

Australian/New Zealand Standard™

Industrial fall-arrest systems and devices

Part 2: Horizontal lifeline and rail systems



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AS/NZS 1891.2:2001

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-015, Industrial Safety Belts and Harnesses. It was approved on behalf of the Council of Standards Australia on 16 February 2001 and on behalf of the Council of Standards New Zealand on 26 January 2001. It was published on 20 March 2001.

The following interests are represented on Committee SF-015:

Australian Association of Certification Bodies
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Lightweight Vertical Rescue Instructors
Bureau of Steel Manufacturers of Australia
Communications, Electrical Plumbing Union
Department of Infrastructure, Energy and Resources, Tas.
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Australian/New Zealand Standard™

Industrial fall-arrest systems and devices

Part 2: Horizontal lifeline and rail systems

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-015, Industrial Safety Belts and Harnesses to supersede in part AS/NZS 1891.2(Int):1998.

The series as published to date comprises the following:

AS/NZS

- 1891 Industrial fall-arrest systems and devices
- 1891.1 Part 1: Safety belts and harnesses
- 1891.2 Part 2: Horizontal lifeline and rail systems (this Standard)
- 1891.2 Suppl1 Supplement 1: Prescribed configurations for horizontal lifelines (supplement to AS/NZS 1891.2:2000)
- 1891.3 Part 3: Fall-arrest devices
- 1891.4 Part 4: Selection, use and maintenance

The following European Standard was consulted in the course of preparation of this Standard:

EN

- 795 Protection against falls from a height—Anchor devices—Requirements and testing

This Standard was previously published as an Interim Standard due to the uncertainty as to whether the proposed ISO Standard for horizontal lifelines and rails would have similar requirements for dynamic performance testing. As it now appears that the ISO requirements will be similar, the Committee has decided to re-publish this Standard in its final form, i.e. with its interim status retracted. It was also decided that for the sake of clarity, Appendix F of the Interim Standard, titled *Prescribed configuration systems for horizontal lifelines*, would be re-published as a Supplement.

The technical content of this Standard together with that of the Supplement, is unchanged from the Interim Standard except for editorial corrections.

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

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Australian/New Zealand Standard
Industrial fall-arrest systems and devices

Part 2: Horizontal lifeline and rail systems

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies design and performance requirements for systems and associated component hardware for horizontal lifelines and rails used for fall-arrest purposes. The Standard covers systems using either rigid rails or flexible lines. Test methods are given in Appendices.

NOTE: Prescribed configurations for horizontal lifelines which are deemed to comply with this Standard are specified in AS/NZS 1891.2 Supplement 1.

1.2 REFERENCED DOCUMENTS

AS

- | | |
|--------|---|
| 1192 | Electroplated coatings—Nickel and chromium |
| 1214 | Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series) |
| 1231 | Aluminium and aluminium alloys—Anodic oxidation coatings |
| 1789 | Electroplated coatings—Zinc on iron or steel |
| 1790 | Electroplated coatings—Cadmium on iron or steel |
| 1897 | Electroplated coatings on threaded components (metric coarse series) |
| 2001 | Methods of test for textiles |
| 2001.1 | Part 1: Conditioning procedures |
| 2193 | Methods for calibration and grading of force-measuring systems of testing machines |
| 3569 | Steel wire ropes |
| 4036 | Corrosion of metal—Dissimilar metals in contact in seawater |
| 4142 | Fibre ropes |
| 4142.2 | Part 2: Three strand hawser-laid and eight-strand plaited |
| 4142.3 | Part 3: Man-made fibre rope for static life rescue lines |
| 4397 | Electroplated coatings of zinc on steel fasteners with imperial threads |

AS/NZS

- | | |
|------------------|---|
| 1891 | Industrial fall-arrest systems and devices |
| 1891.1 | Part 1: Safety belts and harnesses |
| 1891.2,
Suppl | Part 2: Horizontal lifeline and rail systems, Supplement 1: Prescribed configurations for horizontal lifelines (Supplement to AS/NZS 1891.2:2001) |
| 1891.3 | Part 3: Fall-arrest devices |
| 4680 | Hot-dip galvanized (zinc coatings on fabricated ferrous articles) |

BS	
4921	Specification for sherardized coatings on iron or steel
EN	
892	Mountaineering equipment—Dynamic mountaineering ropes—Safety requirements and test methods
1891	Personal protective equipment for prevention of falls from a height—Low stretch kernmantle rope
NFPA	
1983	Fire service life safety rope and system components
SAE	
J211/1	Instrumentation for impact tests—Part 1—Electronic instrumentation

1.3 DEFINITIONS

For the purpose of this Standard, the definitions in AS/NZS 1891.1 and those below apply.

1.3.1 Competent person

A person who has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to correctly perform a specified task.

1.3.2 Configuration

A defined layout of a horizontal lifeline in terms of numbers, dispositions and lengths of spans together with defined requirements for line material and strength, and strength of end and intermediate anchorages.

1.3.3 End anchorage

The anchorage at each end of each horizontal lifeline system which is designed to resist both the lateral tensile forces developed in the line and the directly applied forces at right angles to the line resulting from an arrested fall.

1.3.4 Flexible line

A line comprising steel wire rope, fibre rope or webbing.

1.3.5 Horizontal lifeline system

A flexible line supported by two or more anchorages such that the slope of a straight line joining any two adjacent anchorages does not exceed the system manufacturer's recommended slope or, in the absence of such recommendation, five degrees.

1.3.6 Horizontal life rail system

A structurally rigid rail for the attachment of a lanyard or personal fall-arrest device via a mobile attachment device and having a slope not exceeding system manufacturer's recommendations or, in the absence of such recommendations, three degrees.

1.3.7 Intermediate anchorage

An anchorage supporting a horizontal lifeline other than at its ends.

1.3.8 Line energy absorber

A device placed in series with a horizontal lifeline to absorb energy and reduce the longitudinal forces in the line resulting from a fall-arrest.

1.3.9 Mobile attachment device

A device, either purpose designed and built or adapted for the purpose, for the connection of personal fall-arrest equipment to a horizontal lifeline or rail, and which can slide along the line or rail.

1.4 SYSTEM ACCEPTANCE CRITERIA

Criteria are set for the acceptance of horizontal lifeline and rail systems at three levels as follows:

(a) *Proprietary systems*

Systems for which the fall-arrest performance of any selected layout design can be determined by a method or program which has been verified by means of performance testing of prototypes over an adequately representative range of layout configurations.

NOTE: It should not be implied from the above description that the Standard requires any details of commercially sensitive technology to be revealed.

(b) *Prescribed configuration systems*

Systems set up in accordance with configurations prescribed in AS/NZS 1891.2, Supplement 1 are deemed to comply with this Standard.

(c) *Rigid systems*

Horizontal life rail systems whose performance can be reliably predicted by design calculation.

Detailed requirements for meeting these criteria are set out in Section 4.

1.5 RESTRAINT SYSTEMS

A restraint system not capable of sustaining fall-arrest loadings shall be clearly and permanently marked 'Suitable for restraint only. Not to be used for fall-arrest.'

NOTE: A restraint system using a horizontal line or rail, provided and located such that it effectively prevents users reaching a point at which a free fall could occur, need not meet this Standard. However, if foreseeable misuse of the restraint system could result in a free fall, it is advisable to provide a horizontal lifeline or rail as specified in this Standard.

1.6 LOADING OF LINES IN SERVICE

Flexible line systems shall not be subjected to any operator loading in normal service other than substantially horizontal restraint forces, i.e. they shall not be used for work positioning purposes, unless specifically designed and certified for such use.

NOTE: A primary reason for this requirement is to prevent creep in any part of the system, such as energy absorbers, which might, over time, alter its fall-arrest performance characteristics.

SECTION 2 HARDWARE SPECIFICATIONS

2.1 PERSONAL FALL-ARREST EQUIPMENT

Items of personal fall-arrest equipment used in conjunction with horizontal lifelines and rails shall meet the requirements specified in AS/NZS 1891.1 or AS/NZS 1891.3 as appropriate. The relevant items are as follows:

- (a) Fall-arrest harnesses.
- (b) Lanyard assemblies.
- (c) Attachment hardware, including attachment hardware adapted for use as mobile attachment devices, but excluding purpose designed mobile attachment devices (see Clause 2.6).
- (d) Fall-arrest devices.

2.2 METAL COMPONENTS—GENERAL REQUIREMENTS

2.2.1 General

All metal components shall be free of any defects due to faulty material or manufacture.

2.2.2 Finish

All external components shall be free of burrs, fins, irregularities and sharp edges which would affect the function or safe handling of the device during use.

2.2.3 Corrosion protection

Metal components which are made from metals or alloys without inherent corrosion resistance, shall have a metallic coating meeting the corrosion resistance requirements of AS 1789, AS 1790, AS 1192 or AS 1231 as appropriate to the base metal and the type of coating, at either Service Condition Number 2 or Application Grade 'Moderate' as relevant.

NOTE: Where tolerances are important, it is recommended that the component manufacturer also specify a maximum coating thickness (which should not be more than twice the minimum thickness).

Threaded components coated in accordance with AS 1214, AS 1897 or AS 4397, and all other metal components coated in accordance with the coating grades specified in Table 2.1 shall be deemed to comply with the above requirements.

Non-metallic or other coatings which can be shown to offer equivalent protection to the above methods and which have adequate resistance to impact, abrasion and chipping may be used in lieu.

NOTE: Where there are dissimilar metals in contact, care should be taken to avoid the possibility of galvanic action. Some general guidance on this matter can be obtained from AS 4036. (Although AS 4036 is specific to marine environments its guidance on dissimilar metals in contact can be taken as indicative of more general environmental conditions.)

2.3 FLEXIBLE LINES AND LINE TERMINATIONS

2.3.1 Material and construction requirements

Material and construction requirements for flexible lines shall be as follows:

- (a) *Webbing lines*

Webbing lines shall meet all of the material and construction requirements of AS/NZS 1891.1. This shall include the requirement that when subjected to the resistance of webbing to light test specified in AS/NZS 1891.1 the webbing shall withstand a breaking force of at least 70% of the breaking force specified in Clause 2.3.2.

TABLE 2.1
CORROSION PROTECTION COATINGS FOR METAL COMPONENTS

Material	Coating	Grade
Steel (other than stainless)	Electroplated zinc*	AS 1789—Fe/Zn 5c
	Electroplated cadmium*	AS 1790—Fe/Cd 5c
	Hot-dip galvanized	AS/NZS 4680
	Sherardized	BS 4921—Class 2
	Electroplated nickel	AS 1192—Fe/Ni 20b
	Electroplated nickel and chromium	AS 1192—Fe/Ni 20b Cr r
Copper or brass	Electroplated nickel	AS 1192—Cu/Ni 10b
	Electroplated nickel and chromium	AS 1192—Cu/Ni 10b Cr r
Aluminium and aluminium alloy	Anodized	AS 1231—AA 10
	Electroplated nickel	AS 1192—Al/Ni 20b
	Electroplated nickel and chromium	AS 1192—Al/Ni 20b Cr r

* Zinc coatings are more suitable for general use in industrial atmospheres, and cadmium is more suitable for use in marine environments.

(b) *Fibre rope lines (kernmantle* type)*

The following requirements and recommendations apply:

(i) *Static ropes*

The following apply:

(A) *In Australia*

Rope shall comply with AS 4142.3 for rope for static life rescue lines, except that—

- (1) the specified colour contrast between rope sheath and core, together with the specified tests for colourfastness, are not required; and
- (2) the rope need not have the words 'For static life rescue lines' written on the marker tape.

(B) *In New Zealand*

Pending publication of a New Zealand, a Joint Australian/New Zealand or an International Standard for static type kernmantle ropes, users for whom it is inappropriate to observe the requirements of AS 4142.3 are advised to consult either NFPA 1983 for class one-person life safety rope or EN 1891 for Type A 11 rope. Users are further advised to specify only ropes whose ultimate strength is at least 25 kN and whose minimum diameter (actual) is 10.5 mm.

(ii) *Dynamic ropes*

Pending publication of a Joint Australian/New Zealand Standard or an International Standard for dynamic ropes, users are advised to consult EN 892.

* A type of rope construction commonly used in abseiling, generally comprising essentially straight synthetic fibres encased in a woven synthetic sheath.