

Australian/New Zealand Standard™

**Electrical equipment for coal mines—
Introduction and maintenance**

Part 1: For hazardous areas

AS/NZS 2290.1:2005

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Australian Chamber of Commerce and Industry
Australian Coal Association
Australian Electrical and Electronic Manufacturers Association
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Department of Natural Resources and Mines (Qld)
Department of Primary Industries, Mine Safety (NSW)
Electrical Apparatus Service Association
Electrical Regulatory Authorities Council
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Australian/New Zealand Standard™

Electrical equipment for coal mines— Introduction and maintenance

Part 1: For hazardous areas

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-023, Electrical Equipment in Coal Mines to supersede AS 2290.1—1990, *Electrical equipment for coal mines—Maintenance and overhaul, Part 1: Maintenance of electrical equipment for hazardous areas*.

The objective of this Standard is to provide guidance for the maintenance of electrical equipment in coal mines. It is part of a series of Standards on the maintenance and overhaul of electrical equipment used in association with underground mining machines.

Each Section of this Standard deals with the maintenance requirements appropriate to one of the types of explosion-protection techniques which may be used to achieve electrical safety or with basic requirements and considerations which are fundamental to the safe use of electrical equipment in hazardous areas.

This Standard differs from the 1990 edition as follows:

- (a) The Scope has been extended to include the introduction and initial commissioning of equipment.
- (b) The preparation and maintenance of a verification dossier has been included.
- (c) The designation of the types of periodic equipment examination has been changed from Codes A, B, C and C1 to External examination, Internal examination and Pre-overhaul audit.
- (d) The recommended frequency of examination has, in some cases, been extended.
- (e) Flameproof enclosures (Ex 'd'), intrinsically safe equipment (Ex 'i'), increased safety equipment (Ex 'e') and pressurized enclosures (Ex 'p') are also now covered.
- (f) Illustrations of the condition of the surfaces of flameproof enclosures and flamepath gaps have been referenced to AS/NZS 3800.
- (g) Typical examination report forms, provided as appendices, have been updated.
- (h) It has been published as a Joint Australian/New Zealand Standard.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

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FOREWORD

The purpose of this Standard is to facilitate the safe, efficient and productive use of electrical explosion-protected equipment and cables in underground coal mine hazardous areas. The use of this Standard will enhance the management of safety risks and production risks in coal mines through good and safe electrical engineering practice.

The implementation of this Standard will contribute significantly to—

- (a) prevention of electric shock and burns;
- (b) prevention of surface temperatures that have sufficient energy to ignite gas and/or dust;
- (c) prevention of arcing faults that have sufficient energy to invalidate the type of explosion-protection as a result of damage to the enclosure or generation of an excessive pressure rise beyond that for which the electrical enclosure was designed; and
- (d) prevention of fires caused by the malfunction of electrical equipment.

Any electrical distribution and utilization system should be specified, designed, installed, commissioned, operated, maintained (including servicing and repairs) and disposed of (life cycle) in a manner that manages the safety risks and production risks in the mine. This can be done through:

- (i) Equipment that is fit for purpose throughout the life cycle.
- (ii) People who are competent in the relevant stage of the life cycle.
- (iii) Safe working procedures throughout the life cycle.
- (iv) Appropriate competent supervision throughout the life cycle.
- (v) Managing the work environment throughout the life cycle.

All of this should be done within a management system framework with risk assessment and risk control as a key element. There are a number of fundamental risk controls associated with using electricity in hazardous areas. The fundamental risk controls are:

- (A) Fit for purpose electrical explosion-protected equipment.
- (B) Fit for purpose cables for hazardous areas in a mining environment.
- (C) Fit for purpose electrical protection.
- (D) Fit for purpose earthing systems.
- (E) Consideration of the potential for phase-to-phase arcing faults.
- (F) Fit for purpose lightning protection.
- (G) Fit for purpose tools and test equipment.
- (H) Isolation and electrical testing procedures.
- (I) Removal/restoration of power procedures.
- (J) Proper classification of hazardous areas.
- (K) Correct first aid treatment for persons who receive an electric shock and burns.

This Standard covers many of these particular aspects, but also takes a holistic approach to the electrical system and recognizes that many of the risk controls interact and that each of the life cycle stages interact. It is up to the user of this Standard to make judgements and decisions with all of this in mind.

The principles of explosion-protection techniques can be found in the relevant explosion-protection technique Standard and also in AS/NZS 3800.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Electrical equipment for coal mines—Introduction and maintenance****Part 1: For hazardous areas**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out requirements for the introduction, examination, maintenance, in situ repair and allowable modifications to electrical equipment designed for use in hazardous areas in and around underground coal mines. It details methods for introduction, examination, maintenance, commissioning and testing required to ensure safety, compliance with relevant Standards and supporting documentation for the different types of explosion-protection apparatus and reliable operation while the equipment is in service.

Where other explosion-protection techniques, other than those mentioned in the Standard, are utilized the risks need to be assessed and appropriate management plans developed, within the same context of this Standard.

This Standard provides guidelines covering the life cycle of the equipment including initial commissioning, maintenance, modification and the removal from service for overhaul.

NOTE: Attention is also drawn to the various Acts, the regulations under these Acts and also any other appropriate statutory requirements or by-laws. These place the prime responsibility for complying with specific safety requirements on the manufacturer and user of the equipment.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

- 1359 Rotating electrical machines—General requirements
- 1359.101 Part 101: Rating and performance
- 2380 Electrical equipment for explosive atmospheres—Explosion-protection techniques (all Parts)
- 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems (all Parts)

AS/NZS

- 2381 Electrical equipment for explosive atmospheres—Selection, installation and maintenance
- 2381.1 Part 1: General requirements
- 3800 Electrical equipment for explosive atmospheres—Overhaul and repair
- 4761 Competencies for working with electrical equipment for hazardous areas (EEHA)
- 4871 Electrical equipment for coal mines, for use underground (all Parts)
- 60079 Electrical equipment for explosive gas atmospheres
- HB 13 Electrical equipment for hazardous areas