



SLOVENSKI STANDARD

oSIST prEN 17291:2018

01-december-2018

[Not translated]

Fans - Procedures and methods to determine and evaluate the energy efficiency of non-residential unidirectional ventilation units

Ventilatoren - Verfahren und Methoden zur Ermittlung und Beurteilung der Energieeffizienz von Ein-Richtung-Lüftungsgeräten im Nichtwohnbereich

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Ta slovenski standard je istoveten z: prEN 17291

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ICS:

23.120

Zračniki. Vetrniki. Klimatske
naprave

Ventilators. Fans. Air-
conditioners

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 17291

October 2018

ICS 23.120

English Version

**Fans - Procedures and methods to determine and evaluate
the energy efficiency of non-residential unidirectional
ventilation units**

Ventilatoren - Verfahren und Methoden zur Ermittlung
und Beurteilung der Energieeffizienz von Ein-
Richtung-Lüftungsgeräten im Nichtwohnbereich

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 156.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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prEN 17291:2018 (E)**European foreword**

This document (prEN 17291:2018) has been prepared by Technical Committee CEN/TC 156 “Ventilation for buildings”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2009/125/EC and Commission Regulation (EC) No 1253/2014.

For relationship with EU Directive 2009/125/EC, see informative Annex ZA, which is an integral part of this document.

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1 Scope

This document provides procedures and methods for measuring and calculating the energy efficiency and associated characteristics of non-residential unidirectional ventilation units when driven by electric motors.

Unidirectional ventilation units include roof fans and box fans.

This document includes unidirectional ventilation units with and without filters.

Additional air treatment items are considered in this document but are excluded in the determination of the efficiency of the product.

This document does not include:

- residential unidirectional and bidirectional ventilation units,
- non-residential bidirectional ventilation units.

NOTE 1 Residential unidirectional ventilation units are under the remit of CEN/TC 156/WG 2.

NOTE 2 Non-residential bidirectional ventilation units are under the remit of CEN/TC 156/WG 5.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 779, *Particulate air filters for general ventilation — Determination of the filtration performance*

EN 1886, *Ventilation for buildings — Air handling units — Mechanical performance*

EN ISO 5801, *Fans — Performance testing using standardized airways (ISO 5801)*

prEN 17166, *Fans — Procedures and methods to determine the energy efficiency for the electrical input power range of 125 W up to 500 kW*

EN ISO 12759, *Fans — Efficiency classification for fans (ISO 12759)*

EN ISO 13349, *Fans — Vocabulary and definitions of categories (ISO 13349)*

ISO 13347 (all parts), *Industrial fans — Determination of fan sound power levels under standardized laboratory conditions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 5801 and prEN 17166 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 fan

rotary-bladed machine that receives mechanical energy and utilizes it by means of one or more impellers fitted with blades to maintain a continuous flow of air or other gas passing through it and whose work per unit mass does not normally exceed 25 kJ/kg

In this standard, the word fan means an assembly of an impeller, bearing, transmission, housing, motor and other significant elements within a boundary as defined in prEN 17166 and a variable speed drive if fitted

[SOURCE: EN ISO 13349:2010, definition 3.1.1]

[SOURCE: prEN 17166]

3.2 ventilation unit (VU)

electrically driven appliance equipped with at least one impeller, one motor and a casing

[SOURCE: Regulation (EU) No 1253/2014, article 2, definition (1)]

3.3 unidirectional ventilation unit (UVU)

ventilation unit producing an air flow in one direction only, either for exhaust or for supply

3.4 non-residential ventilation unit (NRVU)

ventilation unit where the maximum flow rate exceeds 250 m³/h, excluding those between 250 m³/h and 1 000 m³/h where the manufacturer has declared it a residential ventilation unit only

Note 1 to entry: Based on definition Article 2 (3) of Regulation (EU) No 1253/2014.

Note 1 to entry: Based on definition Article 2 (3) of Regulation (EU) No 1253/2014.

3.5 housing

stationary part which interacts with the air stream passing through the impeller

Note 1 to entry: A housing could be a device around the impeller which guides the gas stream towards, through and from the impeller.

Note 2 to entry: A housing may have additional parts included within the housing or attached to the housing to affect the performance of the fan. Such as:

- inlet bell, also known as Venturi inlet, inlet cone, inlet radius;
- inlet guide vane;
- outlet guide vane;
- outlet diffuser.

Note 3 to entry: Additional parts are devices not listed above that provide an impact of the air power of the fan.

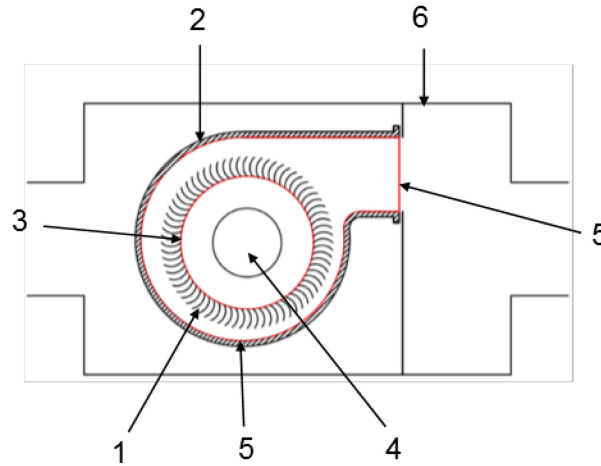
Note 4 to entry: A housing is also called a stator.

[SOURCE: prEN 17166:2017, definition 3.6]

3.6

casing

element that is additional to the housing, see Figures 1, 2 and 3. The casing is all parts of the ventilation unit in addition to the fan housing that interfere with the airflow



Key

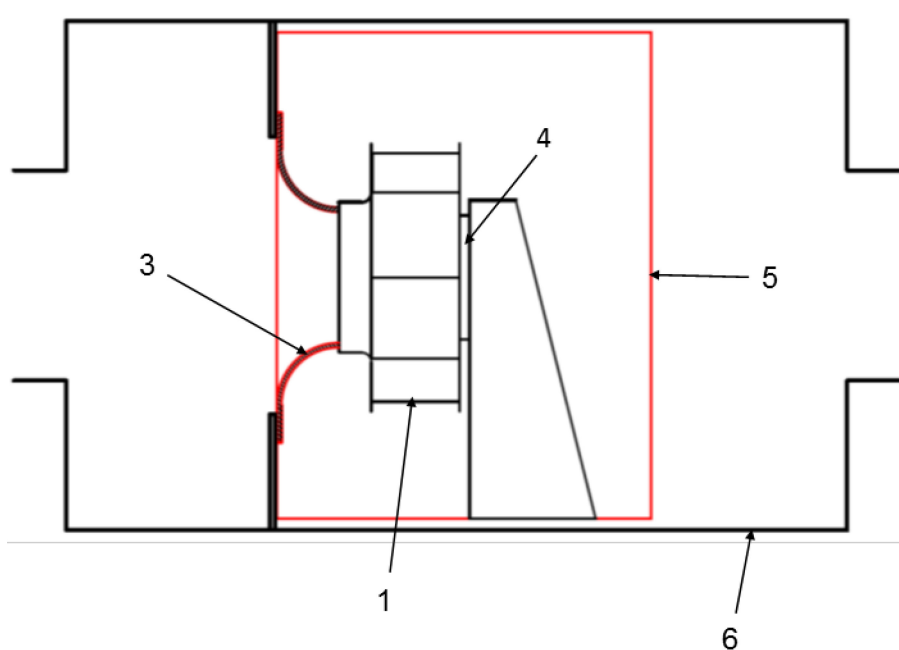
- 1 impeller
- 2 housing
- 3 stator
- 4 motor
- 5 boundary
- 6 casing

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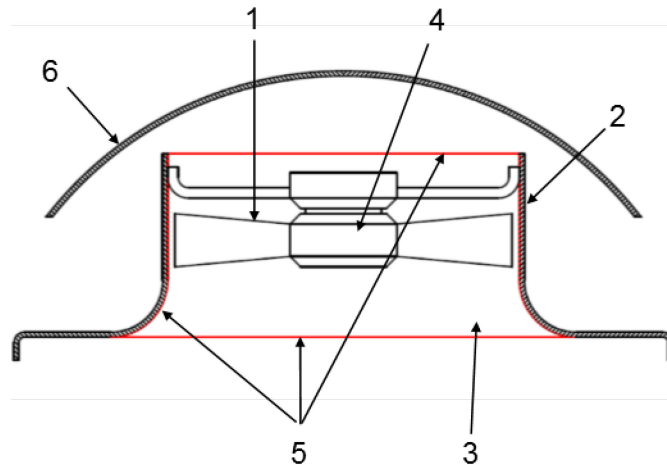
Figure 1 — Diagram explaining casing and housing

**Key**

- 1 impeller
- 3 stator
- 4 motor
- 5 boundary
- 6 casing

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Figure 2 — NRVU-UVU with an impeller (box fan)
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**Key**

- 1 impeller
- 2 housing
- 3 stator
- 4 motor
- 5 boundary
- 6 casing

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Figure 3 — Diagram explaining casing and housing for a roof mounted fan
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Note 1 to entry: In prEN 17166 the 'casing' is called an 'outer casing'.

3.7**boundary**

region of the fan that encompasses the significant elements that affect the conversion of power (electrical or mechanical) into air volume flow rate and pressure

[SOURCE: prEN 17166:2017, 5.3.2]

3.8**ventilation components**

are defined in the reference configuration

3.9**additional non-ventilation components**

components that are not part of the reference configuration and therefore are not part of the calculation of SFP_{int}

Note 1 to entry: Additional non-ventilation components may be heating coils, cooling coils, humidifiers, dehumidifiers, etc.

3.10**reference configuration of an NRVU-UVU**

means a product configured with a casing and at least one fan with variable speed or multi-speed drive (except for units less than 30 Watts and dual use units), and – in case the product is intended to be equipped with a filter on the inlet-side – this filter shall be a clean filter

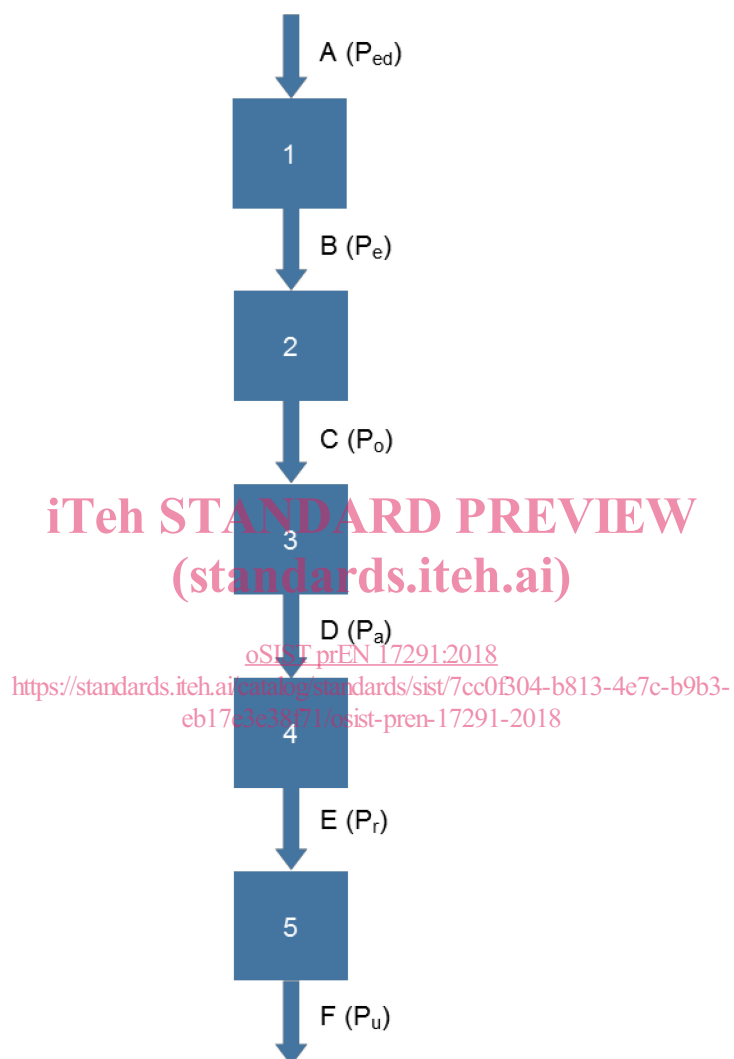
[SOURCE: adapted from Regulation (EU) No 1253/2014 Annex I.2 definition (4)]

prEN 17291:2018 (E)

Note 1 to entry: For units supplying air the filter shall be grade F7 (EN 779) or have an efficiency on the ePM10 ≥ 50 % (EN ISO 16890).

Note 2 to entry: For units exhausting air the filter shall be of an appropriate grade.

3.11 power

**Key**

1 VSD

2 motor

3 transmission

4 bearings (and other mechanical parts)

5 impeller and housing

A drive/control electrical input power (P_{ed})B motor input power (P_e)C motor output power (P_o)D fan shaft power (P_a)E fan impeller power (P_r)F fan air power (P_u)

Figure 4 — Power diagram of driven system

Table 1 — Relationship between powers and efficiencies

Installation category	A and C	B and D
	Static efficiencies	Total efficiencies
Powers		
drive/control electrical input power (P_{ed})	$\eta_{esd} = P_{us} / P_{ed}$	$\eta_{ed} = P_u / P_{ed}$
motor input power (P_e)	$\eta_{es} = P_{us} / P_e$	$\eta_e = P_u / P_e$
motor output power (P_o)	$\eta_{os} = P_{us} / P_o$	$\eta_o = P_u / P_o$
fan shaft power (P_a)	$\eta_{as} = P_{us} / P_a$	$\eta_a = P_u / P_a$
fan impeller power (P_r)	$\eta_{rs} = P_{us} / P_r$	$\eta_r = P_u / P_r$

3.11.1**fan air power** P_u

also known as fan total air power; conventional output power which is the product of the mass flow rate and the fan work per unit mass, or the product of the inlet volume flow rate, the compressibility coefficient and the fan pressure

$$q \times p_f \times k_p$$

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[SOURCE: EN ISO 12759:2015, 3.3.12]

3.11.2**fan static air power** P_{us}

conventional output power which is the product of the mass flow rate and the fan static work per unit mass, or the product of the inlet volume flow rate, the compressibility coefficient and the fan static pressure

$$q \times p_{sf} \times k_p$$

[SOURCE: EN ISO 12759:2015, 3.3.13]

3.12**motor input power** P_e

electrical input power supplied at the terminals of an electric motor drive without a variable speed drive

3.13**drive control electrical input power** P_{ed}

electrical input power measured at the input terminals to the variable speed drive of a motor