

AS 4812:2023



Non-destructive examination and discard criteria for wire ropes in mine winding systems



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This Australian Standard ® was prepared by ME-018, Mining Equipment. It was approved on behalf of the Council of Standards Australia on 17 February 2023.

This Standard was published on 10 March 2023.

The following are represented on Committee ME-018:

- Australasian Institute of Mining and Metallurgy
- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Chamber of Minerals and Energy of Western Australia
- Construction and Mining Equipment Industry Group
- 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
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This Standard was issued in draft form for comment as DR AS 4812:2020.

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ISBN 978 1 76139 080 7

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Originated as AS/NZS 4812:2003.
Revised and redesignated as AS 4812:2023.

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Preface

This Standard was prepared by the Australian members of the joint Standards Australia/Standards New Zealand Committee ME-018, Mining Equipment, to supersede AS/NZS 4812:2003.

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

The objective of this Standard is to promote the safe use of wire ropes for mine winding systems to protect people in the workplace and property by providing well established examination and testing principles as well as discard criteria (safety margin applied).

The major changes in this edition are as follows:

- (a) Inclusion of full and half locked-coil ropes.
- (b) Expanded scope to cover modern rope constructions (i.e. plasticised cores).
- (c) Introduced cycle based rope inspection frequency intervals.
- (d) Inclusion of continuous rope condition monitoring.

The terms “normative” and “informative” have been used in this document to define the application of the appendix to which they apply. A “normative” appendix is an integral part of a document, whereas an “informative” appendix is only for information and guidance.

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Australian Standard®

Non-destructive examination and discard criteria for wire ropes in mine winding systems

Section 1 Scope and general

1.1 Scope

This document specifies requirements for non-destructive examination and discard of steel wire ropes of mine winding systems, including drum winding, friction hoisting, balance, rubbing and guide ropes.

This document is not intended to replace mine-site inspection schedules or destructive tests. Destructive tests may be required in areas not accessible to a non-destructive examination, or in addition to a non-destructive examination.

NOTE This document is not a rope management system but should be used as input for such a system.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

AS/NZS 3785.6, *Underground mining—Shaft equipment, Part 6: Fixed guides, rope guides and rubbing ropes for conveyances*

1.3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

1.3.1

anomaly

irregularity in a rope resulting in a change of signal to a *non-destructive testing instrument* ([1.3.15](#))

1.3.2

balance rope

tail rope

See *rope* ([1.3.16](#))

1.3.3

conveyance

car, carriage, cage, skip, kibble or stage in which persons, minerals or materials are conveyed in a shaft

Note 1 to entry: A counterweight is also considered to be a conveyance.

1.3.4

datum position

point on the rope to which measurements are referred

1.3.5

drum winder

See *winder* ([1.3.21](#))

1.3.6

friction winder

See *winder* ([1.3.21](#))

1.3.7

guide rope

See *rope* ([1.3.16](#))

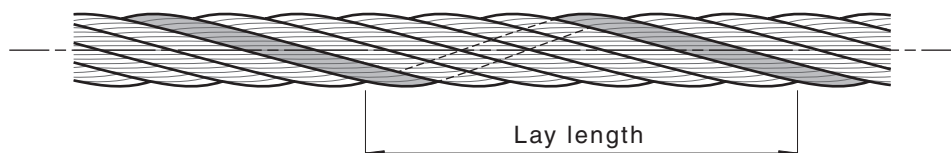
1.3.8**head rope**

See *rope* ([1.3.16](#))

1.3.9**lay length**

linear distance along the axis of a rope that a single strand extends in making one complete turn round the rope

Note 1 to entry: Lay length is approximately six times rope diameter.

**1.3.10****local fault****LF**

localized *anomaly* ([1.3.1](#))

1.3.11**loss of metallic area****LMA**

indicated loss of steel in the cross-section of a rope or strand, expressed as a percentage

1.3.12**may**

indicates the existence of an option

1.3.13**non-destructive examination****NDE**

examination using non-destructive testing equipment and visual inspection

1.3.14**non-destructive testing****NDT**

examination using magnetic detecting and recording instruments

1.3.15**non-destructive testing instrument**

electromagnetic or magnetic instrument, consisting of —

- (a) a sensor head that is clamped around a rope during testing;
- (b) a unit that processes signals from the sensor head; and
- (c) a recording device (e.g. strip chart recorder, data recorder) that records the output of the processing unit.

Note 1 to entry: See [Appendix A](#) for further information on the principles for operating electromagnetic or magnetic instruments for non-destructive testing of wire ropes.

1.3.16**rope****1.3.16.1****balance rope****tail rope**

rope that has one end connected to the bottom of one conveyance and the other to the bottom of the other conveyance

1.3.16.2**guide rope**

suspended steel wire rope in a mine shaft to guide and limit lateral movement of the conveyance to prevent collision with other conveyances the shaft wall **or** equipment installed in the shaft

Note 1 to entry: The conveyance is normally permanently connected to the guide rope such that any lateral movement of the conveyance is resisted by the guide rope.

1.3.16.3**head rope**

rope connected to the top of a conveyance and used to raise and lower the *conveyance* ([1.3.3](#))

1.3.16.4**rubbing rope**

suspended steel wire rope in a mine shaft, positioned between conveyances to prevent collision of passing conveyances

Note 1 to entry: Conveyances are not connected to the rubbing ropes. The ropes only resist conveyance lateral movement after the conveyance has deflected sufficiently to come in contact with the rubbing ropes.

1.3.17**rope area**

metallic cross-sectional area of a wire rope

1.3.18**rubbing ropes**

See *rope* ([1.3.16](#))

1.3.19**shall**

indicates that a statement is mandatory

1.3.20**should**

indicates a recommendation

1.3.21**winder**

machine used for raising and lowering conveyances in a mine shaft by means of a winding rope or ropes

1.3.21.1**drum winder**

winder ([1.3.21](#)) in which a winding rope coils on and off the drum during winding

1.3.21.2**friction winder**

winder ([1.3.21](#)) in which the driving force is transmitted to all winding rope(s) by friction between the drive drum and the rope(s)