

Specification for

Mining type flameproof gate-end boxes —

**Part 1: Gate-end boxes for direct-on-line
motor starting (for use on 3-phase a.c.
circuits up to 650 V)**

Confirmed
January 2011

Co-operating organizations

The Mining and Quarrying Requisites Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government department and scientific and industrial organizations:

- Association of Mining Electrical and Mechanical Engineers*
- British Electrical and Allied Manufacturers' Association*
- British Steel Industry
- Federation of Associations of Mining Equipment Manufacturers
- Institution of Electrical Engineers
- Institution of Mechanical Engineers
- Institution of Mining Engineers
- Mechanical Handling Engineers' Association
- Ministry of Power*
- National Association of Colliery Managers
- National Coal Board*

The Government department and industrial organizations marked with an asterisk in the above list were directly represented on the committee entrusted with the preparation of this British Standard.

This British Standard, having been approved by the Mining and Quarrying Requisites Industry Standards Committee, was published under the authority of the Executive Board on 20 March 1969

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Amendments issued since publication

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Foreword

This standard makes reference to the following British Standards:

BS 88, *Cartridge fuses of voltage ratings up to 660 volts.*

BS 159, *Busbars and busbar connections.*

BS 229, *Flameproof enclosure of electrical apparatus.*

BS 279, *100-ampere flameproof plugs and sockets (restrained type).*

BS 542, *Cable glands and sealing boxes for association with apparatus for use at mines.*

BS 587, *Motor starters and controllers.*

BS 775, *Contactors.*

BS 1259, *Intrinsically-safe electrical apparatus and circuits for use in explosive atmospheres.*

BS 3101, *Intrinsically-safe remote-control circuits associated with restrained plugs and sockets for use in coal mines.*

BS 3454, *3.3 kV 300 A interchangeable bolted flameproof cable couplers and adaptors (including 660 V 300 A adaptors) primarily for use in mines.*

This British Standard, prepared under the authority of the Mining and Quarrying Requisites Industry Standards Committee, was first issued in 1938 and revised in 1965. This new edition brings the previous standard into line with present practice, and incorporates a range of principles and requirements adopted as standard for a group of gate-end boxes used primarily in coal mining in the United Kingdom. Any further revision, including conversion to the metric system, will be covered in a subsequent publication.

It is recognized that the term “gate-end box” is quite general and may be applied to boxes containing different essential components, such as contactors, circuit-breakers, lighting transformers, etc., depending upon the purpose for which they are to be used. This standard, designated as BS 787-1, covers boxes in which the essential apparatus is an air-break electrically operated contactor, which together with the associated equipment provides control and protection for coalface machinery.

BS 787-2 covers gate-end boxes in which the essential apparatus is an air-break circuit-breaker. It is envisaged that additional parts of this British Standard will be issued to cover other types of gate-end boxes, such as lighting units and drill units.

This Part of BS 787 continues to accept a 30 A rated box as standard, in addition to the 80 A and 150 A boxes originally recognized.

A distinction is made between an isolator and an isolating switch, and tests are specified for an isolating switch capable of breaking the same current as the contactor. A test position in association with the isolating switch is an optional feature. In addition to earth fault protection, earth fault electrical lockout has been included.

Reference is also made to BS 3101, “*Intrinsically safe remote-control circuits associated with restrained plugs and sockets for use in coal mines*”, which lays down boundary conditions for the operation of the circuit.

NOTE Where metric equivalents have been given (see Appendix A), the figures in imperial units are to be regarded as the standard. The metric conversions are approximate. More accurate conversions should be based on the tables in BS 350, “*Conversion factors and tables*”.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for flameproof gate-end boxes designed primarily for use, in the mining industry, on 3-phase a.c. circuits up to 650 V, for direct-on-line contactor starting and for the protection of coalcutters, conveyors, loaders and the like.

2 Definitions

For the purposes of this British Standard, the following definitions apply:

2.1

gate-end box

a flameproof enclosure containing electrical apparatus, such as control gear, switchgear and/or protective gear, designed primarily for use underground

NOTE For the purposes of this standard, the apparatus is essentially an air-break electrically operated contactor with associated equipment to provide control and protection for coalface machinery.

2.2

isolator

a mechanical device capable of opening or closing a circuit, under conditions of no-load or negligible current

2.3

isolating switch

a switch which isolates a circuit and is capable of breaking not less than its rated current at rated voltage

2.4

contactor

a device suitable for repeatedly opening and closing the circuits of electrical apparatus; it functions electro-magnetically, the speed of make and of break being independent of the operator

2.5

cable coupling unit (flit plug)

a unit consisting of a cable sealing box and cable gland together with means for connecting the cable conductors to insulated contact tubes within the sealing box, which is designed to receive the cable; to provide room to spread and connect the cores; to protect the cores; to allow for the attachment of the cable gland; to provide for sealing the insulating materials of the cable, and to facilitate ready connection to or disconnection from a similar unit or other apparatus

2.6

cable coupler adaptor

a device used to connect a cable coupling unit to apparatus. It may either be separate from or integral with the flameproof enclosure of the apparatus to which the cable coupling unit is to be connected

for the purposes of this standard, the term “adaptor” also includes the unit used to connect other types of cable terminations to apparatus

2.7

cable sealing and dividing box

a box designed to receive and protect the end of the cable, with provision for sealing the conductors and the insulating material of the cable with a suitable compound, and having a cable gland for attaching the cable to the box, together with any terminals provided for connection to the conductors of the cable within the box. The box may form part of, or be detachable from, the apparatus with which it is associated

2.8

detachable cable sealing box

a cable sealing box so designed that it can be detached from associated apparatus without cutting the cable and without disturbing the sealing

2.9

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 (see 7.2.3)

2.10

rating

the value assigned by the maker to some limitations of performance under certain specified conditions known as the “rated conditions”

2.11

restrained plug and socket

a plug and socket, the 2 portions of which, when engaged, are designed to be held together by an operating bolt, a screwed union ring, or some other equivalent device. Such a device enables the plug to be readily inserted or withdrawn