AS/NZS 2081:2011

Australian/New Zealand Standard™

Electrical protection devices for mines and quarries

STANDARDS Australia

STANDARDS NEW ZEALAND PAEREWA AOTEAROA

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The following are represented on Committee EL-023:

Australian Chamber of Commerce and Industry
Australian Coal Association
Australian Industry Group
Consult Australia
Department of Employment, Economic Development and Innovation
Department of Mines & Petroleum (WA)
Department of Trade and Investment, Regional Infrastructure and Services, NSW
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Australian/New Zealand Standard™

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-023, Electrical Equipment in Mines and Quarries, to supersede Parts 1 to 5 of AS/NZS 2081 (2002), *Electrical equipment for coal and shale mines—Electrical protection devices*.

This Standard specifies the performance requirements for protection devices intended for use with electrical supply networks utilizing earth fault current limitation techniques (IT networks).These protection devices include the following:

(a) Earth fault current limiting devices.

(b) Earth continuity protection devices.

(c) Earth fault protection devices.

(d) Earth fault lockout protection devices.

(e) NER integrity protection devices.

(f) Frozen contact protection devices.

Prospective touch voltage versus operating time characteristics are referenced to facilitate the key objectives of this Standard.

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

(a) All parts have been combined into a single document.

(b) Clarification of the Scope to indicate that the Standard is applicable to both above and below ground mines and quarries.

(c) The addition of NER integrity protection devices.

(d) The addition of frozen contact protection devices.

(e) The inclusion of references to specific prospective touch voltage versus operating time characteristics that form the basis of the protection strategies implemented by the equipment covered by this Standard.

(f) The addition of prescribed levels of immunity to conducted common mode signals and electromagnetic interference for protection devices containing active circuits.

(g) The addition of requirements for vibration, shock and bump immunity.

(h) Clarification of requirements for conformal coatings in lieu of environmental testing.

(i) The revision of typical system electrical diagrams showing the application of the various protection systems detailed in this Standard.

(j) The inclusion of partial discharge and impulse testing.

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 this Standard strives to create the lowest risk working environment possible in surface mines, underground mines and quarries, where electrically powered equipment is often mobile and supplied by trailing or reeling cables.

These techniques are as follows:

(a) The use of earth fault current limiting devices to minimize the risk of touch and step potential reaching a level which would cause harm to personnel.

(b) The continuous checking that the equipment is earthed, by monitoring the earth resistance in the supply cable to the equipment.

(c) The measurement of leakage and fault currents to earth, and the initiation of disconnection of that circuit when the value of leakage or fault current exceeds a preset value.

(d) The testing of a circuit prior to energizing, to ensure that the phase-to-earth insulation value of each and every phase conductor is above a preset value before the circuit can be energized.

(e) The monitoring of the earth fault current-limiting device, and the associated connections between the supply neutral and earth, to ensure the integrity of the earth fault current limitation system.

(f) The initiation of the disconnection of the power supply upstream of the interrupting device in the event that either the interrupting device fails to open when signalled to do so, or a voltage is detected on any phase of the load side of the interrupting device after it has received a signal to open.

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Australian/New Zealand Standard
Electrical protection devices for mines and quarries

S E C T I O N 1 S C O P E A N D G E N E R A L

1.1 SCOPE

This Standard sets out the design, performance, manufacturing, and testing requirements for electrical protection devices for use in surface and underground mines and quarries, where IT supply networks are utilized, and provides information on the general principles of—

(a) earth fault current limitation;

(b) earth continuity protection;

(c) earth fault protection;

(d) earth fault lockout protection;

(e) NER integrity protection; and

(f) frozen contact protection.

NOTES:

1 Whereas this Standard is based upon 50 Hz supply systems, it is envisaged that the equipment described may also be installed in systems with higher, lower or variable frequencies, or in d.c. supplied systems.

The effect of current upon the human body in 50 Hz supplied installations needs to be considered as detailed in AS/NZS 3000.

AS/NZS 60479, Parts 1 and 2 should be referenced for consideration of the effects of current at other supply frequencies upon the human body.

2 Refer to Appendix A for general information on the principles of electrical protection relevant to this Standard.

1.2 OBJECTIVE

The key objectives of this Standard are to set the performance criteria of protection devices to facilitate:

(a) The maintenance of touch and step voltage levels against time within acceptable limits.

NOTE: Guidance information relating to touch voltage versus clearance times is contained in Appendix B.

(b) The minimization of risks associated with electrical arcing i.e. arc blast, arc flash, etc.

(c) Reliable performance under predetermined operating conditions.

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.