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Fans — Efficiency classification for fans —

Part 3: Fans without drives at maximum operating speed

Ventilateurs — Classification du rendement des ventilateurs —

Partie 3: Ventilateurs non entraînés à vitesse maximale de fonctionnement

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

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

This first edition cancels and replaces ISO 12759:2010, which has been technically revised. It also incorporates the Amendment ISO 12759:2010/Amd.1:2013.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The last decade has seen both an escalation in the price and an increasing recognition of the finite life of many of the fossil fuels currently used. There is also a belief by many that climatic change is due to increasing levels of carbon dioxide in the atmosphere. This has led to many nations reviewing methods of energy generation and usage.

To maintain economic growth there is therefore a need to promote energy efficiency. This requires better selection of equipment by users and thus better design of this equipment by its manufacturers.

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

The fan industry is of a global nature, with a considerable degree of exporting and licensing. To ensure that the defining fan performance characteristics are common throughout the world a series of standards have been developed. It is the belief of the industry that there is now a need for minimum efficiency standards to be recognized. 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 in time.

There have been comments concerning the long-standing definition of wide bands used in this document so that, for example, a fan measured as having an efficiency of 68 % is classified as belonging to class FEG71. In other parts of the ISO 12759 series fans are classified as belonging to a certain class only if the measured value is equal to or greater than the class number.

Work is being undertaken to reach a more common approach between the various parts of the ISO 12759 series, for example by renaming the classes or by introducing narrower classes, so that a fan measured with an efficiency of 68 % is said to belong to class FEG68.

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Fans — Efficiency classification for fans —

Part 3:
Fans without drives at maximum operating speed

1 Scope

This document establishes a system for the classification of fan efficiency for all fan types which have a nominal fan shaft power rating of 0,125 kW and above. This document is applicable to fans only. It does not apply to drives or the system in which fans are installed. This document can be used by legislators or regulatory bodies for defining future energy saving targets.

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.

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

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

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

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
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 test configuration, function, fluid path and operating conditions (see ISO 13349).

3.2
fan size
nominal diameter of the impeller

3.3
drive
mechanism used to power the fan

Note 1 to entry: A drive can include the motor and any combination of devices such as couplings and mechanical or electrical transmissions such as belts, chains, gears and variable frequency drives (VFDs).

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3.4
fan without drives
fan without attachments or accessories

Note 1 to entry: See Figure 1.

3.5
optimum efficiency
maximum efficiency achieved on the fan air characteristic with all operational parameters, except the air system resistance, being fixed

3.6
fan efficiency grade
FEG
value detailing the efficiency metric for a fan without drives

4 Symbols and units

The following primary symbols and units for the parameters listed shall be used.

Symbol	Term	Unit
d	Fan size (diameter)	mm
η_{opt}	Optimum efficiency	Expressed as a decimal[a]
[a] Efficiency in percent (%) divided by 100 equals the efficiency expressed as a decimal.		

5 General information

5.1 General

Fans range from the purpose-built single fan to the series produced certified ranges manufactured in large quantities. A fan may be an impeller on a shaft with no drive mechanism attached (fan without drive), Figure 1.

The variation in design has led to efficiency being defined in a number of ways to suit the demands of the fan type and the market place.

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