



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 13821:2002

ICS 13.320

**POTENTIALLY EXPLOSIVE ATMOSPHERES -
EXPLOSION PREVENTION AND PROTECTION
- DETERMINATION OF MINIMUM IGNITION
ENERGY OF DUST/AIR MIXTURES**

National Standards
Authority of Ireland
Dublin 9
Ireland

Tel: (01) 807 3800
Tel: (01) 807 3838

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Potentially explosive atmospheres - Explosion prevention and protection - Determination of minimum ignition energy of dust/air mixtures

Atmosphères explosibles - Prévention et protection contre l'explosion - Détermination de l'énergie minimale d'inflammation des mélanges poussière/air

Explosionsfähige Atmosphären - Explosionsschutz - Bestimmung der Mindestzündenergie von Staub/Luft-Gemischen

This European Standard was approved by CEN on 16 October 2002.

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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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, 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

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Foreword

This document EN 13821:2002 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of an identical text or by endorsement, at the latest by May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

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(s).

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

Annex A is normative.

This document includes a Bibliography.

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

1 Scope

This European Standard specifies a method of test to determine the minimum ignition energy of a dust/air mixture by an electrically-generated spark.

The test method is not suitable for use with recognised explosives, gunpowder, dynamite, explosives which do not require oxygen for combustion; pyrophoric substances, or substances or mixtures of substances which can under some circumstances behave in a similar manner. Where any doubt exists about the existence of a hazard due to explosive properties, expert advice should be sought.

WARNING — It is essential that precautions are taken to safeguard the health of personnel conducting the tests against the risk of fire, explosion and/or toxic effects, of combustion products.

2 Normative references

There are no normative references.

3 Terms and definitions

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

3.1

dust

small solid particles that are able to remain suspended in air for some time

NOTE Normally maximum particle sizes will not exceed 500 µm. This definition includes what are defined in ISO 4225 as 'dust' and 'grit'

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3.2

combustible dust

dust able to undergo an exothermic reaction with air when ignited

3.3

explosive dust/air mixture

mixture of dust with air in which, after ignition has occurred, combustion spreads to the entire unburned mixture

3.4

spark discharge

transient discrete electric discharge which takes place between two electrodes which are at different potentials. The discharge bridges the gap between the conductors in the form of a single ionisation channel

3.5

minimum ignition energy of an explosive dust/air mixture

lowest electrical energy stored in a capacitor which upon discharge is just sufficient to effect ignition of the most ignitable mixture of a given dust under specific test conditions

3.6

ignition

propagation of a sustainable flame away from the spark discharge position

3.7

ignition delay time

time between the onset of dispersion of the dust sample into a cloud and the occurrence of the spark discharge

3.8

test conditions (temperature, pressure)

air having a temperature in the range from 20 °C to 25 °C and a pressure in the range from 0.8 bar to 1.1 bar, absolute

4 Test apparatus

4.1 Spark generation circuit

Annex A describes some suitable forms of circuit for spark generation all of which shall have the following characteristics:

- a) inductance of discharge circuit: from 1 mH to 2 mH except when the data is to be used for the assessment of electrostatic hazards. Then the total inductance of the discharge circuit shall not exceed 25 μ H;
- b) ohmic resistance of discharge circuit: as low as possible and not more than 5 Ω ;
- c) electrode material: tungsten, stainless steel, brass, or copper;
- d) electrode shaft diameter: 2.0 ± 0.5 mm;
- e) electrode shape: pointed;
- f) electrode gap: ≥ 6 mm (minimum);
- g) capacitance of electrode arrangement: as low as possible. If the parasitic capacitance of the electrode system is significant compared with the discharge capacitance, it shall be taken into account;
- h) insulation resistance between electrodes: sufficiently high to prevent leakage currents.

NOTE For low spark energies together with pointed electrodes a significant fraction of the energy in the capacitance can drain away as corona discharges prior to the spark discharge.

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