 4(2)

Regulation text:

(o) declared maximum external leakage rate (%) of the casing of ventilation units; and declared maximum internal leakage rate (%) of bidirectional ventilation units or carry over (for regenerative heat exchangers only); both measured or calculated according to the pressurisation test method or tracer gas test method at declared system pressure;

Question:

E133. Is external leakage relevant for UVU?

Answer:

External leakage rate is relevant for both side ducted UVU (measurement Cat D EU 327/2011).

ANNEX IX – MEASUREMENTS AND CALCULATIONS

Regulation text:

Annex 1.2 Definitions. NRVU (3) - Reference Configuration

(3) 'reference configuration of a BVU' means a product configured with a casing, at least two fans with variable speed or multi-speed drives, a HRS, a clean fine filter on the inlet-side and a clean medium filter on the exhaust-side;

Question:

**E134. What is included in the reference configuration?
What is not included?**

Answer:

Reference configuration of a BVU includes the following components:

- two fans
- heat recovery
- casing including flow entrance and exit
- clean filters M5 extract and F7 supply air

Reference configuration does not include any other components in the unit like:

- Sound attenuator
- second and additional filter stages
- cooling or heating coils
- humidifiers and dehumidifiers
- heat exchangers from heat pumps or condensing units
- Etc.

The design of the fan (efficiency) includes the pressure of all additional components and external pressure of the ductwork. See SFP_{int}

Question:

Q21. How can manufacturers handle filters, if they are different to the reference condition? Like a F9 filter instead of a F7 Filter?

Answer:

NRVUs must be tested and calculated in accordance with Annex IX of Regulation 1253/2014. In case of BVUs, filter correction factors are given, where either the filter on the inlet-side or the one on the exhaust side (or both) are missing.

In case of UVUs intended to be used with a filter, such correction factors are not given, therefore the compliance with the SFP_{int} requirement shall only be assessed in the reference configuration.

In principle, the tests could be performed with a filter different from the ones foreseen in the reference configurations (see in particular definitions 3 and 4 in Annex I, Part 2), **e.g. using a F9 filter instead of a F7 filter. In this case, an appropriate (calculation) method must be used to infer (and declare) the performance with the filter foreseen in the reference configurations.**

Q22. What is the reference configuration of an exhaust UVU?

Answer:

Definition 4 of Annex I, part 2 of Regulation 1253/2014 does not explicitly provide specific indications on the reference configuration for an exhaust UVU. Therefore, the reference configuration of such products shall be in line with the general case ("reference configuration of an UVU' means a product configured with a casing and at least one fan with variable speed or multi-speed drive"); concerning the presence (or the lack of) and the typology of the filter, **it is left to the manufacturer to decide** (and consequently declare) it.

Question:

Q25. What is it meant for 'nominal flow rate' for NRUVs under Regulation 1253/2014? At which conditions shall a manufacturer refer to?

Answer:

The 'nominal flow rate' for NRUVs is the 'declared design flow rate', at the conditions laid down in definition 6 of Annex I, Part 2. Therefore, freedom is left to the manufacturer on how to determine more in detail such conditions, depending on the specific design choices (e.g, including or not a pressure reserve for clogging). As an indirect conclusion stemming from definition 8 of Annex I, Part 2, it is deemed necessary that the 'nominal flow rate' is the one at which the maximum rated fan speed occurs.

Q26. What is the demand for fluid mixture in Run around coil (RAC) system?

Answer:

The percentage of ethylene glycol to be used in RAC system is the mixture related to the design condition given by the manufacturer
If nothing is specified it is considered that the brine in the RAC system is a mixture with 25 % ethylene glycol and 75% water. A brine with 25% glycol has a freezing point at around -14 °C.

The percentage is based on the volume.

Q31. What is meant by energy performance, and energy classification of filters?

Answer:

In Annex X the information requirements for NRVUs requires:

(p) energy performance, preferably energy classification, of the filters (declared information about the calculated annual energy consumption);

The suggested method to provide this information requirement is the declaration of the filter classification (efficiency) determined according to Annex IX.

Comment: The Eurovent classification for air filters can be used.

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