Technical Assistance
Study for the Ventilation
Units Product Group

Discussion document

Considerations about scope of Regulation 327/2011 and Regulation 1253/2014 for ventilation products producing an airflow in one direction only and intended to replace air in a building or part of a building

Prepared for the first stakeholder meeting of the
Technical Assistance Study of the Ventilation Units Product Group
15 June 2015

(www.ventilationunits.eu)

Background

Questions from stakeholders have revealed that for some ventilation products, it is difficult to decide whether they fall under Regulation 327/2011 ('Fans') or under Regulation 1253/2014 ('Ventilation units'). These ventilation products typically produce airflow in one direction only, e.g., for extraction of air from indoors to outdoors.

It appears that some of the difficulties arise because no common or standardised terminology exists for these products. Furthermore, the commercial terminology/trade names (used in product catalogues, on webpages, etc.) are not always in line with the terminology used in the regulations. For example, the commercial term 'roof fan' may be used for products that fall under Regulation 1253/2014 ('ventilation units') even though the term includes the word 'fan'.

To avoid misunderstandings and to facilitate the application of the regulations, a more systematic approach is required to decide on the ventilation products. The purpose of this discussion document is to present such an approach.

The systematic approach will use the term 'housing' as defined in Regulation 327/2011 ('Fans') and the term 'casing' of in Regulation 1253/2014 ('ventilation units') to define the product boundaries.

What say the regulations?

Excerpts from Regulation 327/2011

Article 2, Definitions

1. **'Fan'** means a rotary bladed machine that is used to maintain a continuous flow of gas, typically air, passing through it and whose work per unit mass does not exceed 25 kJ/kg, and which:
   — is designed for use with or equipped with an electrical motor with an electric input power between 125 W and 500 kW (≥ 125 W and ≤ 500 kW) to drive the impeller at its optimum energy efficiency point;
   — is an axial fan, centrifugal fan, cross flow fan or mixed flow fan; and
   — may or may not be equipped with a motor when placed on the market or put into service;

12. **'Housing' means a casing** around the impeller which guides the gas stream towards, through and from the impeller;

Excerpts from Regulation 1253/2014

Article 2, Definitions

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;

Article 1, Subject matter and scope

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

c. are axial or centrifugal fans only **equipped with a housing in terms of Regulation (EU) No 327/2011**;

Annex I, Definitions,

2. Definitions for NRVU, in addition to the definitions in Annex I Part 1:

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;

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;

The challenge

As seen from the above excerpts from Regulations 1253/2014 and 327/2011, the term 'housing' is important in relation to which regulation to use for the ventilation products. On the one hand, the ventilation product is exempt from Regulation 1253/2014 if '**equipped with a housing in terms of Regulation (EU) No 327/2011'.** On the other hand, the term 'housing' in Regulation 327/2011 is defined relatively vaguely: **'Housing' means a casing around the impeller which guides the gas stream towards, through and from the impeller**.

Finally, the term 'casing' is important, for as seen from the definitions of Regulation 1253/2014 a ventilation unit is always 'equipped with at least one impeller, one motor and **a casing**.'

Systematic approach for ventilation products

The systematic approach is based on the following considerations:

- a 'fan' can be with or without a 'housing';
- the housing can be considered the first layer enveloping the air stream;
- a 'ventilation unit' is always conFigured with a casing; and
- the 'casing' can be considered the second layer enveloping the air stream.

This implies that any first layer enveloping the fan air stream will be a 'housing' and that a ventilation unit will always have both a first layer ('housing') and a second layer ('casing'). This approach is somewhat inspired by drawings presented in the final report of the review study of Regulation 327/2011 (see www.fanreview.eu) and will be demonstrated by some examples.

Some ventilation products are equipped with grilles/protection guards or rain covers/guards, which typically are an integrated part of the products. In this case, grilles/protection guards or rain covers/guards are to be considered as the second layer enveloping the air stream ('casing').

Principles

Consider the ventilation product in Figure 1. It consists of a fan with a scroll housing and a casing enveloping the fan with scroll housing. The ventilation product is an 'electricity driven appliance equipped

with at least one impeller, one motor and **a casing'.** In other words, it is a **ventilation unit**, which falls under Regulation 1253/2014**.**

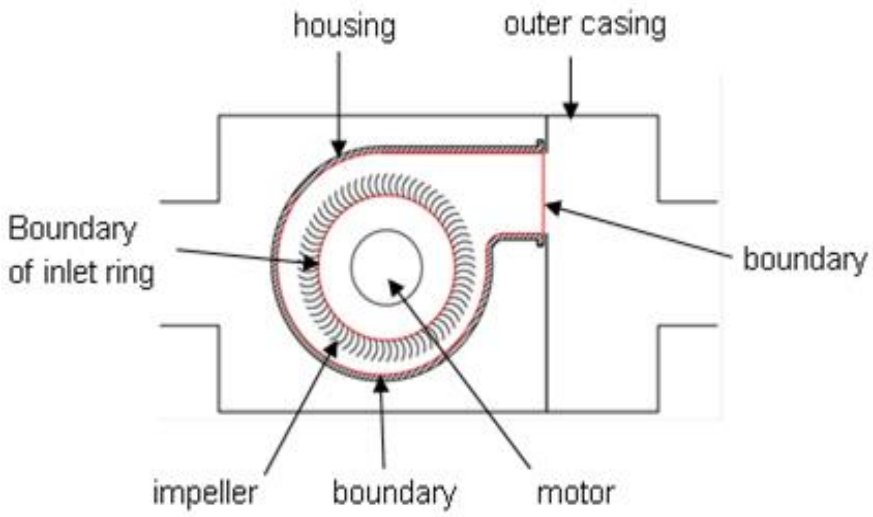

Figure 1: Sketch from final report of the fan review study [1]

For this ventilation product, the decision making on which regulation to use is relatively simple. Now, we introduce the idea of 'first layer' and 'second layer' for the same ventilation product, see Figure 2.

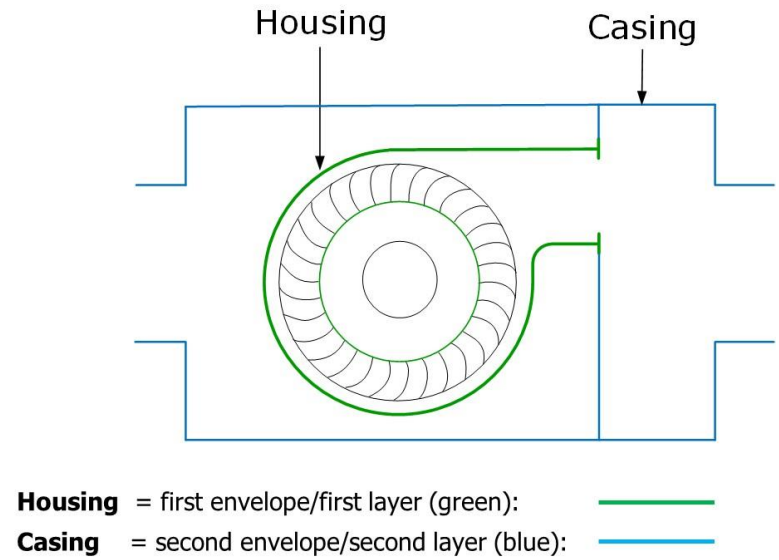

Figure 2: Sketch as Figure 1, but with marking of first and second layers enveloping the airstream.

The first layer enveloping the air stream is the scroll housing (marked with green), and the second layer enveloping the airstream is the ventilation unit casing (marked with blue).

Consider another ventilation product intended to place on the roof of a building as shown in Figure 3. It consists of a fan with a circular housing and a casing (rain guard) enveloping the airstream. The ventilation product is an 'electricity driven appliance equipped with at least one impeller, one motor and **a casing'.** In other words, it is a **ventilation unit** that falls under Regulation 1253/2014**.**

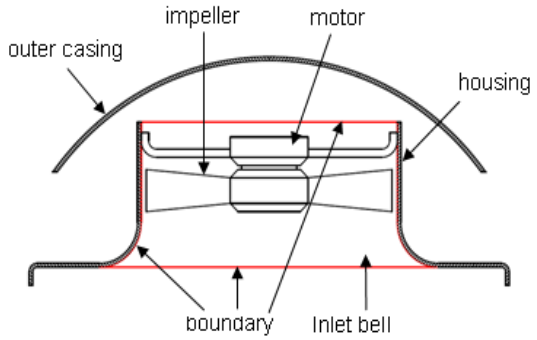

Figure 3: Sketch from final report of the fan review study [1]

By using the systematic approach, see Figure 4, the first layer enveloping the air stream is the circular housing (marked with green), and the second layer enveloping the airstream is the rain guard ('casing') (marked with blue). Thus, with both a first and a second layer enveloping the airstream, the product is a ventilation unit.

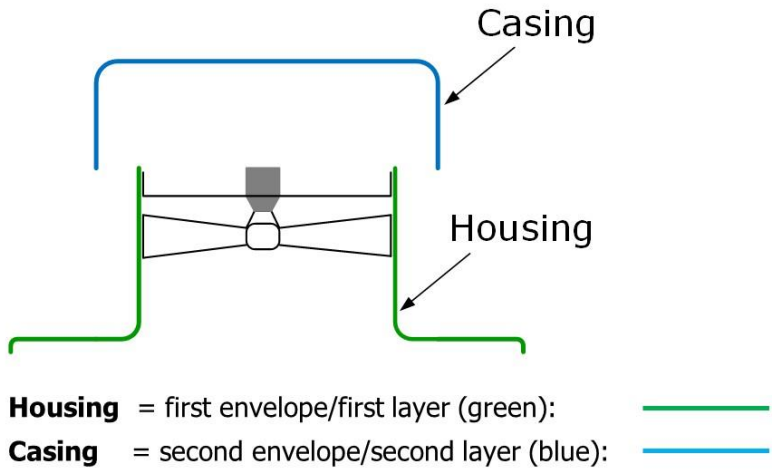

Figure 4: Sketch as Figure 3, but with marking of first and second layers enveloping the airstream.

Example 1: Fan with scroll housing

For the ventilation product in Figure 5, the first layer enveloping the air stream is the scroll housing (marked with green). As there is no second layer enveloping the air stream, the product falls under Regulation 327/2011.

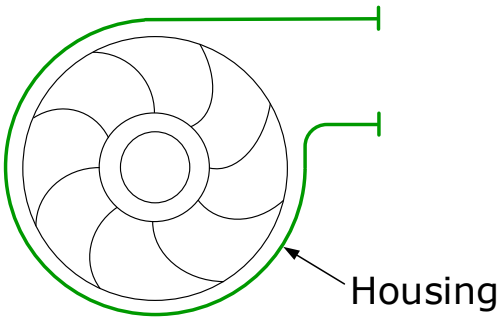

Figure 5 Sketch of ventilation product – fan with a scroll housing

Example 2: Fan with scroll housing and insulation

For the ventilation product in Figures 6 and 7, the first layer enveloping the air stream is the scroll housing (marked with green). The product has an outer casing that protects the insulation material that is part of this product. However, the casing is not in contact with the airstream. So, in this case, there is no second layer enveloping the air stream, and the product falls under Regulation 327/2011.

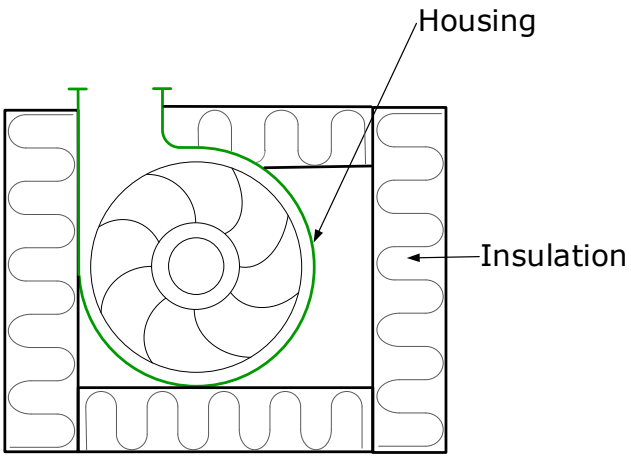

Figure 6 Fan with scroll housing and insulation

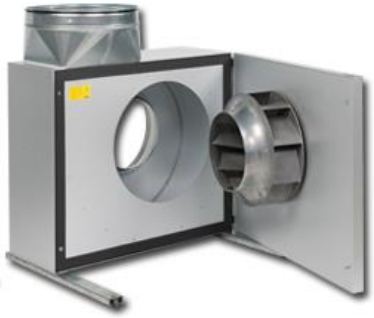

Figure 7 Commercial product [2]

Example 3: Fan without housing

For the ventilation product in Figures 8 and 9, there is no housing and therefore no first layer enveloping the air stream. The product falls under Regulation 327/2011.

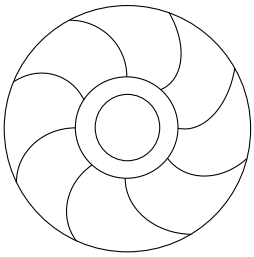

Figure 8 Fan without housing

Figure 9 Commercial product [2]

Example 4: Fan with large housing

For the ventilation product in Figures 10 and 11, the first layer enveloping the air stream is the large housing (marked with green). As there is no second layer enveloping the air stream, the product falls under Regulation 327/2014.

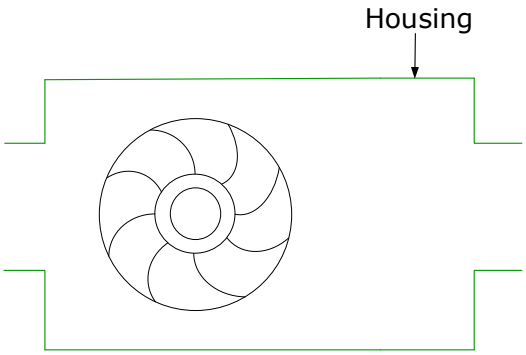

Figure 10 Fan with large housing

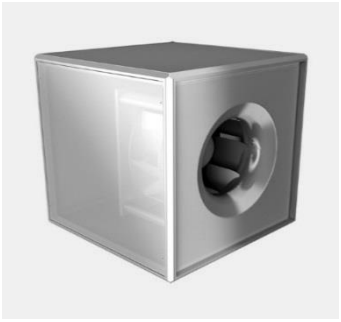

Figure 11 Commercial product [2]

Example 5: Ventilation unit including fan with scroll housing and casing

For the ventilation product in Figures 12 and 13, the first layer enveloping the air stream is the scroll housing (marked with green). The product has a casing that is also in contact with the airstream. So, in this case, there is a second layer enveloping the air stream, and the product falls under Regulation 1253/2014.

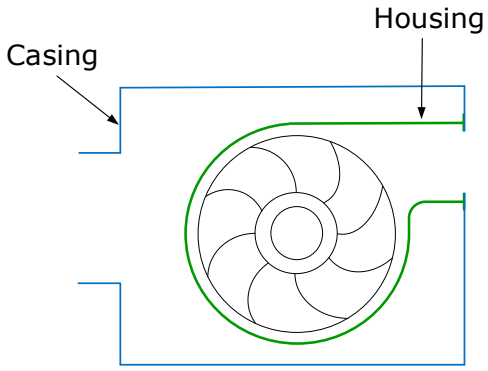

Figure 12 Ventilation unit including fan with scroll housing and casing

Figure 13 Commercial product [2]

Example 6: Ventilation unit with fan and grilles

For the ventilation product in Figures 14 and 15, the first layer enveloping the air stream consists of the inlet section to the radial fan and the housing including the motor (marked with green). The product has grilles, so in this case there is a second layer enveloping the air stream ('casing'), and the product falls under Regulation 1253/2014.

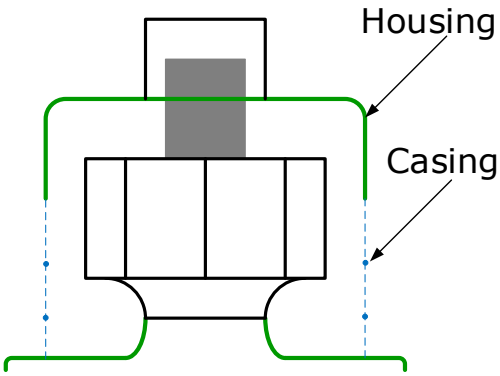

Figure 14 Ventilation unit with fan and grilles

Figure 15 Commercial product [2]

If there had been no grilles, this product would be a product with only a first layer enveloping the airstream, and the product would then fall under Regulation 327/2011.

Example 7: Ventilation unit with fan and rain guard

For the ventilation product in Figures 16 and 17, the first layer enveloping the air stream consists of the inlet section to the radial fan and the housing including the motor (marked with green). The product also has a rain guard, so in this case a second layer envelopes the air stream ('casing') and the product falls under Regulation 1253/2014.

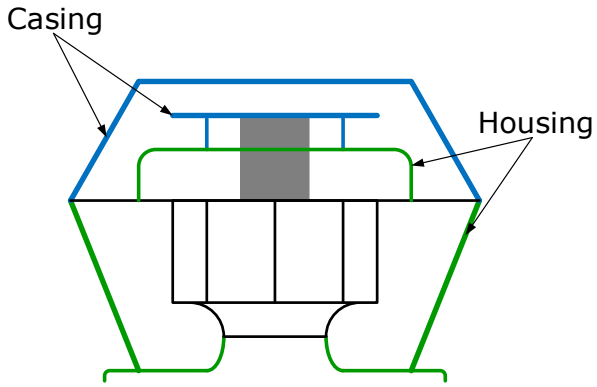

Figure 16 Ventilation unit with fan and rain guard

Figure 17 Commercial product [2]

Other issues

In the following, we discuss a number of other issues.

Accessories

The eco-design requirements of Regulation 1253/2014 are set at a level so that they generally take into account the additional pressure loss caused by the casing and the build in of components.

For non-ducted ventilation units it is proposed, they are tested with the duct lengths required to connect the ventilation unit with the outdoors through an external wall (e.g. ½-1 meter – to be decided on) and with the protection grilles to be mounted in the façade after the manufacturer's recommendation/instructions.

For ducted unidirectional ventilation units to be placed outdoors (e.g. on a roof or external wall) it is proposed to test them with rain cover and protection grilles (or one of these) after the manufacturer's recommendation/instructions in case, these are not an integrated part of the ventilation unit.

For other ventilation products producing an airflow in one direction only and intending to replace air in a building or part of a building, they can either fall under Regulation 327/2011 or under Regulation 1253/2014. In this case, the first layer/second layer systematic approach decides which of the regulations the ventilation product falls under. It is proposed, that for a case where a fan (with first layer) is combined with a protection grille only (second layer) and is not one of the other ventilation unit types specified above, the manufacturer can chose to declare the ventilation product according to Regulation 327/2011 and the grille(s) can be removed during testing.

Hybrid solutions

Work in CEN is ongoing regarding an update of EN 13141-5 and the wind effect of hybrid solutions. According to manufacturers, these products will mostly be considered as RVUs and will be able to comply with the eco-design requirements as such. However, for flow above 1000 m3/h, they can only be considered NRVUs, and it is claimed that it is not possible to fulfil the NRVU requirements.

References

[1] Ecodesign Fan Review, *Review study of Commission Regulation (EU) No 327/2011, Final report,* Prepared by Van Holsteijn en Kemna B.V. 16.3.2015, see www.fanreview.eu.

[2] Manufacturers product catalogues/webpages: Exhausto, Systemair, Rosenberg and Fläkt woods.