

Mitteelelektrilised seadmed plahvatusohtlike keskkondade jaoks. Osa 6: Kaitsmine süttimisallika kontrolli 'b' abil

Non-electrical equipment for use in potentially explosive atmospheres - Part 6: Protection by control of ignition source 'b'

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 13463-6:2005 sisaldab Euroopa standardi EN 13463-6:2005 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 22.06.2005 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 20.04.2005.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 13463-6:2005 consists of the English text of the European standard EN 13463-6:2005.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 22.06.2005 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 20.04.2005.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

ICS 13.230

Võtmesõnad:

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

ICS 13.230

English version

**Non-electrical equipment for use in potentially explosive
atmospheres - Part 6: Protection by control of ignition source 'b'**

Appareils non électriques destinés à être utilisés en
atmosphères explosibles - Partie 6: Protection par contrôle
de la source d'inflammation 'b'

Nicht-elektrische Geräte für den Einsatz in
explosionsgefährdeten Bereichen - Teil 6: Schutz durch
Zündquellenüberwachung 'b'

This European Standard was approved by CEN on 15 March 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword.....	3
Introduction	4
1 Scope	6
2 Normative references	7
3 Terms and definitions	7
4 Determination of suitability	7
5 Determination of the control parameters	8
6 Ignition prevention system design and settings	8
7 Ignition protection of sensors and actuators	9
8 Ignition prevention levels (IPL) of the ignition prevention system	9
9 Type tests	11
10 Instructions for use	11
11 Marking	12
Annex A (informative) Flow diagram of the procedures described in this document	13
Annex B (informative) Thought process used to assign IPLs to different categories of equipment	14
Annex C (informative) Background information on EN 954-1 and EN 61508	15
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 94/9/EC.....	16
Bibliography	21

Foreword

This document (EN 13463-6:2005) 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 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

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 94/9/EC of 23 March 1994.

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

This document is to specify the requirements for the type of protection "Control of ignition sources" for equipment intended for use in potentially explosive atmospheres and should be used in conjunction with EN 13463-1 "Non-electrical equipment for potentially explosive atmospheres – Part 1: Basic method and requirements".

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

Introduction

Many types of non-electrical equipment intended for use in potentially explosive atmospheres of gas, vapour, mist and/or combustible dust, do not contain an effective ignition source in normal operation. However, there is a risk that an ignition source might arise in such equipment if the moving parts suffer a malfunction or an abnormal operation occurs.

An example of this is a fan, having high speed rotating blades fixed to a shaft, supported on rolling element bearings, inside a stator. In normal operation, no frictional ignition sources should be present. However, because the clearances between the rotor and stator are very small, malfunctions such as the collapse of a shaft bearing, distortion of a rotating blade, build up of foreign material on a rotating blade, etc. could cause the clearance to be reduced and frictional sparking, or hot surfaces, to occur.

To prevent potential ignition sources from becoming effective during normal operation, malfunction and rare malfunction, it is possible to incorporate sensors into the equipment to detect impending dangerous conditions and initiate control measures at an early stage of deterioration before the potential sources are converted into effective sources. The control measures applied, may be initiated automatically, via direct connections between the sensors and the ignition prevention system, or manually, by providing a warning to the equipment operator (With the intention of the operator applying the ignition prevention measures e.g. by stopping the equipment).

In this document, the incorporation of such sensors and their associated automatic/manual ignition prevention measures, to prevent potential ignition sources becoming effective ignition sources, is known as protection by "Control of ignition source 'b' "

This type of ignition protection, and the devices used to achieve it, can take many forms. In practice, they may be mechanical, electrical, optical, visual or a combination of all of these. Although this document deals with the ignition protection of non-electrical equipment, it nevertheless has to take account of the fact that an increasing amount of non-electrical equipment makes use of electrical sensors to detect and initiate the ignition prevention measures. It is therefore impossible to produce a non-electrical equipment protection standard without making reference to the use of electrical sensors and their associated ignition prevention system circuits.

Some examples of mechanical sensor / actuator devices are:

- a) fuseable plugs (as used in fluid couplings), that melt to release the energy contained in the power transmission fluid before the temperature of ignition capable parts exceed allowable limits;
- b) centrifugal speed governors, that directly control the power throttle and prevent rotating parts attaining frictional ignition capable rotational speeds;
- c) thermostatic valves, that close to reduce the input energy, or open to increase the amount of coolant, thereby preventing ignition capable temperatures being attained;
- d) pressure relief valves (using springs or weights), that open to limit pressure levels and consequent temperature rise during gas compression. Alternatively, to protect against catastrophic failure leading to the exposure of unintended hot surfaces.

Some examples of combined electro-mechanical sensor / actuator devices are:

- e) temperature, flow and level monitoring/control devices, that detect temperature / flow / level and initiate a solenoid valve to reduce the input energy, or increase the amount of coolant,
- f) optical pulse counters, that sense abnormal rotational speeds on the teeth of gears and send signals to a speed controller,
- g) vibration sensors, that detect abnormal vibration, from e.g. rolling element bearings, before they fail (usually indicated by high frequency vibrations), or rotating parts that are becoming out of dynamic balance (usually indicated by low frequency vibrations),

- h) conveyor belt alignment devices, that detect unintended frictional rubbing between the moving belt and fixed parts of the supporting structure,
- i) power transmission belt tension devices, that detect frictional slippage between the drive pulley and power transmission belt, due to loss of belt tension,
- j) wear detectors on clutches, which detect unacceptable wear likely to cause frictional heating by incorrect engagement of the clutch.

Such sensor / actuator control devices may be either, continuously active in normal operation of the equipment (e.g. to control the temperature of category 3 equipment), or be arranged so that they only detect abnormal operation (e.g. to detect impending dangerous over-temperature in category 2 equipment).

As malfunction of any of the above sensors / actuator control devices, may result in failure to apply the appropriate ignition prevention measure, they are critical to the ignition safety related parts of the equipment. This ignition protection standard therefore calls for them to be assessed and suggests a minimum quality for such devices in the form of an ignition prevention level (IPL) that the equipment manufacturer must attempt to achieve.

Thus, to meet the requirements of this document, the non-electrical equipment manufacturer is required to perform both the ignition hazard assessment (required by EN 13463-1), and additionally, an evaluation, to determine the ignition prevention level (IPL) necessary to ensure that the sensors / ignition prevention system function when they are called upon to contain the ignition risk within tolerable limits.

A flow diagram is provided at Annex A (Figure A.1) to assist the non-electrical equipment manufacturer follow the procedural stages described in this document.

1 Scope

This document specifies the requirements for the design and construction of equipment, intended for use in potentially explosive atmospheres, protected by the type of protection: Control of ignition source "b".

This document supplements the requirements in EN 13463-1, the contents of which also apply in full to equipment constructed in accordance with this document.

Equipment conforming with the relevant clauses of this document meet the requirements for the following categories:

- Equipment Group I Category M2 – that does not contain an ignition source arising from severe operating conditions, in particular arising from rough handling and changing environmental conditions in mines;
- Equipment Group II category 3 – that does not contain an ignition source in normal operation;
- Equipment Group II category 2G or 2D – that does not contain an ignition source arising as a result of foreseeable malfunctions;
- Equipment Group II category 1G or 1D – that does not contain an ignition source in normal operation, or under foreseeable malfunctions, or under rare malfunctions.

NOTE The requirements for Group I, Category M1 equipment, are given in EN 50303, which specifies the requirements for both electrical and non-electrical equipment

This type of protection can be used to produce category 3 equipment which otherwise would have an ignition source in normal operation, i.e. it is not able to conform with EN 13463-1

The type of ignition protection described in the standard can be used either on its own or in combination with other types of ignition protection to meet the requirements for equipment of Group I category M2, or Group II categories 1, 2 and 3 depending on the ignition hazard assessment in EN 13463-1.

This document does not apply to:

- control devices which are not intended to provide ignition protection;
- the ignition protection of electrical equipment;
- equipment shut down systems, initiated by flammable gas detectors, explosive atmosphere detectors, carbon monoxide, fire, or smoke detectors.

NOTE This is because this document deals only with the detection and control of impending ignition sources in equipment, not the detection of explosive atmospheres surrounding it.

Ignition protection systems conforming to the relevant clauses of this document are not intended to be autonomous protective systems.

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.

EN 954-1, *Safety of Machinery — Safety-related parts of control systems — Part 1: General principles for design*.

EN 1127-1:1997, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*.

EN 1127-2:2002, *Explosive atmospheres — Explosion prevention and protection — Part 2: Basic concepts and methodology for mining*.

EN 13463-1:2001, *Non-electrical equipment for potentially explosive atmospheres — Part 1: Basic method and requirements*.

EN 60079-0:2004, *Electrical apparatus for explosive gas atmospheres — Part 0: General requirements*.