AS 2290.1:2021

Australian STANDARD®

STANDARDS Australia

Electrical equipment for coal mines — Introduction, inspection and maintenance

Part 1: Hazardous areas

AS 2290.1:2021

This Australian Standard ® was prepared by EL-023, Electrical Equipment in Mines and Quarries. It was approved on behalf of the Council of Standards Australia on 8 October 2021.

This Standard was published on 22 October 2021.

The following are represented on Committee EL-023:

Australian Cablemakers Association
Australian Chamber of Commerce and Industry
Australian Industry Group
Better Regulation Division (Fair Trading, Safework NSW, Testsafe)
Construction Forestry Miners and Energy Union
Department of Mines, Industry Regulation and Safety WA
Department of Regional NSW
Engineers Australia
Engineers Australia / Mining Electrical and Mining Mechanical Engineering Society
Minerals Council of Australia
National Association of Testing Authorities Australia
Resources Safety & Health Queensland
University of Newcastle

This Standard was issued in draft form for comment as DR AS 2290.1:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:
www.standards.org.au

ISBN 978 1 76113 540 8

Electrical equipment for coal mines — Introduction, inspection and maintenance

Part 1: Hazardous areas

Originated in Australia as AS 2290.1—1979.
Fourth edition AS/NZS 2290.1:2014.
Revised and redesignated as AS 2290.1:2021.

Preface

This Standard was prepared by the Standards Australia Committee EL-023, *Electrical Equipment for Mines and Quarries*, to supersede AS/NZS 2290.1:2014, *Electrical equipment for coal mines — Introduction, inspection and maintenance*, *Part 1: For hazardous areas*.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective 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, by specifying requirements and recommendations for the inspection and maintenance of such equipment.

This Standard is part of a series on the maintenance and overhaul of electrical equipment used in association with underground mining machines. The series is as follows:

(a) AS 2290.1, *Electrical equipment for coal mines— Introduction, inspection and maintenance, Part 1: Hazardous areas* (this Standard)

(b) AS/NZS 2290.3, *Electrical equipment for coal mines—Maintenance and overhaul, Part 3: Gas detecting and monitoring equipment*

In addition, this Standard aligns with AS/NZS 3800:2012, *Electrical equipment for explosive atmospheres—Repair and overhaul.*

The principal differences between this edition and the 2014 edition are as follows:

(i) Definitions for “modification” and “readily accessible component” have been revised.

(ii) The concept of a risk-based approach with recommended inspection periods has been reversed to be required inspection periods, which may be overridden by a risk-based approach.

(iii) Additional information has been added to the requirements of a verification dossier.

(iv) The accessibility of components and the determination of the need to maintain them via a risk-based approach has been given additional clarification and detail.

(v) Requirements for when equipment/components have been in storage have been added.

(vi) Limitations on the use of pre-overhaul audits have been applied.

(vii) Clarification in regards to the requirements of an overhaul have been added.

(viii) The requirements for *in situ* repairs have been revised to cover the use of non-metallic materials for temporary repairs.

(ix) Requirements have been added for intrinsically safe installations to reduce the likelihood of fires due to damaged cables causing undetected resistive faults.

(x) Appendix C has been designated as normative.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

Statements expressed in mandatory terms in footnotes to tables are deemed to be requirements of this Standard.

Contents

Introduction

Electrical installations in hazardous areas have features specially designed to make them suitable for operation in such areas. For safety reasons, it is essential that the integrity of those special features is maintained throughout the life of the installations. Therefore, they require an initial inspection and regular periodic inspections by competent persons, as specified in this document.

NOTE Correct functional operation of hazardous area installations does not mean, nor is it to be interpreted to mean, that the integrity of the special features referred to above is preserved.

The use of this document and safe electrical engineering practice will assist in the management of electrical hazards.

The implementation of this document will contribute significantly to the —

(a) prevention of ignition of explosive gases or dusts;

(b) prevention of electric shock and burns;

(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.

The risk management process should be utilized to identify relevant controls. There are a number of controls associated with using electricity in hazardous areas, including the following:

(i) Fit-for-purpose electrical explosion-protected equipment.

(ii) Fit-for-purpose cables for hazardous areas in a mining environment.

(iii) Fit-for-purpose electrical protection.

(iv) Fit-for-purpose earthing systems.

(v) Reduction of the potential for phase-to-phase arcing faults.

(vi) Fit-for-purpose lightning protection.

(vii) Fit-for-purpose tools and test equipment.

(viii) Isolation and electrical testing procedures.

(ix) Removal/restoration of power procedures.

(x) Proper classification of hazardous areas.

(xi) Correct first aid treatment for persons who receive an electric shock and burns.

This document covers many of these particular aspects, but also takes a holistic approach to the electrical system and recognizes that many of the 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.

Australian Standard®

Electrical equipment for coal mines — Introduction, inspection and maintenance

Part 1: Hazardous areas

Section 1 Scope and general

1.1 Scope

This Standard sets out both general and specific requirements for the inspection and maintenance of electrical equipment designed for use in areas classified as Group I hazardous areas.

This document is intended for areas where there is a potential risk due to the presence of explosive gas, dust mixtures and combustible dust layers. It is not intended for —

(a) surface infrastructure, typically Group II or Group III classified areas;

(b) areas where a risk can arise due to the presence of hybrid mixtures, such as hydrocarbons, flammable solvents and combustible materials;

(c) areas where small quantities of flammable materials are introduced for maintenance purposes; or

(d) shot firing activities and associated equipment.

This Standard does not include —

(i) electrical installation and inspection requirements not directly associated with an explosion-protection technique;

(ii) the regulatory compliance assessment of electrical equipment; or

(iii) the permanent repair, reclamation and overhaul of explosion-protected equipment.

1.2 Normative references

The following are the normative documents referenced in this Standard. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS/NZS 1747, *Leading, trailing and feeder cables used for mining—Repair, testing and fitting of accessories*

AS/NZS 3000, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*

AS/NZS 4800, *Electrical equipment for explosive atmospheres—Repair and overhaul (IEC 60079-19:2015 (ED. 3.1), MOD)*

AS/NZS 4761, *Competencies for working with electrical equipment for hazardous areas (EEHA) (series)*

AS/NZS 4871, *Electrical equipment for mines and quarries (series)*

AS/NZS 60079.0, *Explosive atmospheres, Part 0: General requirements (IEC 60079-0:2017 (ED. 7.0), MOD)*

AS/NZS 60079.2, *Explosive atmospheres, Part 2: Equipment protection by pressurized enclosures 'p'*

IEC 60079-19, *Explosive atmospheres, Part 19: Equipment repair, overhaul and reclamation*