

Electrical apparatus for use in the presence of combustible dust —

Part 1: Protection by enclosures “tD”

The European Standard EN 61241-1:2004 has the status of a
British Standard

ICS 29.260.20

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 61241-1:2004, incorporating corrigendum December 2006. It should be read in conjunction with BS EN 61241-0. It is identical with IEC 61241-1:2004. Together with BS EN 61241-0, it supersedes BS EN 50281-1-1:1999 which will be withdrawn on 1 October 2008. It partially supersedes BS 6467-1:1985 and BS 6467-2:1988 which are withdrawn.

The UK participation in its preparation was entrusted by Technical Committee GEL/31, Electrical apparatus for explosive atmospheres, to Subcommittee GEL/31/20, Apparatus for use in the presence of combustible dust.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 13 January 2005

© BSI 2007

ISBN 0 580 45200 X

Amendments issued since publication

Amd. No.	Date	Comments
15758 Corrigendum No. 1	25 November 2005	Revision of supersession details
16958 Corrigendum No. 2	28 February 2007	Revision of EN foreword and supersession details in national foreword, and addition of Annex ZZ

EUROPEAN STANDARD

EN 61241-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2004

ICS 29.260.20

English version

Electrical apparatus for use in the presence of combustible dust
Part 1: Protection by enclosures "tD"
(IEC 61241-1:2004)

Matériels électriques pour utilisation
en présence de poussières combustibles
Partie 1: Protection par enveloppes "tD"
(CEI 61241-1:2004)

Elektrische Betriebsmittel zur Verwendung
in Bereichen mit brennbarem Staub
Teil 1: Schutz durch Gehäuse "tD"
(IEC 61241-1:2004)

This European Standard was approved by CENELEC on 2004-06-01. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees 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.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

© 2004 CENELEC - All rights of exploitation in any form and by any means reserved worldwide for CENELEC members.

Foreword

The text of document 31H/168/FDIS, future edition 1 of IEC 61241-1, prepared by SC 31H, Apparatus for use in the presence of combustible dust, of IEC TC 31, Electrical apparatus for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61241-1 on 2004-06-01.

This part of EN 61241 is to be read in conjunction with EN 61241-0.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2007-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2008-10-01

This European Standard was prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and supports the essential requirements of Directive 94/9/EC.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61241-1:2004 was approved by CENELEC as a European Standard without any modification.

CONTENTS

INTRODUCTION.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 Construction.....	7
5 Practice A and practice B	7
6 Supplementary requirements for electrical apparatus protected by enclosures for practice A for use in zones 20, 21 and 22.....	7
7 Supplementary requirements for electrical apparatus protected by enclosures for practice B for use in zone 20 or 21	8
7.1 Joints	8
7.1.1 Plain joints	8
7.1.2 Spigotted joints.....	8
7.1.3 Gasketed joints.....	9
7.2 Operating rods, spindles or shafts	9
7.2.1 General	9
7.2.2 Running contact seals	9
7.2.3 Power shafts	9
7.2.4 Operating rods.....	10
7.3 Clearance of bolts	10
8 Verification and tests	11
8.1 General	11
8.2 Type tests	11
8.2.1 Tests for dust exclusion by enclosures	11
8.2.2 Thermal tests	13
9 Marking	13
Annex ZA (normative) Normative references to international publications with their corresponding European publications	14
Annex ZZ (informative) Coverage of Essential Requirements of EC Directives.....	15
Bibliography.....	16
Figure 1 – Plain joints	8
Figure 2 – Spigotted joints	8
Figure 3 – Gasketed joints	9
Figure 4 – Power shafts for speeds of 100r/min or more	10
Figure 5 – Clearance of bolts	11
Table 1 – Plain joints	8
Table 2 – Gasketed joints	9
Table 3 – Power shafts for speeds of 100 r/min or more	10
Table 4 – Power shafts for speeds of less than 100 r/min	10

INTRODUCTION

Many dusts which are generated, processed, handled and stored, are combustible. When ignited they can burn rapidly and with considerable explosive force if mixed with air in the appropriate proportions. It is often necessary to use electrical apparatus in locations where such combustible materials are present, and suitable precautions must therefore be taken to ensure that all such apparatus is adequately protected so as to reduce the likelihood of ignition of the external explosive atmosphere. In electrical apparatus, potential ignition sources include electrical arcs and sparks, hot surfaces, and frictional sparks.

Areas where dusts, flyings and fibres in air occur in dangerous quantities are classified as hazardous and are divided into three zones according to the level of risk.

Generally, electrical safety is ensured by the implementation of one of two considerations, i.e. that electrical apparatus be located where reasonably practicable outside hazardous areas and that electrical apparatus be designed, installed and maintained in accordance with measures recommended for the area in which the apparatus is located.

Combustible dust can be ignited by electrical apparatus in several ways:

- by surfaces of the apparatus that are above the minimum ignition temperature of the dust concerned. The temperature at which a type of dust ignites is a function of the properties of the dust, whether the dust is in a cloud or layer, the thickness of the layer and the geometry of the heat source;
- by arcing or sparking of electrical parts such as switches, contacts, commutators, brushes or the like;
- by discharge of an accumulated electrostatic charge;
- by radiated energy (e.g. electromagnetic radiation);
- by mechanical sparking or frictional sparking or heating associated with the apparatus.

In order to avoid ignition hazards it is necessary that:

- the temperature of surfaces on which dust can be deposited, or which would be in contact with a dust cloud, is kept below the temperature limitation specified in this standard;
- any electrical sparking parts, or parts having a temperature above the temperature limit specified in IEC 61241-14:
 - are contained in an enclosure which adequately prevents the ingress of dust, or
 - the energy of electrical circuits is limited so as to avoid arcs, sparks or temperatures capable of igniting combustible dust;
- any other ignition sources are avoided.

Compliance with this part of IEC 61241 will only provide the required level of safety if the electrical apparatus is operated within its rating and is installed and maintained according to the relevant codes of practice or requirements, for example in respect of protection against over-currents, internal short-circuits, and other electrical faults. In particular, it is essential that the severity and duration of an internal or external fault be limited to values that can be sustained by the electrical apparatus without damage.