SLOVENSKI STANDARD
oSIST prEN ISO 13349:2021

01-september-2021

Ventilatorji - Slovar in definicije kategorij (ISO/DIS 13349:2021)

Fans - Vocabulary and definitions of categories (ISO/DIS 13349:2021)

Ventilatoren - Terminologie und Klassifizierung (ISO/DIS 13349:2021)

Ventilateurs - Vocabulaire et définitions des catégories (ISO/DIS 13349:2021)

Ta slovenski standard je istoveten z: **prEN ISO 13349**

ICS:

01.040.23	Tekočinski sistemi in sestavni deli za splošno rabo (Slovarji)	Fluid systems and components for general use (Vocabularies)
23.120	Zračniki. Vetrniki. Klimatske naprave	Ventilators. Fans. Air-conditioners

oSIST prEN ISO 13349:2021 **en,fr,de**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 13349

ISO/TC **117**

Secretariat: **BSI**

Voting begins on:
2021-07-16

Voting terminates on:
2021-10-08

Fans — Vocabulary and definitions of categories

Ventilateurs — Vocabulaire et définitions des catégories

ICS: 23.120; 01.040.23

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 13349:2021(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13349 was prepared by Technical Committee ISO/TC 117, *Fans*.

This second edition cancels and replaces the first edition (ISO 13349:2010), which has been technically revised.

Introduction

This International Standard reflects the importance of a standardized approach to the terminology of fans.

The need for an International Standard has been evident for some considerable time. To take just one example, the coding of driving arrangements differs from manufacturer to manufacturer. What one currently calls arrangement no. 1 can be known by another as arrangement no. 3. The confusion for the customer is only too apparent. For similar reasons, it is essential to use standardized nomenclature to identify particular parts of a fan.

Wherever possible, in the interests of international comprehension, this International Standard is in agreement with similar documents produced by Eurovent, AMCA, VDMA (Germany), AFNOR (France) and UNI (Italy). They have, however, been built on where the need for amplification was apparent.

Use of this International Standard will lead to greater understanding among all parts of the air-moving industry. This International Standard is intended for use by manufacturers, consultants and contractors.

Fans — Vocabulary and definitions of categories

1 Scope

This International Standard defines terms and categories in the field of fans used for all purposes.

It is not applicable to electrical safety.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements*

ISO 5801:2017, *Fans — Performance testing using standardized airways*

ISO 5802:2001, *Industrial fans — Performance testing in situ*

ISO/CD 12759-1, *Fans — Efficiency classification for fans — Part 1:General information for fans*

ISO 13351, *Fans — Dimensions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5167-1 and ISO 5801 and the following apply

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

Note 1 to entry: The term “fan” is taken to mean the fan as supplied, without any addition to the inlet or outlet, except where such addition is specified.

Note 2 to entry: Fans are defined according to their installation category, function, fluid path and operating conditions.

Note 3 to entry: If the work per unit mass exceeds a value of 25 kJ/kg, the machine is termed a turbocompressor. This means that, for a mean stagnation density through the fan of 1,2 kg/m^3, the fan pressure does not exceed 1,2 × 25 kJ/kg, i.e. 30 kPa, and the pressure ratio does not exceed 1,30 since atmospheric pressure is approximately 100 kPa.

3.1.1
non-driven Fan
a fan without motors, drives, attachments or accessories

Note 1 to entry: Also known as Bare Shaft Fan.

See ISO 12759-1.

3.1.2
driven fan
a fan driven by an electrical motor. One or more impellers fitted to or connected to a motor with a stationary element, with or without transmission or variable speed drive.

[SOURCE: See ISO 12759-1.]

3.1.3
fan integrated (embedded) in other energy related products
fan which is an integral part of another product

3.1.4
term for Stand Alone Fan
a fan what is used as a unique entity and integrated into any other product, it may or may not have ducting connected to its inlet and outlet

3.2
Air
abbreviated term for the expression “air or other gas”

3.3
Standard air
by convention, air with a density of 1,2 kg/m^3

3.4 Fan installation categories according to the arrangement of ducting

[SOURCE: See Figure 1.]

3.4.1
installation category A
installation with free inlet and free outlet with a partition

[SOURCE: See ISO 5801 and ISO 5802.]

3.4.2
installation category B
installation with free inlet and ducted outlet

[SOURCE: See ISO 5801 and ISO 5802.]

3.4.3
installation category C
installation with ducted inlet and free outlet

[SOURCE: See ISO 5801 and ISO 5802.]

3.4.4
installation category D
installation with ducted inlet and ducted outlet

[SOURCE: See ISO 5801 and ISO 5802.]

3.4.5
installation category E
installation with free inlet and free outlet without a partition

3.5 Types of fan according to their development and application

3.5.1
custom designed fan
fan developed and produced for one single application

3.5.2
standardised fan
fan whose detailed performance is widely available in a catalogue (electronic and/or printed),and which is frequently manufactured in quantity

3.6 Types of fan according to their function

3.6.1
ducted fan
fan used for moving air within a duct

Note 1 to entry: This fan can be arranged in installation category B, C or D (see Figures 3, 4, 5 and 6).

3.6.2
partition fan
fan used for moving air from one free space to another, separated from the first by a partition having an aperture in which or on which the fan is installed

Note 1 to entry: This fan can be arranged in installation category A (see Figure 7).

3.6.3
jet fan
fan used for producing a jet of air in a space and unconnected to any ducting

[SOURCE: See Figure 8.]

Note 1 to entry: The air jet can be used, for example, for adding momentum to the air within a duct, a tunnel or other space, or for intensifying the heat transfer in a determined zone.

3.6.4
circulating fan
fan used for moving air within a space which is unconnected to any ducting

[SOURCE: See Figure 9.]

3.6.5
air curtain unit
air moving device which produces an air curtain

[SOURCE: See Figure 31.]

3.6.5.1
air curtain
airstream
directionally controlled airstream, moving across the entire height and width of an opening, which can reduce the infiltration or transfer of air from one side of the opening to the other, and inhibits insects, dust or debris from passing through

3.7 Fan types according to the fluid path within the impeller

fan of specific and typical design primarily distinguished by the geometry of its impeller and the resulting gas path through the fan

3.7.1
axial, mixed flow and centrifugal fan
fan types are identified by the angles α, average value of the angles $\alpha 1$ and $\alpha 2$ (see Figure 2)

$$\alpha = (\alpha 1 + \alpha 2)/2$$

The angle α1 is the angle of the tangent at the hub at the intersection of the blade trailing edge with the hub. The angle α2 is the angle of the tangent at the shroud or at the outer diameter of the blade at the intersection of the blade trailing edge with the shroud or with the outer diameter of the blade. If the hub and/or shroud are not axisymmetric, angles α1 and α2 are the average values in circumferential direction. The fan types are defined as in Table 1.

Table 1 — Fan type defined by the relationship of the blade and the shroud/hub

Fan type	Angle α
Axial fan	$\alpha < 20°$
Mixed flow fan	$20° \leq \alpha < 70°$
Centrifugal fan	$70° \leq \alpha$

Note 1 to entry: Centrifugal fans contain the types 'centrifugal radial bladed fan' (including radial tip), 'centrifugal forward curved fan' and 'centrifugal backward curved fan' (including also backward inclined and backward curved aerofoil bladed fans).

3.7.2
axial fan
axial-flow fan in which the air enters and leaves the impeller along essentially cylindrical surfaces coaxial with the fan

[SOURCE: See Figure 4.]

Note 1 to entry: An axial-flow fan can be of the low-, medium- or high-pressure type, according to the aspect ratio of hub diameter to outside impeller diameter. These terms indicate that the pressure generated at a given flow rate is low, medium or high.

Note 2 to entry: Figure 11 shows a cross-section through a family of impellers having the same outside diameter. Fans with ratios of hub/outside impeller diameter of less than approximately 0,4 mm are considered "low aspect ratio", and greater than approximately 0,71 mm are considered "high aspect ratio". Medium aspect ratio axial fans are intermediate between these two figures.

Note 3 to entry: These categories are also affected by the ability to run at the necessary peripheral speed.

3.7.2.1
contra-rotating fan
axial-flow fan which has two impellers arranged in series and rotating in opposite directions

[SOURCE: See Figure 33.]

3.7.2.2
reversible axial-flow fan
axial-flow fan that is specially designed to rotate in either direction, regardless of whether or not the performance is identical in both directions

3.7.2.3
propeller fan
axial-flow fan having an impeller with a small number of broad blades of uniform material thickness and designed to operate in an orifice

3.7.2.4
plate-mounted axial-flow fan
axial-flow fan in which the impeller rotates in an orifice or spigot of relatively short axial length, the impeller blades being of aerofoil section

3.7.2.5
vane-axial fan
axial-flow fan suitable for ducted applications, which has guide vanes before or after the impeller, or both

3.7.2.6
tube-axial fan
axial-flow fan without guide vanes, suitable for ducted applications

3.7.3
mixed-flow fan
fan in which the fluid path through the impeller is intermediate between the centrifugal and axial-flow types

Note 1 to entry: also known as diagonal flow fan.

[SOURCE: See Figures 6 and 12.]

3.7.4
centrifugal fan
fan in which the air enters the impeller with an essentially axial direction and leaves it in a direction perpendicular, or near perpendicular to this axis (see Table 1 and Figures 2,3)

Note 1 to entry: The centrifugal fan is also known as a radial-flow fan.

Note 2 to entry: The impeller can have one or two inlet(s) and might include a shroud and/or a backplate (centreplate) (see Figure 17).

Note 3 to entry: The impeller is defined as “backward-curved or inclined”, “radial” or “forward-curved”, depending on whether the outward direction of the blade at the periphery is backward, radial or forward relative to the direction of the rotation (see Figures 10 and 17).

Note 4 to entry: A centrifugal fan can be of the low-, medium- or high-pressure type, according to the aspect ratio of fan inlet diameter to outside diameter of the impeller. These terms indicate that the pressure generated at a given flow rate is low, medium or high.

Note 5 to entry: Figure 10 shows a cross-section through a family of impellers having the same inlet diameter. Fans with ratios of fan inlet/outside impeller diameter of greater than approximately 0,63 mm are considered “low aspect ratio”, and lower than approximately 0,4 mm are considered “high aspect ratio”. Medium aspect ratio centrifugal fans are intermediate between these two.

Note 6 to entry: The impeller diameter and the casing scroll radii increase with the pressure range for which the fan is designed.

Note 7 to entry: These categories are also affected by the ability to run at the necessary peripheral speed (see 5.2 and Table 2).

3.7.5
cross flow fan (tangential fan)
fan in which the fluid path through the impeller is in a direction essentially at right angles to its axis both entering and leaving the impeller at its periphery

[SOURCE: See Figure 13.]

3.7.6
induced flow fan
housed fan with a nozzle and windband whose outlet airflow is greater than its inlet airflow due to induced airflow

Note 1 to entry: All of the flow entering the inlet will exit through the nozzle, the flow exiting the windband will include the nozzle flow plus the induced flow.

Note 2 to entry: Windband can also referred to as an airflow accelerator or venturi.

3.7.7
peripheral or side channel fan
air moving device for which the circulation of fluid in the toric casing is helicoidal

Note 1 to entry: The rotation of the impeller, which contains a number of blades, creates a helicoidal trajectory, which is intercepted by one or more blades depending on the flow rate. The impeller transfers energy to the fluid (see Figure 16).

3.7.8
multi-stage fan
fan having two or more impellers working in series

EXAMPLE A two-stage fan or a three-stage fan.

Note 1 to entry: Multi-stage fans can have guide vanes and interconnecting ducts between successive impellers.

Note 2 to entry: The blades of an impeller can be either of a profiled section (as an aerofoil) or of uniform thickness (see Figure 17).

3.7.9
in-line centrifugal fan
fan having a centrifugal impeller used in an in-line ducted configuration

[SOURCE: See Figure 5.]

3.7.10
bifurcated fan
fan having an axial-flow, mixed-flow or centrifugal impeller in an in-line configuration where the direct-drive motor is separated from the flowing air stream by means of a compartment or tunnel

[SOURCE: See Figure 28 c).]

3.7.11
plug fan
fan having an unhoused impeller arranged such that the system into which it is inserted acts as a housing, allowing air to be drawn into the impeller inlet

[SOURCE: See Figure 14.]

3.7.12
plenum fan
fan having an unhoused centrifugal impeller which draws air into the impeller through an inlet located in a barrier wall, and having a driver located on the same side of the barrier as the impeller

[SOURCE: See Figure 15.]

3.7.13
in-line and box fan
fan that incorporates centrifugal/mixed-flow impellers

[SOURCE: See Figures 5 and 31.]

3.8 Types of fan according to operating conditions

3.8.1
general-purpose fan
fan suitable for handling air which is non-toxic, unsaturated, non-corrosive, non-flammable, free from abrasive particles and within a temperature range from −20 °C to +80 °C

Note 1 to entry: For temperatures greater than 40 °C, the motor is especially taken into consideration.

3.8.2
special-purpose fan
fan used for special operating conditions

[SOURCE: See 3.8.2.1 to 3.8.2.12.]

Note 1 to entry: A fan can have a combination of special features.

Note 2 to entry: The operating conditions stated below (3.8.2.1 to 3.8.2.12) represent a typical range, but the list is not necessarily complete. It is intended that the manufacturer and purchaser agree on other types having special features to suit specific applications.

3.8.2.1
hot-gas fan
fan used for handling hot gases continuously

Note 1 to entry: Special materials can be incorporated, as necessary, for the fan which can have a direct or indirect drive.

Note 2 to entry: The motor on a direct-drive fan can be either in the air stream or separated from it.

Note 3 to entry: Indirect-drive fans can incorporate a means for cooling belts, bearings or other drive components, where necessary (for designation, see 5.3.2).

3.8.2.2
smoke-ventilating fan
fan suitable for handling hot smoke for a specified time/temperature profile

Note 1 to entry: Special materials can be incorporated, as necessary, for the fan, which can have a direct or indirect drive.

Note 2 to entry: The motor can be either in the air stream on a direct-drive fan or separated from it.

Note 3 to entry: Indirect-drive fans incorporate a means for cooling belts, bearings or other drive components, where necessary (for designation, see 5.3.2).

3.8.2.3
wet-gas fan
fan suitable for handling air containing particles of water or any other liquid

3.8.2.4
gas-tight fan
fan with a suitably sealed casing to match a specified leakage rate at a specified pressure

Note 1 to entry: Depending upon the leakage specification, this can involve special attention being paid to all services which penetrate the casing, such as inspection means, lubricator fittings and electrical supply, as well as the details of the connecting flanges (for categorization, see 5.3.4).

3.8.2.5
dust fan
fan suitable for handling dust-laden air, designed to suit the dust being handled

3.8.2.6
conveying fan
transport fan
fan suitable for the conveying of solids and dust entrained in the air stream, designed to suit the material being conveyed

Note 1 to entry: A conveying/transport fan can be of direct or indirect drive type, depending on whether or not the handled material passes through the impeller.

Note 2 to entry: Examples of solids are wood chips, textile waste and pulverized materials.