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Australian Standard 1039—1983

ELECTRICAL EQUIPMENT FOR COAL MINES

FLAMEPROOF DISTRIBUTION AND CONTROL BOXES FOR VOLTAGES UP TO 1100 V A.C.

STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests were represented on the committee responsible for the preparation of this standard:

Association of Mining Electrical and Mechanical Engineers, Australia

Australian Coal Association

Australian Electrical and Electronic Manufacturers Association

Confederation of Australian Industry

Department of Industrial Relations, N.S.W.

Department of Mines, Queensland

Elcom Collieries, N.S.W.

Joint Coal Board

Queensland Confederation of Industry

State Energy Commission of Western Australia

AUSTRALIAN STANDARD

ELECTRICAL EQUIPMENT FOR COAL MINES

FLAMEPROOF DISTRIBUTION AND CONTROL BOXES FOR VOLTAGES UP TO 1100 V A.C.

AS 1039—1983

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PREFACE

This edition of this standard was prepared by the Association's Committee on Electrical Equipment in Coal Mines to supersede AS 1039—1972. It is intended for the guidance of manufacturers, users, statutory authorities and associated interests and for use with SAA standards and relevant mining regulations.

In its terminology, definitions and general treatment of the subject, this standard took account of the following British standard:

BS 787 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)
Part 2: Boxes with Air-Break Circuit-Breakers (for use on 3-phase a.c. circuits up to 650 V)

Acknowledgement is made of the assistance received from this source.

This edition incorporates previous amendments and updates cross-references. The opportunity has also been taken to delete several requirements from the previous edition which are now considered by the committee to be inappropriate.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
ELECTRICAL EQUIPMENT FOR COAL MINES—FLAMEPROOF DISTRIBUTION AND CONTROL BOXES FOR VOLTAGES UP TO 1100 V A.C.

FOREWORD

The purpose of this standard is to establish requirements for a form of enclosed electrical equipment for use in flammable or explosive atmospheres, i.e. for flameproof distribution and control boxes associated with electrical equipment, in coal mines.

NOTE: The term 'distribution and control box' is synonymous with the term 'gate end box' as used in the United Kingdom. The boxes are usually skid mounted and are connected to a feeder cable which runs from a mobile substation. Electrical energy is then distributed within the distribution and control box to the various plug receptacles into which the machine's trailing cables are plugged.

This standard applies to boxes which are designed for the attachment of trailing cables and in which essential electrical equipment provides control and protection for each trailing cable connected to electrical equipment and machines at the coal face.

A distinction is made between an isolator and an isolating switch. Isolators are not normally used underground in coal mines and have not been included in this standard. Tests are specified for an isolating switch capable of breaking the same current as the contactor. In addition to earth-fault protection, earth-fault electrical lock-out has been included.

The relevant Statutory Authority may at any time terminate requirements additional to those of this standard.

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for multiple-outlet or single-outlet flameproof distribution and control boxes (hereinafter referred to as 'DCB') designed for use with a.c. voltages up to 1100 V, in the coalmining industry.

NOTE: Appendix A sets out information to be specified by the purchaser with an enquiry or order.

1.2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1025	High Voltage Switches
AS 1029	A.C. Contactors (up to and including 1000 volts a.c.)
AS 1040	Voltages and Frequency for Coal Mines
AS 1299	Flameproof Restrained Plugs and Receptacles for Use in Coal Mines
AS 1300	Bolted Flameproof Cable Coupling Devices for Use in Coal Mines
AS 1802	Trailing Cables for Mining Purposes (including underground coal mines, metalliferous mines, open-cut mines, quarries and dredges)
AS 1829	Electrical Equipment for Explosive Atmospheres—Intrinsically Safe Apparatus—Type of Protection i
AS 1930	Circuit-breakers for Distribution Circuits (up to and including 1000 V a.c. and 1200 V d.c.)
AS 1931	High Voltage Testing Techniques
AS 1972	Cables for Use Below Ground in Coal Mines (other than Trailing Cables)
AS 2067	Switchgear Assemblies and Ancillary Equipment for Alternating Voltages above 1 kV
AS 2081	Earth-fault Protection, Monitoring and Current Limitation Equipment for Use in Coal Mines and Shale Mines
AS 2184	Moulded-case Circuit-breakers (up to and including 600 V a.c. and 250 V d.c.) (Interrupting Rating 10 kA and more)
AS 2374	Power Transformers Part 1—General Requirements
AS 2480	Electrical Equipment for Explosive Atmospheres—Flameproof Enclosure—Type of Protection d
AS 3133	Approval and Test Specification for Air Break Switches
AS 3175	Approval and Test Specification for Semi-enclosed Fuses for a.c. Circuits

1.3 DEFINITIONS. For the purpose of this standard the following definitions apply:

1.3.1 Adaptor—a device designed to connect one or more cable coupling units (with sealing device interposed) to apparatus in such a manner as to form a flameproof enclosure. It may either be attached to or be integral with the apparatus.

1.3.2 Authority—the relevant Statutory Authority responsible for the implementation of Government regulations applying to coal mines in each of the States of Australia.

1.3.3 Automatic control—control by means of any device other than a manually operated switch or control button.

1.3.4 Circuit-breaker—a device capable of making, carrying and breaking normal load currents and also making and automatically breaking (under predetermined conditions) abnormal currents, such as short-circuit currents.

1.3.5 Contactor—a device having one position of rest, operated other than by hand, and usually designed for frequently making and breaking the normal operating current including operating overloads.

1.3.6 Controlgear—a general term covering switching devices and their combination with associated control, measuring, protective and regulating equipment, also assemblies of such devices and equipment with associated interconnections, accessories, enclosures and supporting structures, intended in principle, for the control of power consuming equipment.

1.3.7 Distribution and control box (DCB)—a flameproof enclosure designed primarily for the attachment of trailing cables and in which the essential electrical equipment provides control and protection for trailing cables and the connected, portable, transportable and mobile coalmining equipment.

NOTE: The apparatus is essentially a skid-mounted flameproof enclosure containing the electrical equipment to provide control and protection of coalface machinery and with provision for the connection of an incoming supply cable from an underground substation.

1.3.8 Flameproof enclosure—an enclosure for electrical equipment that will withstand, without damage, an explosion of a prescribed flammable gas or vapour within the enclosure and will prevent the transmission of flame such as will ignite the external prescribed flammable gas or vapour for which it is designed, and which operates at such an external temperature that will not ignite a surrounding flammable atmosphere.

A flameproof enclosure, in accordance with the foregoing definition, will not necessarily or ordinarily be weatherproof, dustproof, etc.

1.3.9 Flameproof restrained plug and receptacle—a device consisting of two portions having metallic contacts and arranged to engage and disengage with each other and also to be retained by means of a manually operated device.

1.3.10 Intrinsically safe—a circuit or part of a circuit is intrinsically safe when any sparking produced normally by breaking or closing the circuit or accidentally, e.g. by short-circuit or earth fault, is incapable under prescribed test conditions of causing ignition of a prescribed gas or vapour. For the purpose of this standard, the term 'certified as intrinsically safe' means certified by an appropriate testing authority in accordance with the provisions of AS 1829.