Steel prestressing materials

Part 1: General requirements

This Australian Standard® was prepared by Committee BD-084, Steel Reinforcing and Prestressing Materials. It was approved on behalf of the Council of Standards Australia on 14 August 2006.
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The following are represented on Committee BD-084:

- Austroads
- Association of Consulting Engineers Australia
- Australian Chamber of Commerce and Industry
- Australian Post Tensioning Association
- Australian Steel Association
- Australian Wire Industry Association
- Bureau of Steel Manufacturers of Australia
- Business New Zealand
- Cement & Concrete Association of New Zealand
- Galvanizers Association of Australia
- Institution of Professional Engineers New Zealand
- Master Builders Australia
- National Precast Concrete Association Australia
- Steel Reinforcement Institute of Australia

This Standard was issued in draft form for comment as DR 04001.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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AS 1310 first published 1972.
Second edition 1987.
AS 1311 first published 1972.
Second edition 1987.
AS 1313 originated as AS A144—1963.
Second edition 1971.
AS A144—1971 revised and redesignated AS 1313—1972.
Second edition 1989.
AS 1310—1987, AS 1311—1987 and AS 1313—1989 revised, amalgamated and redesignated (in part) AS/NZS 4672.1:2007.
Reissued incorporating Amendment No. 1 (November 2018) and redesignated as AS 4672.1:2007.
Reissued incorporating Amendment No. 2 (October 2020).

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PREFACE

This Standard was prepared by the Standards Australia/Standards New Zealand Committee BD-084, Reinforcing and Prestressing Materials, to supersede the following Standards:

AS 1310—1987 *Steel wire for tendons in prestressed concrete*

AS 1311—1987 *Steel tendons for prestressed concrete—7-wire stress-relieved strand for tendons in prestressed concrete*

AS 1313—1989 *Steel tendons for prestressed concrete—Cold-worked high-tensile alloy steel bars for prestressed concrete*

This Standard incorporates Amendment No. 1 (November 2018) and Amendment No. 2 (October 2020). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

Amendment No. 1 to this Standard was prepared by the Australian members of Joint Standards Australia/Standards New Zealand Committee BD-084, Reinforcing and Prestressing Materials. As a consequence of Amendment No. 1, which is published as an Australian-only amendment, the designation of this Standard has been changed from AS/NZS 4672.1:2007 to AS 4672.1:2007.

The objective of this Standard is to provide a single specification for material requirements for as-drawn wire, stress-relieved wire, quenched and tempered wire, strand, and hot-rolled steel bars, intended for use in prestressed concrete structures which have been designed in accordance with AS 3600, *Concrete structures* or NZS 3101.1, *Concrete structures standard*, Part 1: *The design of concrete structures*.

AS/NZS 4672.2, *Steel prestressing materials*, Part 2: *Testing requirements*, provides a method to ensure compliance with this Standard.

This Standard is aligned technically with both ISO 6934, *Steel for the prestressing of concrete* (all parts), and ISO 15630-3 *Steel for the reinforcement and prestressing of concrete—Test methods*—Part 3: *Prestressing steel.* The Standard is not classed as 'technically equivalent' to any of these documents primarily because—

(a) the procedure for the isothermal relaxation test in ISO 15630-3 was not thought to be adequate (e.g., duration of test, and other testing requirements); and

(b) differences in both the text and numerical values, although minor in nature, are too numerous to meet the strict definition of 'technically equivalent'.

Reference has also been made to the European Standards prEN 10138, Parts 1 to 4, *Prestressing steels*, for additional material and information.

The test methods described in this Standard are not generally suitable for crimped wire.

For ease of use, the tables setting out the dimensions, masses and tensile properties have been divided into common sizes readily available and other sizes that may be available from suppliers on special request.

The term force has been used throughout this Standard in place of the term load (which was used previously).

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.

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

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for high tensile strength steel tendons to be used for prestressing concrete and for other similar purposes (e.g., masonry structures). It applies only to tendons in the condition as supplied by the manufacturer. It does not cover requirements for anchorage devices (see Note 1) and materials used in conjunction with the prestressing steel in structural components.

The specific properties for each type of prestressing steel are given in Sections 2 to 6, namely:

(a) Section 2, As-drawn (mill coil) wire.

(b) Section 3, Stress-relieved wire.

(c) Section 4, Quenched and tempered wire.

(d) Section 5, Strand.

(e) Section 6, Hot-rolled bars with or without subsequent processing.

NOTES:

1 Anchorage devices are covered by AS/NZS 1314.

2 Advice and recommendations on information to be supplied by the purchaser at the time of enquiry and order are contained in the purchasing guidelines set out in Appendix A.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

A1

1310	Steel wire for tendons in prestressed concrete
1311	Steel tendons for prestressed concrete—7-wire stress-relieved strand for tendons in prestressed concrete
1391	Metallic materials—Tensile testing at ambient temperature
1545	Methods for the calibration and grading of extensometers
2193	Calibration and classification of force-measuring systems
2505	Metallic materials
2505.2	Method 2: Bars, rods and solid shapes—Bend tests
2505.4	Method 4: Wire—Reverse bend test
2706	Numerical values—Rounding and interpretation of limiting values