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NON-ELECTRICAL EQUIPMENT FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES - PART 3: PROTECTION BY FLAMEPROOF ENCLOSURE 'D'

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Non-electrical equipment for use in potentially explosive atmospheres - Part 3: Protection by flameproof enclosure 'd'

Appareils non électriques destinés à être utilisés en atmosphères explosibles - Partie 3 : protection par enveloppe antidéflagrante 'd'

Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen - Teil 3: Schutz durch druckfeste Kapselung 'd'

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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.

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Foreword

This document (EN 13463-3:2005) 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of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.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 94/4EC 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 “Protection by flameproof enclosure” 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 – 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

Some types of non-electrical equipment intended for use in potentially explosive atmospheres of gas, vapour, mist and/or combustible dust, contain effective ignition sources in normal operation and these have to be prevented from becoming an ignition source for the surrounding atmosphere in which they are used. One way of achieving this is to enclose the ignition sources so that an ignition of the atmosphere inside the enclosure is not transmitted to the outside atmosphere. This document describes one such way, known as protection by "Flameproof enclosure 'd'".

The basic principle of ignition protection by the use of a flameproof enclosure, is that gases, or vapour, may enter the enclosure through the cover joints / flanges and if an explosive atmosphere inside the enclosure ignites, neither the enclosure will be deformed significantly, nor flame transmitted through the joints / flanges to the explosive atmosphere outside. For this reason the enclosure has to be both robust and have dimensionally controlled cover joints / flanges with maximum allowable safe gaps appropriate for the types of explosive gas / vapour likely to occur inside the equipment.

Since its conception, protection by flameproof enclosure has been developed to allow many kinds of continuously sparking equipment to be used safely in places where a potentially explosive atmosphere exists. For electrical equipment, this type of protection is well known for protecting power arcing components and is defined and described in EN 60079-1. As the electrical equipment standard contains the generic testing, verification and marking requirements, unnecessary duplication of the requirements in this non-electrical equipment document is avoided by cross reference to the electrical standard. In this document, only those differences necessary for the purpose of providing protection for non-electrical equipment are written in full.

In contrast to this document EN 60079-1 does not consider explosive atmospheres formed by dusts, except for Group I, category M2 electrical equipment, where its associated general requirements document, EN 60079-0, states that flameproof equipment designed, constructed and tested for use in explosive atmospheres of firedamp (explosive mine gas consisting mainly of methane) needs no alteration, or further testing to allow it to be used where a coal dust cloud is present.

The concept of protecting equipment against dust cloud ignition by testing it in a gas / air mixture is also accepted in this document for both Group I, Category M2 mining equipment, and Group II, Category 2G and 2D non-mining equipment. This is because it introduces an acceptable safety factor against ignition and it allows a much more simple method of testing and verifying its explosion protection properties.

Examples of non-electrical types of equipment that can be protected by flameproof enclosure are:

a) Equipment with potentially hot rubbing surfaces exceeding the ignition temperature of the atmosphere surrounding them, e.g. friction clutches and brake linings

b) equipment that has to operate at high temperature to function correctly, such as catalytic converters in the exhaust systems of flameproof internal combustion engines, or hot catalytic pellistors used in the sensors of flammable gas measuring instruments,

c) equipment producing incendive frictional sparks in normal operation.

Little equipment is currently made to flameproof designs for dust applications, because alternative designs using dust tight enclosures are usually cheaper. There are however non-mining applications where both dust and gas are present, where this document may be applicable.

Where dust alone is present, there is usually no mechanism to create inside an enclosure an explosive dust cloud, although deposits of dust may form. The risk from a fire involving dust deposits inside the enclosure is not considered by this document, as it falls outside the concept of protection by flameproof enclosure.