

Australian/New Zealand Standard™

**Electrical equipment for coal and shale
mines—Electrical protection devices**

Part 1: General requirements

AS/NZS 2081.1:2002

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-023, Electrical Equipment in Coal Mines. It was approved on behalf of the Council of Standards Australia on 16 July 2002 and on behalf of the Council of Standards New Zealand on 27 June 2002. It was published on 12 August 2002.

The following are represented on Committee EL-023:

Australian Chamber of Commerce and Industry
Australian Coal Association
Australian Electrical and Electronic Manufacturers Association
Australian Industry Group
Department of Mineral Resources N.S.W.
Department of Natural Resources and Mines (QLD)
Electrical Apparatus Service Association
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Australian/New Zealand Standard™

Electrical equipment for coal and shale mines—Electrical protection devices

Part 1: General requirements

Originated as part of AS C318—1958.
Previous edition AS 2081.1—1988.
Jointly revised and designated AS/NZS 2081.1:2002.

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Jointly published by Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 4747 7

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-023, Electrical Equipment in Coal Mines, to supersede AS 2081.1—1988, *Electrical equipment for coal and shale mines—Electrical protection devices, Part 1: General requirements*.

The AS/NZS 2081 series comprises the following parts:

- Part 1: General requirements (this Part)
- Part 2: Earth-continuity monitoring devices
- Part 3: Earth-leakage protection systems for use on earth-fault current limited systems (IT systems)
- Part 4: Lockout earth-fault protection devices
- Part 5: Earth-fault current limiters

The key objectives of the AS/NZS 2081 series are as follows:

- (a) To ensure touch and step time/voltage levels are within acceptable limits.
- (b) To minimize the risk of explosion due to arcing.
- (c) To ensure earth return path(s).
- (d) To ensure reliable operation under operating conditions.
- (e) To ensure performance criteria are maintained under operating conditions.
- (f) To minimize the risk of fires initiated by electrical arcing.
- (g) To minimize exposure to electrical contact with live parts.

In the AS/NZS 2081 series, levels were established using data provided in AS 3007.2 *Electrical installations—Surface mines and associated processing plants, Part 2: General protection requirements*, with respect to the physiological effects of electricity on the human body. The preservation of the integrity of other equipment was an important consideration in the preparation of this series.

This Standard differs from the previous edition in the following significant ways:

- (a) Clarification of the Scope to indicate that the Standard is applicable to both above- and below-ground mines.
- (b) The inclusion of a definition for ‘critical component’.
- (c) The replacement of the term ‘ambient temperature’ with ‘service temperature’, the range now being 0°C to +60°C.
- (d) The addressing of programmable or software controlled devices.
- (e) The inclusion of a typical system electrical diagram showing the application of all relevant protection systems.
- (f) This Standard 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 interrelationship of the 'techniques' described in the five Parts of this series strives to create as safe a working environment as possible. In this environment of surface and underground mines electrically powered equipment is often mobile and supplied by trailing or reeling cables.

These 'techniques' are as follows:

- (a) The continuous checking that the equipment is earthed, by monitoring the pilot loop earth in the supply cable, its connection to the machine it is supplying and its termination at the substation supplying the machine (see AS/NZS 2081.2).
NOTE: This system may incorporate remote start/stop features.
- (b) The measurement of leakage current to earth in a circuit and the initiation of isolation of that circuit, when the value reaches or exceeds a predetermined safe value (see AS/NZS 2081.3).
- (c) The pre-energization testing of a circuit, to determine that the phase-to-earth insulation value of each and every phase conductor is above a preset value, before the circuit can be energized (see AS/NZS 2081.4).
- (d) The use of earth current limiting devices, to minimize the risk of touch and step potential reaching a level which would cause risk to personnel (see AS/NZS 2081.5).

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Australian/New Zealand Standard**Electrical equipment for coal and shale mines—Electrical protection devices****Part 1: General requirements**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out minimum performance requirements for specific electrical protection devices for use in above- and below-ground coal and shale mines and provides information on the general principles of earth-leakage protection, lockout earth-fault protection and earth-continuity protection used on a.c. power supply systems having an earth-fault current limitation system (IT system).

NOTES:

- 1 Whereas this Standard is based upon 50 Hz supply systems it is envisaged that equipment may be installed upon higher or low frequency supply systems.
Consideration of the effects of these installations upon current limitation and effects upon the human body need to be considered. IEC 60479-1 and IEC 60479-2 should be referenced for the effects upon the human body of other supply frequencies.
- 2 See Appendix A.

1.2 OBJECTIVE

The objective of this Standard is to establish the common requirements applicable to each type of protection device described in the AS/NZS 2081 series of Standards.

1.3 RELATIONSHIP TO REGULATIONS

The requirements of this Standard may be read in conjunction with, but do not take precedence over, regulations of a regulatory authority that may apply in a specific area.

1.4 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1939	Degrees of protection provided by enclosures for electrical equipment (IP Code)
2380	Electrical equipment for explosive atmospheres—Explosion-protection techniques
2380.1	Part 1: General requirements
61508	Functional safety of electrical/electronic/programmable electronic safety-related systems

AS/NZS

2081	Electrical equipment for coal and shale mines—Electrical protection devices (all Parts)
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