

POTENTSIAALSELT PLAHVATUSOHTLIKUS
KESKKONNAS TÖÖTAVATE VENTILAATORITE
PROJEKTEERIMINE

Design of fans working in potentially explosive
atmospheres

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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English Version

Design of fans working in potentially explosive atmospheres

Conception des ventilateurs pour les atmosphères
explosibles

Konstruktion von Ventilatoren für den Einsatz in
explosionsgefährdeten Atmosphären

This European Standard was approved by CEN on 30 October 2016.

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European foreword

This document (EN 14986:2017) has been prepared by Technical Committee CEN/TC 305 "Potentially explosive atmospheres - Explosion prevention and protection", the secretariat of which is held by DIN.

This document supersedes EN 14986:2007.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2017, and conflicting national standards shall be withdrawn at the latest by July 2017.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2014/34/EU.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a type C standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered and indicated in the scope of this European Standard.

When provisions of this type C standard are different from those, which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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1 Scope

1.1 This European Standard specifies the constructional requirements for fans constructed to Group II G (of explosion groups IIA, IIB and hydrogen) categories 1, 2 and 3, and Group II D categories 2 and 3, intended for use in explosive atmospheres.

NOTE 1 Operation conditions for the different categories of fans used in this European Standard are defined in Clause 4.

NOTE 2 Technical requirements for category 1 D fans are not given in this document. Where explosive dust atmospheres are regularly conveyed, explosion protection measures as described in EN 1127-1 are required if this specific use is needed.

1.2 This European Standard does not apply to group I fans (fans for mining), cooling fans or impellers on rotating electrical machines, cooling fans or impellers on internal combustion engines.

NOTE 1 Requirements for group I fans are given in EN 1710.

NOTE 2 The requirements for electrical parts are covered by references to electrical equipment standards.

1.3 This European Standard specifies requirements for design, construction, testing and marking of complete fan units intended for use in potentially explosive atmospheres in air containing gas, vapour, mist and/or dusts. Such atmospheres may exist inside (the conveyed atmosphere (flammable or not)), outside, or inside and outside of the fan.

1.4 This European Standard is applicable to fans working in ambient atmospheres and with normal atmospheric conditions at the inlet, having

- absolute pressures ranging from 0,8 bar to 1,1 bar,
- and temperatures ranging from -20 °C to $+60\text{ °C}$,
- and maximum volume fraction of 21 % oxygen content,
- and an aerodynamic energy increase of less than 25 kJ/kg.

NOTE 1 25 kJ/kg is equivalent to 30 kPa at inlet density of $1,2\text{ kg/m}^3$.

This European Standard may also be helpful for the design, construction, testing and marking of fans intended for use in atmospheres outside the validity range stated above or in cases where other material pairings need to be used. In this case, the ignition risk assessment, ignition protection provided, additional testing (if necessary), manufacturer's marking, technical documentation and instructions to the user, should clearly demonstrate and indicate the equipment's suitability for the conditions the fan may encounter.

This European Standard should not apply to integral fans as a part of Diesel engines, vehicles or electric motors.

NOTE 2 Where undated references are used in the body of the standard the latest edition applies.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1127-1:2011, *Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology*

EN ISO 80079-36:2016, *Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements (ISO 80079-36:2016)*

EN ISO 80079-37:2016, *Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k" (ISO 80079-37:2016)*

EN 60079-0, *Explosive atmospheres - Part 0: Equipment - General requirements*

EN ISO 5801, *Industrial fans - Performance testing using standardized airways (ISO 5801)*

EN ISO 11925-2, *Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2)*

EN ISO 12100, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100)*

EN ISO 16852:2010, *Flame arresters - Performance requirements, test methods and limits for use (ISO 16852:2008, including Cor 1:2008 and Cor 2:2009)*

EN ISO 13349:2010, *Fans - Vocabulary and definitions of categories (ISO 13349:2010)*

ISO 14694:2003, *Industrial fans — Specifications for balance quality and vibration levels*

ISO 14694:2003/AMD1, *Industrial fans — Specifications for balance quality and vibration levels*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1127-1:2011, EN ISO 80079-36:2016 and the following apply.

3.1

externally mounted flame arrester

flame arrester consisting of a flame arrester housing and flame arrester elements mounted as a separate equipment on the fan

3.2

integrated flame arrester

flame arrester consisting of a flame arrester housing and flame arrester elements where the flame arrester housing is part of the fan housing

3.3

contact diameter

diameter of a rotating part at the point where it can contact a stationary part