SLOVENSKI STANDARD
oSIST prEN ISO 12759-5:2019

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[Not translated]

Fans - Efficiency classification for fans - Part 5: Jet fans (ISO/DIS 12759-5:2019)

Ventilatoren - Effizienzklassifizierung für Ventilatoren (ISO/DIS 12759:2019)

Ventilateurs - Classification du rendement des ventilateurs - Partie 5 : Ventilateurs accélérateurs (ISO/DIS 12759-5:2019)

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ICS:

23.120	Zračniki. Vetrniki. Klimatske naprave	Ventilators. Fans. Air-conditioners

oSIST prEN ISO 12759-5:2019 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 12759-5

ISO/TC **117**

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Fans — Efficiency classification for fans —

Part 5:
Jet fans

ICS: 23.120

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The committee responsible for this document is Technical Committee ISO/TC 117 *Fans.*

A list of all parts in the ISO 12759:— series can be found on the ISO website.

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Introduction

The last decade has seen not only an escalation in the price, but also an increasing recognition of the finite life of many of the fossil fuels in use. There is also a belief that climatic change is due to an increase in the levels of carbon dioxide in the atmosphere. This has resulted in many nations reviewing methods of energy generation and usage.

Therefore, there is a need to promote energy efficiency in order to maintain economic growth. This requires better selection of equipment by users and better design of this equipment by manufacturers.

Fans of all types are used for ventilation and air conditioning, process engineering (drying, pneumatic conveying), combustion air supply and agriculture, etc. Indeed, the energy usage by fans has been calculated as nearly 20 % of worldwide demand.

The fan industry is of a global nature, with a considerable degree of exporting and licensing. To ensure that defined fan performance characteristics are common throughout the world, a series of International Standards has been developed. It is the belief of the industry that there is a need for the recognition of minimum efficiency standards. To encourage their implementation, a classification system is proposed which incorporates a series of efficiency bands. With improvements in technology and manufacturing processes, the minimum efficiency levels can be reviewed and increased over time.

This International Standard can be used by legislators or regulatory bodies for defining future energy saving targets.

Part 5 is specific to Jet Fans whose efficiency ratings are based on Thrust.

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Fans — Efficiency classification for fans —

Part 5:
Jet fans

1 Scope

This International Standard establishes a classification of fan efficiency for all jet fan types driven by motors with an electrical **input power range from 5.5 kW to 155 kW** (and this is likely to be in the size range 500 to 1600 mm diameter with motors rated between 5.5 kW to 150 kW from IEC 60034-34-1).

This standard describes a number of different procedures to classify the efficiency of a fan or to apply a minimum efficiency limit (MEL). Those procedures are described in parts 3, 4, 5 and 6. There is no method described to compare these classifications and MEL's. Direct comparison shall not be made between the classifications and MEL's described in parts 3, 4, 5 and 6.

This International Standard is not applicable to:

a) Jet fans for use in enclosed car parks

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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.

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ISO 13348:2007, *Industrial fans — Tolerances, methods of conversion and technical data presentation*

ISO 13349:2010, *Fans — Vocabulary and definitions of categories*

ISO 13350:2015, *Fans — Performance testing of jet fans*

EN 12101-3:2015, *Smoke and heat control systems. Specification for powered smoke and heat control ventilators (Fans)*

IEC 60034-2-1, *Rotating electrical machines — Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)*

IEC 60034-30-1, *Rotating electrical machines — Part 30-1: Efficiency classes of single-speed, three-phase, squirrel-cage induction motors*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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3.1 Fans — General

3.1.1
Fan
Rotary bladed machine which 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: Fans are defined according to their installation category, function, fluid path and operating conditions.

Note 2 to entry: Adapted from ISO 13349:2010, definition 3.1.1.

3.1.2
Jet fan
fan used for producing a jet of air in a space and not connected to any ducting, that is type E category/ configuration. Performance must only be expressed as thrust and efficiency is determined from thrust measurement or calculation. Performance characteristics relating to pressure development are not compliant

3.1.3
Fan size
Maximum impeller tip diameter, D, on which the design of the fan is based

3.1.4
Drive
(Transmission and motor/control system) device used to power the fan, including motor, mechanical transmission and motor/control system

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Note 1 to entry: Examples of a motor or control system are variable frequency controller and electronic commutator.

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3.1.5
Air
Abbreviated term for the expression “air or other gas”

[SOURCE: ISO 13349:2010, definition 3.2]

3.1.6
Standard air
ρ
Atmospheric air having a density of exactly 1,2 kg/m^3

Note 1 to entry: Atmospheric air at a temperature of 16 °C, a pressure of 100 000 Pa and a relative humidity of 65 %, has a density of 1,2 kg/m^3, but these conditions do not form part of the definition.

Note 2 to entry: Adapted from ISO 13349:2010, definition 3.3.

3.2 Fan or test installation categories according to the arrangement of ducting

3.2.1
Installation category E
Installation with free inlet and free outlet without a partition

3.3 Fans — Definitions relating to calculations

3.3.1
Average density at fan inlet
ρ_1
Fluid density calculated from the absolute pressure and the static temperature

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3.3.2
Atmospheric pressure
Pa
Pressure, measured with respect to absolute zero pressure, which is exerted at a point at rest relative to the air around it

3.3.3
Fan pressure
Pf
Difference between the stagnation pressure at the fan outlet and the stagnation pressure at the fan inlet

3.3.4
Conventional dynamic pressure at a point
Pd
Pressure calculated from the velocity and the density of the air at the point

3.3.5
Fan dynamic pressure at the fan outlet
Pd2
Conventional dynamic pressure at the fan outlet calculated from the mass flow rate, the average gas density at the outlet and the outlet area

3.3.6
Mass flow rate
qm
Mean value, over time, of the mass of air which passes through the specified airway cross-section per unit of time

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3.3.7
Volume flow rate determined by thrust
q_v(T)
Mass flow rate at the inlet divided by the corresponding mean value, over time, of the average density at the inlet

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3.3.8
Fan work per unit mass
W m
Increase in mechanical energy per unit mass of fluid passing through the fan

3.3.9
Fan air power
P_u
conventional power output at standard conditions; in the particular case of a jet fan, product of inlet volume flow and effective fan dynamic pressure

3.3.10
Nominal motor power
P_N
Rated output power of an electric motor

3.3.11
Fan shaft power
P_a
Mechanical power supplied to the fan shaft

3.3.12
Motor output power
P_o
Shaft power output of the motor or other prime mover

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