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Design of fans working in potentially explosive atmospheres

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 06/24

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English Version

Design of fans working in potentially explosive atmospheres

Conception des ventilateurs pour les atmosphères
explosiblesKonstruktion von Ventilatoren für den Einsatz in
explosionsgefährdeten Bereichen

This European Standard was approved by CEN on 16 March 2024.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 8 May 2024.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EN 14986:2024 (E)

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EN 14986:2024 (E)**European foreword**

This document (EN 14986:2024) 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 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of an identical text or by endorsement, at the latest by October 2024, and conflicting national standards shall be withdrawn at the latest by October 2024.

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 supersedes EN 14986:2017.

The significant changes with respect to EN 14986:2017 are listed in Annex F.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This document is a type C standard as stated in EN ISO 12100:2010.

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

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.

EN 14986:2024 (E)

1 Scope

1.1 This document 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 Operation conditions for the different categories of fans used in this document are defined in Clause 4.

1.3 This document 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 can exist inside (the conveyed atmosphere (flammable or not)), outside, or inside and outside of the fan.

This document covers mechanical equipment, in particular fans. The “type of protection” as specified in EN ISO 80079-37:2016 is constructional safety.

1.4 This document 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 document can 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, clearly demonstrate and indicate the equipment's suitability for the conditions the fan can encounter.

NOTE 2 Temperatures below -20 °C can be considered. Material suitability can require specific evaluation for these temperatures. With lower temperature the explosion pressure increases, which leads to increased test pressures (see A.3) and can require specific testing. Although the standard atmospheric conditions in EN ISO 80079-36:2016 give a temperature range for the atmosphere of -20 °C to $+60\text{ °C}$ the normal ambient temperature range for the equipment is -20 °C to $+40\text{ °C}$ unless otherwise specified and marked.

1.5 This document does not apply to:

- group I fans (fans for mining);
- explosion group IIC (other than hydrogen);
- category 1D fans;
- cooling fans or impellers on rotating electrical machines;
- cooling fans or impellers on internal combustion engines, vehicles or electric motors.

NOTE 1 Measures for category 1D fans are given in EN 1127-1:2019.

NOTE 2 Measures for explosion group IIC (other than hydrogen) are given in EN 1127-1:2019.

NOTE 3 Measures for explosion group I are given in EN ISO/IEC 80079-38:2016 and EN 1127-2:2014.

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 1127-1:2019, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 60079-14:2014, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection (IEC 60079-14:2013)*

EN IEC 60079-0:2018, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2017)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13349-1:2022, *Fans — Vocabulary and definitions of categories — Part 1: Vocabulary (ISO 13349-1:2022)*

EN ISO 16852:2016, *Flame arresters — Performance requirements, test methods and limits for use (ISO 16852:2016)*

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)*

CLC/TR 60079-32-1:2018, *Explosive atmospheres — Part 32-1: Electrostatic hazards, guidance*

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

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