

EVIA initial position on EU 1253 and 1254/2014 Review – Non-Residential aspects

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EVIA strongly supports the Ecodesign and energy Labelling Legislation. Both regulations are pushing the market to develop energy efficient products and support the harmonisation of product performance and test methods. Furthermore, they are enhancing the positioning of European Products on export markets. To improve the legislation, EVIA has been discussing the need to consider certain elements for revision of EU 1253 and 1254/2014 on ventilation products, and calls on the European Commission to consider the following aspects in the revision process.

This document highlights initial positions agreed upon within EVIA's Non-Residential Working Group and additional positions on others topics will be updated on a continuous basis, depending on the outcomes of discussions held with the consultants and the European Commission. EVIA wishes to highlight that some aspects and studies could be made available to the European Commission further down the line, including positions on the potential exclusion of roof and box fans from the scope of Lot 6 and their inclusion under the scope of Lot 11. Other items still to be discussed and positions to be developed in the near future include energy performance of filters, aspects of separate delivery, tolerances, leakages, as well as market surveillance.

EVIA and its members stand ready to support the European Commission in its efforts to make the legislative framework fit for purpose and hope to continue to contribute to the revision process.

1 General Aspects

1.1 Multifunctional ventilation units

EVIA as well as other industry representatives have called the European Commission to include multifunctional bidirectional ventilation units in the revision of the Ecodesign Regulation (EU) 1253/2014 (Ventilation). You can find our position [here](#).

1.2 Use the declaration of intended use as a basis for further specification

EVIA recommends to use the Declaration of Intended Use issued by the manufacturer (in analogy with the Machine Directive) to identify the valid ErP regulation for the products. This is a simple way to deal with multi-usage and various applications whilst allowing market surveillance to react in the correct way. Furthermore, manufacturers shall specify the correct way to assess the conformity based on regulations and standards.

EVIA proposes to modify the following definitions as follows:

Article 2 **Definitions**

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

- (1) 'Ventilation unit (VU)' means an appliance equipped with at least a fan, motor and casing intended to replace utilised air by fresh air in a building or part of a building;
- (2) 'Residential ventilation unit (RVU)' means a ventilation unit where the nominal (maximum) **outdoor air volume flow does not exceed 1.000 m³/h and the manufacturer does not declare it as a NRVU**;
- (3) 'Non-residential ventilation unit (NRVU)' means a ventilation unit where the nominal (maximum) **outdoor air volume flow**
 - a. **exceeds 1.000 m³/h or**
 - b. **the manufacturer declares it only for a non-residential ventilation application**

1.3 All aspects of published FAQs

EVIA suggests that the European Commission refers back to EVIA and Eurovent's [Guidance Document](#) which is intended to contribute to a better understanding of EU Regulations 1253 and 1254/2014 and a more uniform and coherent implementation across different sectors and product groups within the EU Common Market. Overall, we call on the European Commission to harmonize definitions where and when possible.

2 Non-Residential Ventilation Units

2.1 Repair, refurbishments and replacement of existing units – Historic listed buildings

EVIA would like to point out that in some specific cases of refurbishment, especially for historically listed buildings, the Ecodesign requirements applied to new ventilation units are in most cases not adapted to the actual building architecture. Indeed, these ventilation units which aim at replacing old/existing ventilation systems often face limited space in the installation rooms. The existing installation rooms in historical buildings are in most cases too small for ventilation units that have the same operation point and fulfil all Ecodesign regulation.

In general, historical buildings and listed buildings have special laws and exemptions in national or local building codes (see Annex 1 for Italian examples). EVIA suggests that on the basis of these codes, and an investigation of the feasibility of the refurbishment by local authorities, Air Handling Units (AHU) can be excluded from meeting minimum requirements if needed, given the architecture of the building, while still respecting the higher standard of energy efficiency.

The [European Commission Regulation \(EU\) No 548/2014 of 21 May 2014](#) already allows exemptions for power transformers in these cases. Therefore EVIA proposes to adapt the Regulation 1253 along the following proposal, based on wording included in the Transformers regulation No 548/2014.

Proposal: “2. This Regulation shall not apply to ventilation units specifically designed and used for the following applications:

- ventilation units which are meant for **replacements** in the same physical location/installation for existing ventilation units, where this replacement cannot be achieved without entailing disproportionate costs associated to their transportation and/or installation,
- ventilation units for **historic and listed buildings** where the installation cannot be achieved in a limited space and without changing the historic character of the building and entailing disproportionate costs associated to their transportation and/or installation, except as regards the product information requirements and technical documentation set out in Annex V.”

2.2 Filter and filter correction

In some cases, it is not clear how filter correction should apply, for instance how should one proceed when the filter delivered has a lower efficiency than the one in the reference configuration.

In order to deal with these issues, EVIA suggests an option which would lead to changing the formula of the SFPLimit requirement to make the limit dependant on the filtration level. For this, a typical value of filter SFP for each class of Filter should be proposed. If the Regulation goes in that direction, there would be no need down the line for any corrections.

a) Principles

- We propose to change the formula of the SFP limit requirement to make the limit dependent on the filtration level of the used filter.
- For this, we would have to propose a typical value of filter SFP for each filter classified acc to EN ISO 16890 from ISO Coarse $\geq 60\%$ (G4) to ISO ePM1 $\geq 80\%$ (F9).
- If there are several filter stages (*2 options proposed – we will have to fix the EVIA preferred option later*):
 - Option 1: they are all considered in ventilation components. We apply the filter SFP value to each filter.
 - Option 2: only the highest efficiency filter acc to EN ISO 16890 is considered. Other filters are considered in non-ventilation components (additional SFP)

- This procedure shall be used for BVU's as well as for UVU's.

b) Proposed SFP values per Filter Type

Based on 2018 requirements. To be adapted for further tiers

Filter class EN 779	Based on EVIA recommendation							
	ISO ePM ₁	SFP	ISO ePM _{2,5}	SFP	ISO ePM ₁₀	SFP	ISO Coarse	SFP
G4							≥ 60%	90
M5					≥ 50%	150		
M6			≥ 50%	170				
F7	≥ 50%	190						
F8	≥ 70%	230						
F9	≥ 80%	260						

XX: value from 2018 requirement

c) Example of SFP requirement (based on 2018 requirements)

The Current requirements for BVU NRUV

- Run around coil HRS:

$$1600 + E - 300 * \frac{q_{nom}}{2} - F \text{ if } q_{nom} \leq 2 \text{ m}^3/\text{s and}$$

$$1300 + E - F \text{ if } q_{nom} \geq 2 \text{ m}^3/\text{s}$$

- All others HRS

$$1100 + E - 300 * \frac{q_{nom}}{2} - F \text{ if } q_{nom} \leq 2 \text{ m}^3/\text{s and}$$

$$800 + E - F \text{ if } q_{nom} \geq 2 \text{ m}^3/\text{s}$$

- UVU intended to be used with filters

230

F = 150 if medium filter is missing

F = 190 if fine filter is missing

d) Proposed requirement

- Run around coil HRS:

$$1260 + E - 300 * \frac{q_{nom}}{2} + F_{sup} + F_{exh} \text{ if } q_{nom} \leq 2 \text{ m}^3/\text{s and}$$

$$960 + E + F_{sup} + F_{exh} \text{ if } q_{nom} \geq 2 \text{ m}^3/\text{s}$$

- All others HRS

$$760 + E - 300 * \frac{q_{nom}}{2} + F_{sup} + F_{exh} \text{ if } q_{nom} \leq 2 \text{ m}^3/\text{s and}$$

$$460 + E + F_{sup} + F_{exh} \text{ if } q_{nom} \geq 2 \text{ m}^3/\text{s}$$

- UVU intended to be used with filters

$$230 + F_{sup}(\text{or } F_{exh})$$

F_{sup} and F_{exh} : values from table above

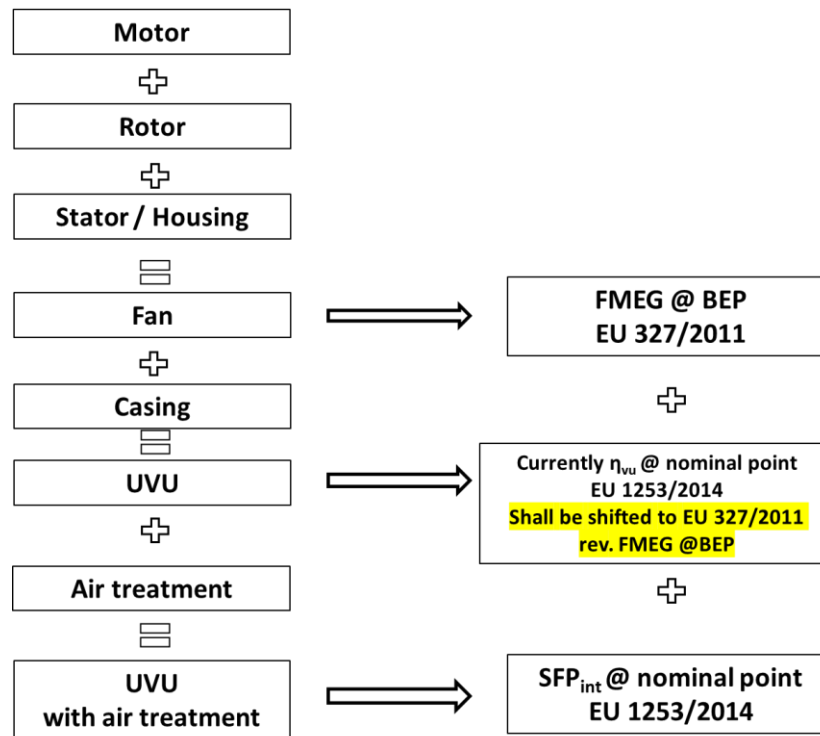
2.3 Filter correction for UVUs

Filters in UVUs should be treated in the same way as filters in BVUs, as the function remains the same. EVIA suggests to include filter correction factor F in SFPint requirements for UVUs intended to be used with filters. This should be done in the same way that is suggested above for BVUs (see 2.2).

In addition, important distinctions are to be made between:

- UVU with air treatment (filtration and/or additional heating, cooling, etc.) which should be considered as a ventilation unit (AHU);
- UVU without any air treatment which should be considered as a fan (see [EVIA/Eurovent FAQ Document](#) for clarification)

You can see below an explanatory graphic to justify this distinction.



2.4 Filter definitions

EVIA suggests that clear reference should be made to ISO 16890 principles which give a clear definition of a filter.

2.5 Demand control options for Non-Residential Ventilation Units

Demand control systems are suitable solutions to optimize energy demand of ventilation systems. There are a wide range of Non-Residential applications for ventilation units and a simplified approach, similar to the one applied for the residential sector is just not possible or feasible. The reasons are:

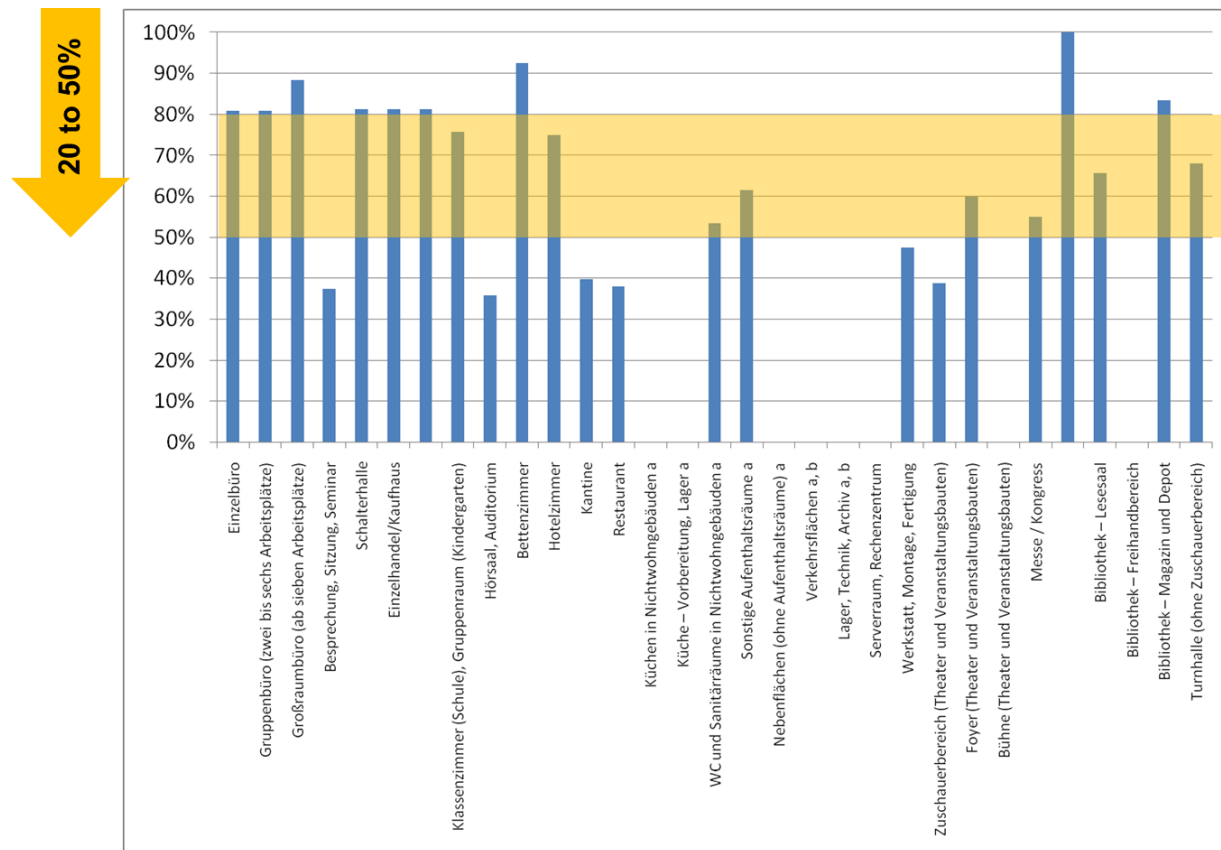
- In general, the application of a non-residential ventilation unit is not known by the manufacturer
- Key elements of demand control is not part of the AHU delivery (i.e. VAV controller, dampers, and diffusers).
- A high percentage of AHUs are not equipped with any control system, because this is part of the installer's work or the customer specifies his needs according their individual BACS needs and the manufacturer has no choice in installing a control system in the product.
- Even units with their own control systems might not have an impact on Demand Control Ventilation (DCV) elements in the field.

Considering the aspects above, EVIA would like to propose a simple **bonus system on the minimum requirement of SFP_{int}** . If the unit is equipped (by the manufacturer) with a controls system covering a function level 3 or higher (EN 15232) or IDA-C5 /C6 (EN 16798-3), allowed to have an additional bonus on the SFP_{int} value, which would make it higher.

The following chart shows the impact of DCV in different applications considering EN 16798-3 on the air volume flow according to German EPBD implementation (EnEV and DIN V 18599). The average reduction

of air volume flow over all comfort applications can be considered to 35% and a minimum of 20%. Therefore a conservative approach to consider DCV system in AHU with controls could be 20% bonus on SFP_{int} .

The relative impact of air flow on heat recovery is low so there is no need to correct heat recovery requirements by considering DCV. Therefore we are not proposing to attribute a bonus scheme applying to heat recovery requirements when there is a DCV, because the impact is only limited.



Graph originating from DIN V 18599

2.6 Enthalpy recovery

Enthalpy recovery describes the function of heat recovery and moisture recovery from the extract air to the supply air. Enthalpy recovery systems provide a better energy performance for AHU in the following cases:

1. Humidifying or dehumidifying the air
2. Cold recovery
3. Frost protection in cold climates

Considering items 1 and 2, the calculation of the energy performance of the enthalpy recovery is a very complex process and even EPBD calculation considers these aspects at a lower level, EPBD does not calculate the whole range of the enthalpy recovery. The building model is purely based on temperature.

EVIA is proposing a simple bonus system on heat recovery based on the humidity ratio of heat recovery component. In case enthalpy recovery or humidity recovery, then give a bonus for the temperature ratio for minimum heat recovery rates depending on a humidity ratio of 8%, based on a calculated average.

$$\eta = \eta_t + 0,08 * \eta_x$$

2.7 Life cycle costs

Several studies show, that the impact of ventilation heat recovery and fan consumption in Non-Residential buildings is highly dependent on:

- Building performance
- Building use and application
- Occupation times
- Thermal loads
- Climatic data

In some applications and user scenarios, regulation that imposes high efficiency requirements is actually not providing realistic energy savings. For example, when high efficiency heat recovery systems are used in bypass in trade fare halls or shopping malls, their operating time is at 100% therefore leading to fans using a lot more energy than what is necessary.

Also, EVIA suggests that when a ventilation unit is running less than 500 hours/year, it should benefit from a different treatment and requirements on its efficiency, given its usage.

Revised requirements for ventilation units must take into account some individual application cases to ensure that the regulations do not conflict with their original ambition and actually provides energy savings in all scenarios.

2.8 Dual use

When specific exemptions are planned in component legislation, such as the Fans & Motors Regulations, it is important for these to also be reflected in related product regulations, such as the Ventilation Unit Regulation. If ventilation units contain fans or motors that are exempt from meeting energy efficiency requirements, then exemptions and arrangements should also be put in place to ensure that the overall unit should not have to respect its usual energy efficiency requirements.

For instance, some claim that motors above 0.75 kW have to be equipped with a VSD is an issue for motors in smoke extraction fans because they work only in case of emergency at its maximum speed or possibly a few minutes a year for maintenance purposes, the requirement of equipping those fans with a VSD is actually illogical.

This is not precisely right because those motors not only can be used in emergency use only fans (only a few minutes a year only for maintenance purposes) but they can also be used (and are the majority of applications) in dual use fans and ventilation units (working several hours a day. Emergency use only fans are excluded from both Regulations 327/2011 (fans) and from draft fan regulation, since the importance of the use phase on the overall environmental impact of emergency use only fans is minimum. There are no energy gains to achieve due to its few hours of operation through its lifetime. This exclusion cannot be

extended to motor regulation as there is no distinction between emergency only motors and dual use motors.

Therefore a request for an exclusion for motors in smoke extraction fans makes no sense. ErP Directive aims to minimize expected life-cycle costs. Production costs of emergency only fans are for far the highest on the life cycle cost impact. Therefore minimizing those costs is a must. Since VSD is useless in those applications, IE3 motor is the mandatory which is even cheaper than using IE2+VSD.

The problem appear with the use of VSD. Current motor regulation requirement accept the use of IE2 motors+VSD, but this is not accepted in fan and ventilation unit regulations for dual use products due to maximizing safety aspects: what would happen in a dual use product when it has to shift to emergency operation when it had been run for several year through VSD.

EVIA proposes to keep the current motor regulation and draft fan regulations as they are:

- draft motors regulation lot 30 that will repeal regulation 640/2009
 - from 1 January 2021: motors above 0,75kW up to 375 kW will met IE3 efficiency level
 - from 1 January 2022: motors above 0,12 kW up to 0,75 kW will met IE2 efficiency level
 - excluded motors specified to operate exclusively in maximum operating temperature above 400 °C
- according to the draft fan regulation that will repeal regulation 327/2011
 - excluding fans designed for emergency use only, at short-time duty of 1 hour or more with regard to fire safety requirements for temperatures of 300°C and above set out I Regulation (EU) No 305/201 and keep the exclusion of equipping VSD with dual use units in the future ventilation unit regulation.

2.9 Heat Recovery energy efficiency requirements

For heat recovery systems, some studies highlight that higher energy efficiency requirements are not always the best way to deliver energy savings, as these requirement should take into account other factors, such as the big differences in climatic conditions in which heat recovery systems operate in Europe. More detailed studies can be provided on this point.

2.10 p static, p total, Δp static,ext

The harmonization of the terminology is in progress at the CEN level (draft standards under the current mandate). The review of Regulation 1253 will have to align with these standards and especially use p_u and p_{us} as pressure reference parameter instead of $\Delta p_{s,ext}$.



New pressure reference parameter

2.11 Two UVU's ventilating one room / building

Article 2 item 5 is defining:

(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;

This definition is valid for residential ventilation systems, where units generally are sold as a "system package".

In Non-Residential applications, however a UVU can be balanced in different ways, and normally not by natural means, because the airflows are too high. Additionally, these units are not sold as a package, and the manufacturer does not know anything about the balancing.

These units might be balanced for example by:

- Process air flows
- Disbalanced BVU
- Other corresponding UVU
- Etc.

EVIA proposes do correct the definition by deleting the last part.

(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;~~

2.12 Reduce SFP_{int} and η_{vu} to one value

As long as box and roof fans without air treatment are in the scope of Lot 6, fans without air treatment should follow only $SPF_{internal}$, and not in parallel η_{vu} as the efficiency of the fan inside is already in the scope of the Fans Regulation 327/2011.

2.13 Use of SFP global

EVIA is facing ongoing discussions on SFP internal, global and other versions.

EVIA recommends a consistent development of the electrical requirements for the ventilation functions either by keeping current procedure or by changing into an equivalent SFP global approach.

Any change of the view must be discussed carefully on all implications and must keep the principle of excluding external or additional components impact.

Considering the above, the following approach based on SFP global instead of SFP internal might be a metric for characterization of aerodynamic performance of NRUVU. The ErP limit on SFP global would take into account the design external pressure: higher design external pressure => higher SFP global allowed.

- SFP_{int} is difficult to measure (often impossible to measure onsite). EVIA highlights that different approaches should be considered for tailor made and mass products, given that the measurements may produce different results and create a risk of non-compliance for manufacturers.
- SFP_{global} is easy to measure onsite: one just needs the power and the airflow. It has been used for long in building codes and standards in some countries. It may be applicable to all units, including box and roof fans, with adjusted parameters

Requirements can be easily derived from target fan efficiency and current SFPint limit and can take into account the design external pressure.

Formulas and propositions are listed below (from prEN 16798-3, §9.5.6)

$$SFPg = \frac{\Delta p_{s, fan}}{\eta_{s, fan}}$$

$$SFPg = \frac{\Delta p_{s, ext}}{\eta_{s, fan}} + \frac{\Delta p_{s, int}}{\eta_{s, fan}} + \frac{\Delta p_{s, add}}{\eta_{s, fan}}$$

$$SFPg = SFP_{ext} + SFP_{int} + SFP_{add}$$

The only parameters the manufacturer is accountable are $\eta_{s, fan}$ and $\Delta p_{s, int}$.
 $\Delta p_{s, ext}$ is not under the responsibility of the manufacturer
 $\Delta p_{s, add}$ is partly under the responsibility of the manufacturer

$$SFPg = \frac{\Delta p_{s, ext}}{\eta_{s, fan}} + \frac{\Delta p_{s, int}}{\eta_{s, fan}} + \frac{\Delta p_{s, add}}{\eta_{s, fan}}$$

Thus, a requirement on global SFP should be related to the design external pressure and the additional components (it is already the case).

The requirement formula would be of this type for BVU:

$$SFPg, lim = \frac{\Delta p_{s, ext}}{6.2 \times \ln(P_{unit}) + X} + Y + E - 300 \times qnom/2$$

X, Y to be adjusted for each Tier

Example for 2018, (heat exchanger other than run around coil):

$$SFPg, lim = \frac{\Delta p_{s, ext}}{6.2 \times \ln(P_{unit}) + X} + 1100 + E - 300 \times qnom/2$$

Proposed values: X= 52

We can also make it simpler by removing the $qnom/2$ factor since the size effect is already taken into account with the logarithm.

$$SFPg, lim = \frac{\Delta p_{s, ext}}{6.2 \times \ln(P_{unit}) + X} + 1100 + E$$

Proposed values: X= 58

2.14 Toxic and highly corrosive & Abrasive substances

EVIA would like to highlight the need to harmonise and clarify the definitions of what is a “toxic or highly corrosive” substance, by using the following standards for example: REACH EU/1907/2006, prEN 17166 Annex B, EU / 2011 / 327, prEN 17166 Annex B.

2.15 Implementation of decision tree from EVIA FAQ

The current regulation is not clear yet on process ventilation application and mixing air, the FAQ clarifies these aspects and EVIA suggests to use the [decision tree](#) included in the FAQ to clarify this issue (E125, E135). Any new requirements included in the revision of the Regulation should consider the decision tree and clarify first

About EVIA

The European Ventilation Industry Association (EVIA)’s mission is to represent the views and interests of the ventilation industry and serve as a platform between all the relevant European stakeholders involved in the ventilation sector, such as decision-makers at the EU level as well as our partners in EU Member States. Our membership is composed of more than 35 member companies and 6 national associations across Europe, realising an annual turnover of over 7 billion euros and employing more than 45,000 people in Europe.

EVIA aims to promote highly energy efficient ventilation applications across Europe, with high consideration for health and comfort aspects. Fresh and good indoor air quality is a critical element of comfort and contributes to keeping people healthy in buildings.