

Considerations about hybrid and low pressure ventilation fans in the regulation 1253/2014

1) Definition of hybrid fans

The hybrid fans are in general “roof fans” designed to complement the natural forces, thermal draught and wind effect. The wind effect is described in EN 13141-5: when the wind crosses the cowl it induces a negative pressure at the top of the duct that gives suction effect and produces vertical flow in the duct. The thermal draught depends on the temperature difference (indoor – outdoor) and of the vertical height of the duct.

Hybrid ventilation fans are generally characterised by the following facts:

- Hybrid fans are dual products: cowls and fans. They provide additional pressure to the one generated by the thermal draught and wind effect
- They have a dual working mode : mechanical and natural
- Their specific consumption is quite good
- They have a very low pressure loss when they are “off”, and have a wind effect.
- They produce very low mechanical pressure, between 5 to 15 Pa, when they are “on”, and still benefit from the wind effect and thermal draught (EN 13141-5 is under revision to include correctly this additional effect).

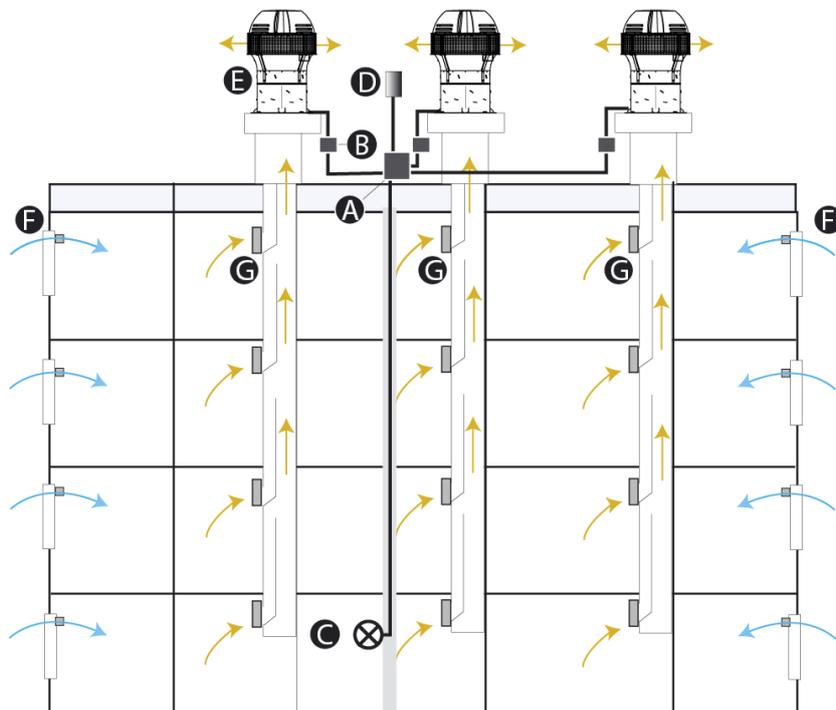
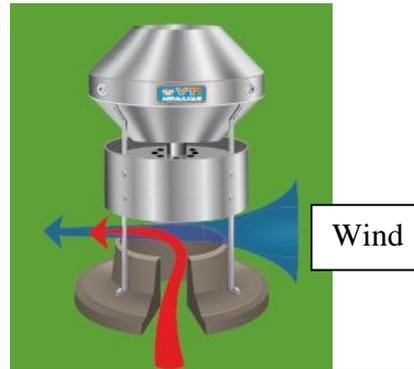


Figure 1: Sketch of hybrid ventilation system
 (E = hybrid fans, other letters = components of the system)



Wind effect:
 Additional pressure is
 provided thanks to the wind.

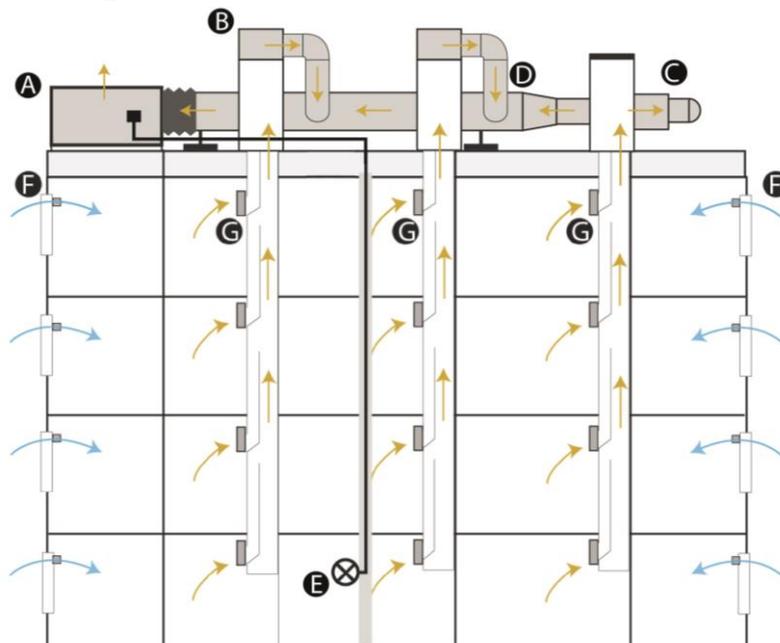
[Figure 2: Wind effect](#)

2) Definition of low pressure ventilation fans

The low pressure ventilation fans are casing fans.

Low pressure ventilation fans are generally characterised by the following facts:

- Their specific consumption is quite good
- They produce very low mechanical pressure between 15 to 30 Pa, and benefit from the thermal draught.



[Figure 3 : Sketch of low pressure ventilation system](#)
 (A = low pressure fan, other letters = components of the system)

Advantages:

- Hybrid ventilation enables to reuse without any modification (no need to reinforce the airtightness) the duct formerly used in PSV (Passive Stack Ventilation) as it keeps the pressure level (from 5 to 15 Pa)
- Low pressure ventilation system enables to reuse without any modifications (no need to reinforce the airtightness) the duct formerly used in PSV (Passive Stack Ventilation) as it keeps the pressure level (from 15 to 30 Pa)
- SPI of hybrid fans is very good thanks to low pressure and intermittent working although their efficiency is poor (typically less than 15%). For example, an average of 6 W/dwelling is generally measured, which is much lower than most other ventilation systems.
- These fans have a real and great interest in retrofitting the 50's to 70's collective buildings in several countries of Europe as they are directly compatible with the existing ductwork and roof outlets.

Hybrid ventilation and low pressure ventilation in Eco-design regulation:

- Up to 1000 m³/h hybrid fans could be considered as RVU (residential ventilation units) if declared by the manufacturers, and their SEC could match the requirements. However the regulation doesn't allow the assessment of hybrid ventilation systems due to the pressure level which is lower than the ones required in the regulation (100 and 50 Pa for ducted units).
- Above 250 m³/h (if not declared as RVU) or above 1000 m³/h they would be considered as NRVU and will never match the efficiency requirements due to very low pressure level.
- These products would hardly fulfil the requirements of the directive as it is written today although they respect the spirit of the text, as offering a very good energy performance along the year.

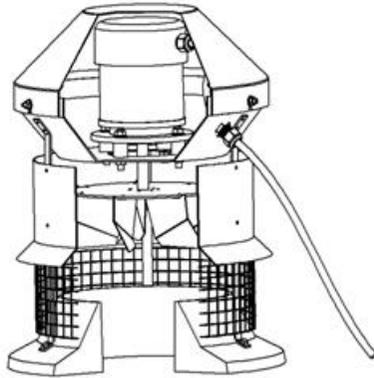
There are several issues on the regulation on the table in annex to justify **the exemption of hybrid fans from the scope**.

N°	Part of n°1253/2014 Commission Regulation	Comment	Proposal
1	<p>Article 2</p> <p>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;</p>	<p>The meaning of « casing » explained in the discussion document is not clear, especially the figure 14.</p> <p>Hybrid extractor, assisting natural ventilation, are not composed by a « casing » because ventilation has to be possible when motor is turned off.</p>	<p>Clarify the definition in the FAQ or hybrid extractors have to be excluded from the scope.</p>
2	<p>Article 2</p> <p>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;</p>	<p>For ducted RVUs, how to declare the maximum flow rate for hybrid extractors or low pressure ventilation systems whose maximal pressure is under 100Pa?</p>	<p>Clarify in the FAQ how to deal with other pressures for ducted RVUs</p>
3	<p>Annex I</p> <p>1. Définitions</p> <p>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 250 Pa for RVUs and at 400 Pa for NRVUs, for both under and over pressure;</p>	<p>For hybrid extractors which are not composed by a casing, it is not possible de measure the external leakage rate.</p>	<p>Clarify in the FAQ</p>
5	<p>Annex I</p> <p>1. Définitions</p> <p>14) 'flow rate/pressure diagram' means a set of curves for flow rate (horizontal axis) and pressure difference of a unidirectional RVU or the supply side of a bidirectional RVU, where each curve represents one fan speed with at least eight equidistant test-points and the number of curves is given by the number of discrete fan speed options (one, two or three) or, in the case of a variable fan speed drive, includes at least</p>	<p>It is not clear if the pressure difference has to be done in total pressure (p_t) or static pressure (p_{st}).</p>	<p>Clarify in the FAQ</p>

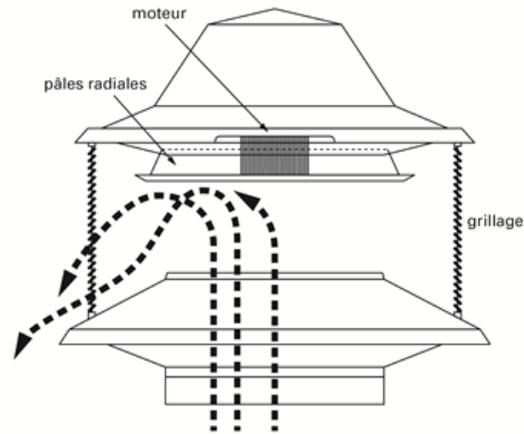
N°	Part of n°1253/2014 Commission Regulation	Comment	Proposal
	a minimum, maximum and appropriate intermediate curve close to the reference air volume and pressure difference for SPI testing;		
6	Annex I 1. Définitions 15) 'reference flow rate' (expressed in m ³ /s) is the abscissa value to a point on 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;	The reference flow rate, as defined, is not a flow rate possible for hybrid extractors and low pressure ventilation systems because 50 Pa cannot be reached.	Clarify in the FAQ how to deal with other pressures for ducted RVUs
7	Annex I 2. Definitions for NRVU 4) 'reference configuration of an UVU' means a product configured with a casing and at least one fan with variable speed or multi-speed drive, and — in case the product is intended to be equipped with a filter on the inlet-side — this filter shall be a clean fine filter;	Same comment as n°1	
8	Annex VIII « ta » value	« ta » value has a default value not taking into account hybrid extractors specificity. Indeed, hybrid extractor's motors run in an intermittent way (depending external temperature and wind velocity) and not continuously.	Take into account hybrid extractor's natural mode (indeed with the motor turned off).
9	Annex VIII	Some hybrid extractors can control motor's rotation speed depending the external temperature. In that case, the Specific Energy Consumption (SEC) gain is not taken into account in the formula and « CTRL » « x » parameters are not suitable.	Clarify SEC formula to take into account this kind of hybrid extractor, or hybrid extractors have to be excluded from the scope.

Consideration about scope of Regulation 327/2011 and Regulation 1253 for hybrid ventilation fan units:

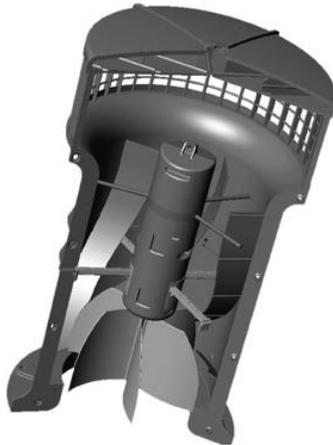
Are the ventilation product related to the regulation n°1253/2014?



[Figure 4: Hybrid product 1](#)



[Figure 5 : Hybrid product 2](#)



[Figure 6: Hybrid product 3](#)