

BRITISH STANDARD CODE OF PRACTICE

CP 1003: Part 1: 1964

UDC 621.3-7 : 614.83

DECLARED OBSOLESCE

OCTOBER 1985

**ELECTRICAL APPARATUS
AND ASSOCIATED EQUIPMENT FOR USE IN
EXPLOSIVE ATMOSPHERES
OF GAS OR VAPOUR
OTHER THAN MINING APPLICATIONS**

**Part 1. Choice, installation and maintenance of
flameproof and intrinsically-safe equipment**

**THE COUNCIL FOR CODES OF PRACTICE
BRITISH STANDARDS INSTITUTION**

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**Incorporating amendments issued April 1973 (AMD 1142)
and July 1976 (AMD 2053)**

**THE COUNCIL FOR CODES OF PRACTICE
BRITISH STANDARDS INSTITUTION**

British Standards House, 2 Park Street, London, W1



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**ELECTRICAL APPARATUS AND ASSOCIATED EQUIPMENT
FOR USE IN EXPLOSIVE ATMOSPHERES OF GAS OR
VAPOUR (OTHER THAN MINING APPLICATIONS)**

**PART 1. CHOICE, INSTALLATION AND MAINTENANCE OF
FLAMEPROOF AND INTRINSICALLY-SAFE EQUIPMENT**

This part of the Code of Practice has been prepared by a Committee convened by the Codes of Practice Committee for Electrical Engineering. Having been endorsed by the Council for Codes of Practice, it was published under the authority of the General Council on 9th April, 1964.

First published April, 1948.

First revision (in two parts).

Part 1, April, 1964.

This Code of Practice makes reference to the following British Standards and British Standard Codes of Practice:

- B.S. 31 Steel conduit and fittings for electrical wiring.
- B.S. 88 Cartridge fuses of voltage ratings up to 660 volts.
- B.S. 116 Oil circuit-breakers for alternating current systems above 1 kV.
- B.S. 229 Flameproof enclosure of electrical apparatus.
- B.S. 842 A.C. voltage-operated earth-leakage circuit-breakers.
- B.S. 861 Air-break switches and isolators.
- B.S. 889 Flameproof electric lighting fittings.
- B.S. 1259 Intrinsically safe electrical apparatus and circuits for use in explosive atmospheres.
- B.S. 1387 Steel tubes and tubulars suitable for screwing to BS 21 pipe threads.
- B.S. 1538 Intrinsically-safe transformers primarily for bell-signalling circuits.
- B.S. 2474 Recommended names for chemicals used in industry.
- B.S. 2733 Intrinsically safe magneto-call telephones primarily for use in coal mines
- B.S. 3573 Polyethylene-insulated copper-conductor telecommunication distribution cables.
- B.S. 4568 Steel conduit and fittings with metric threads of ISO form for electrical installations.

- B.S. 4727 Glossary of electrotechnical, power, telecommunications, electronics, lighting and colour terms.
- B.S. 4752 Circuit-breakers of rated voltage up to and including 1000 volts a.c. and 1200 volts d.c.
- B.S. 6004 PVC-insulated cables (non-armoured) for electric power and lighting.
- B.S. 6007 Elastomer-insulated cables for electric power and lighting.
- B.S. 6207 Mineral-insulated cables.
Part 1. Copper-sheathed cables with copper conductors.
- B.S. 6346 PVC-insulated cables for electricity supply.
- B.S. 6480 Impregnated paper-insulated cables for electricity supply.
Part 1. Lead or lead alloy sheathed cables for working voltages up to and including 33 kV.
- B.S. 6500 Insulated flexible cords.
- B.S.CP. 326 The protection of structures against lightning
- B.S.CP. 406 Mechanical refrigeration.
- B.S.CP. 1008 Maintenance of electrical switchgear.
- B.S.CP. 1009 Maintenance of insulation oil (with special reference to transformers and switchgear).
- B.S.CP. 1011 Maintenance of electric motor control gear.
- B.S.CP. 1013 Earthing.
- B.S.CP. 1019 Installation and servicing of electrical fire alarm systems.
- B.S.CP. 1022 The selection and accommodation of telephone, telegraph and data communication installations.

British Standard Codes of Practice are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work in this Code of Practice:
Committee reference ELCP/19
Draft for comment CZ(ELCP)377

CODE DRAFTING COMMITTEE ELCP/19
FLAMEPROOF AND INTRINSICALLY-SAFE ELECTRICAL
EQUIPMENT

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This Code of Practice represents a standard of good practice and takes the form of recommendations. Compliance with it does not confer immunity from relevant legal requirements including byelaws.

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BRITISH STANDARD CODE OF PRACTICE ON
ELECTRICAL APPARATUS AND ASSOCIATED
EQUIPMENT FOR USE IN EXPLOSIVE
ATMOSPHERES OF GAS OR VAPOUR
 (OTHER THAN MINING APPLICATIONS)

Part 1. Choice, installation and maintenance of
flameproof and intrinsically-safe equipment.

FOREWORD

The need for the guidance covered by this Code of Practice has been reviewed and it has been decided that, in the interests of rationalization, it should be declared obsolescent. Its application for new installations is therefore not recommended. The Code of Practice will be withdrawn in due course.

Although this Code of Practice will continue in being, new installations should follow the recommendations of BS 5345 (see below).

BS 5345 Code of practice for the selection, installation and maintenance of electrical apparatus for use in potentially explosive atmospheres (other than mining applications or explosive processing and manufacture).

Part 1 : 1976 Basic requirements for all Parts of the code

Part 2 : 1983 Classification of hazardous areas

Part 3 : 1979 Installation and maintenance requirements for electrical apparatus with type of protection 'd'. Flameproof enclosure

Part 4 : 1977 Installation and maintenance requirements for electrical apparatus with type of protection 'i'. Intrinsically safe electrical apparatus and systems

Part 5 : 1983 Installation and maintenance requirements for electrical apparatus protected by pressurization 'p' and by continuous dilution, and for pressurized rooms

Part 6 : 1978 Installation and maintenance requirements for electrical apparatus with type of protection 'e'. Increased safety

Part 7 : 1979 Installation and maintenance requirements for electrical apparatus with type of protection N

Part 8 : 1980 Installation and maintenance requirements for electrical apparatus with type of protection 's'. Special protection

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In dealing with the risk of fire or explosion from the presence of flammable liquids, gases or vapours, three sets of conditions are recognized:

- Div. 0. An area or enclosed space within which any flammable or explosive substance, whether gas, vapour or volatile liquid is continuously present in concentration within the lower and upper limits of flammability.
- Div. 1. An area within which any flammable or explosive substance, whether gas, vapour or volatile liquid is processed, handled or stored, and where during normal operations an explosive or ignitable concentration is likely to occur in sufficient quantity to produce a hazard.
- Div. 2. An area within which any flammable or explosive substance, whether gas, vapour or volatile liquid, although processed or stored, is so well under conditions of control that the production (or release) of an explosive or ignitable concentration in sufficient quantity to constitute a hazard is only likely under abnormal conditions.

An area falling within the category of Div. 2 is sometimes known as a 'Remotely Dangerous Area'.

The conditions described as appertaining to Div. 0 are such as normally to require the total exclusion of any electrical equipment, except in such special circumstances as to render this impracticable, in which case recourse may be possible to special measures such as pressurization or the use of intrinsically-safe equipment.

A risk of the nature described under Div. 1 can be met by the use of flameproof or intrinsically-safe equipment, with which Part 1 is concerned, or by the use of

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one or other of the means described in Part 2 of the Code which is concerned with methods, other than the use of flameproof or intrinsically-safe equipment, of securing safety in flammable and explosive atmospheres.

The precautions appropriate to Div. 2 areas are also described in Part 2.

Installations in Great Britain in premises subject to the Factories Act are governed by the Electricity (Factories Act) Special Regulations 1908 and 1944 and other statutory regulations administered by the Ministry of Labour.

The Petroleum (Consolidation) Act 1928*, administered by local authorities on behalf of the Home Office, carries authority in certain premises which may not be under the jurisdiction of the Factories Act.

The certifying authority for flameproof apparatus is the Ministry of Power. The certifying authority for intrinsically-safe electrical apparatus for use in factories coming within the scope of the Factories Act, is the Ministry of Labour. Further information on testing and certification is given in the Ministry of Power Memoranda referred to in Appendix B.

The recognized testing authority for flameproof enclosures and intrinsically-safe circuits and apparatus is the Ministry of Power.

The Regulations for the Electrical Equipment of Buildings issued by The Institution of Electrical Engineers set out the fundamental requirements which are essential for safety in the use of electricity. It is essential that all electrical installations should comply fully with the requirements of these Regulations, as far as they are applicable, and thus it has been considered unnecessary to repeat in this Code of Practice these safeguards which are set out in detail in the Regulations.

* Obtainable from H.M.S.O.

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SECTION 1. GENERAL

101. Scope. This part of the Code offers guidance in the selection, installation and maintenance, for industries other than coal mining, of flameproof or intrinsically-safe electrical equipment, including telecommunication equipment, for the avoidance of risk, arising therefrom, of ignition of gas, vapour, or liquid.

Precautions which, in certain circumstances, it may be necessary to take against the effects of static electricity are outside the scope of this Code.

102. Definitions. The recommendations of B.S. 4727 have been observed throughout, and for the purposes of the Code the following definitions apply:

*As amended
July 1976*

Danger Danger of fire or explosion from the ignition of a gas, vapour or liquid.

Danger area The area within which danger of fire or explosion from ignition of gas, vapour or liquid occurs or is liable to occur.

†Flameproof enclosure A flameproof enclosure for electrical apparatus is one that will withstand, without injury, any explosion of the prescribed flammable gas that may occur within it under practical conditions of operation within the rating of the apparatus (and recognized overloads, if any, associated therewith) and will prevent the transmission of flame such as will ignite the prescribed flammable gas which may be present in the surrounding atmosphere.

It should be noted that the certification of flameproof apparatus does not imply the immunity of such apparatus from the effects of electrical faults in the form of short circuits and faults to earth and references to this subject taken from B.S. 229, Clause 2, Notes 1-5 are given in Clause 701.

Flashpoint The flashpoint of a liquid may be regarded as the lowest temperature at which a liquid gives off enough vapour to form an explosive concentration when exposed to a means of ignition which does not itself appreciably raise the temperature of the liquid.

The value depends to some extent on the method of test, but for practical purposes the flashpoint is an indication of the liability of the liquid to produce an explosive vapour at the temperature to which it is subjected, and so of the danger involved in its use.

† Quoted from B.S. 229, 'Flameproof enclosure of electrical apparatus'.

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- *Intrinsically-safe*
- a. Applied to a circuit, the term denotes that any electrical sparking that may occur in normal working under the conditions specified by the Certifying Authority, and with the prescribed components, is incapable of causing an ignition of the prescribed flammable gas or vapour.
 - b. Applied to apparatus, the term denotes that it is so constructed that when installed and operated under the conditions specified by the Certifying Authority, any electrical sparking that may occur in normal working, either in the apparatus or in the circuit associated therewith, is incapable of causing an ignition of the prescribed flammable gas or vapour.

NOTE 1. The use of the term 'in normal working' is intended to cover sparking that may, in normal use, be produced by breaking line current, or a short-circuit across the lines, in the circuit that is required to be intrinsically-safe. It is also intended to cover sparking that may be produced under any condition of fault, which in the opinion of the Certifying Authority might arise in practice.

NOTE 2. For applications other than coal mining, where part of the certified equipment is to be mounted outside the hazardous area or in flameproof enclosure, the assessment of intrinsic safety may be restricted to cover only such electrical sparking as may occur within the hazardous area or outside the flameproof enclosure. Any certificate of intrinsic safety issued by the appropriate authority will then define the circumstances to which it applies.

Portable apparatus Apparatus which from the nature of its use requires to be moved while it is working, or which is designed so that it can be moved while it is working.

Stopper box A fitting with entries for cables such that between any one entry and each other entry of the fitting there is a barrier capable of preventing the propagation of an explosion from one side of the barrier to the other.

NOTE. This barrier may, for example, consist of a terminal block or compound filling.

Transportable apparatus Apparatus which from the nature of its use requires to be moved to a new position from time to time between the periods when it is working.

103. Exchange of information. Before any electrical apparatus is introduced into an area likely to be dangerous, full consultation should take place between those persons familiar with the nature and extent of the expected risk, and the electrical engineer responsible for the proposed installation, so that the necessity for special measures can be decided. Consultation should also take place before the introduction of a different process in an established production area which might give rise to a hazard or one of a greater degree than that already covered.

* Taken from B.S. 1259, 'Intrinsically safe electrical apparatus and circuits for use in explosive atmospheres'.