

Australian Standard[®]

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

This Australia Standard was prepared by Committee BD/23, Structural Steel. It was approved on behalf of the Council of Standards Australia on 25 November 1988 and published on 26 June 1989.

The following interests are represented on Committee BD/23:

Australian Institute of Steel Construction
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Institute of Steel Service Centres of Australia
Metal Trades Industry Association of Australia
National Association of Australian State Road Authorities
Railways of Australia Committee
Steel Reinforcement Promotion Group
University of New South Wales
University of Sydney

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 85140.

Australian Standard[®]

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

First published as AS A144-1963.
Second edition 1971.
Revised and redesignated AS 1313-1972.
Second edition 1989.

PREFACE

This Standard was prepared by the Standards Australia Committee on Structural Steel as a replacement for AS 1313–1972, *Cold-worked high-tensile alloy steel bars in prestressed concrete (metric units)*.

This Standard differs from the previous edition as follows:

- (a) The introduction of the 'Referenced Documents' clause.
- (b) Australian Standards replace British Standards as referenced documents.
- (c) 'Proof stress' is changed to 'yield force' and 'breaking load' to 'breaking force'.
- (d) There is a change in the relaxation test procedure which is now in an appendix.
- (e) The marking (identification) requirements are revised.
- (f) 15 mm and 19 mm bars are introduced in Tables 1 and 3.
- (g) Some editorial variations in accordance with current Standards Australia style have been introduced.

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

	<i>Page</i>
1 SCOPE	4
2 REFERENCED DOCUMENTS	4
3 DEFINITIONS	4
4 BASE MATERIAL	4
5 PROOF LOADING DURING MANUFACTURE	4
6 QUALITY OF FINISHED BARS	4
7 WELDS	4
8 DIMENSIONS, MASS AND TOLERANCE	5
9 ASSESSMENT OF COMPLIANCE	5
10 TESTING	5
11 RETESTS	5
12 ROUNDING OF NUMBERS	6
13 TEST CERTIFICATE	6
14 MARKING	6
15 PACKING	6
 APPENDICES	
A PURCHASING GUIDELINES	7
B RELAXATION TEST	8

STANDARDS AUSTRALIA

Australian Standard
Steel tendons for prestressed concrete—Cold-worked high-tensile alloy steel bars
for prestressed concrete

1 SCOPE. This Standard specifies requirements for two grades of high-tensile steel bar, made from hot-rolled alloy steel bars by cold-working, intended for use in prestressed concrete and prestressed ground anchors.

The two grades of bar are 'regular' and 'super'.

Bars may be plain or ribbed.

NOTE: Guidelines to purchasers on requirements that should be specified by the purchaser and those that should be agreed at the time of enquiry or order are given in Appendix A.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS

1391	Methods for tensile testing of metals
1545	Methods for the calibration and grading of extensometers
2193	Methods for calibration and grading of force-measuring systems of testing machines.
2706	Numerical values—Rounding and interpretation of limiting values.

3 DEFINITIONS. For the purpose of this Standard, the definitions below apply.

3.1 Breaking force—the force where failure of the parent bar occurs.

3.2 Rib bar—a deformed bar of substantially circular cross-section.

3.3 Nominal diameter of rib bar—the diameter of a plain bar having the same mass per metre as that of the rib bar.

3.4 Length—a piece of bar cut to a specified length.

3.5 Lot—a quantity of finished bars manufactured under essentially the same conditions and at essentially the same time. A consignment or shipment may consist of one or more lots, or parts thereof.

3.6 Parent bar—the bar in the as-cast condition as

received from the steelmaker.

3.7 Relaxation—loss of force on a test piece that is being maintained at constant length and constant temperature.

3.8 Rolled threads—threads formed by cold-rolling a plain bar.

3.9 Yield force—force determined from the force-elongation curve based on a non-proportional elongation of 0.2 percent.

4 BASE MATERIAL. On check analysis, the chemical composition of the steel shall have not more than 0.050 percent of sulphur and not more than 0.050 percent of phosphorus.

NOTE: No other limitations are given for the composition of the steel. The tensile strength and other requirements imply that the bars will be manufactured from a steel of suitable composition.

5 PROOF LOADING DURING MANUFACTURE. All bars shall be proof loaded either during cold-working or after cold-working, the proof load being at least 0.85 times the minimum breaking force given in Table 3, as appropriate.

6 QUALITY OF FINISHED BARS. Bars shall be manufactured to the specified dimensions (see Table 1) and shall be sound and free from harmful defects such as splits, surface flaws and piping.

Light surface rusting is permissible, provided no pitting detrimental to the performance of the bar is present.

Where bars are threaded, the threads shall be cold-rolled.

7 WELDS. There shall be no welds on any length of bar. Bars shall not be welded under any circumstances.

TABLE 1
DIMENSIONS

PLAIN BAR			RIBBED BAR		
Nominal diameter mm	Nominal area mm ²	Nominal mass kg/m	Nominal diameter mm	Nominal area mm ²	Nominal mass kg/m
15	177	1.54			
19	284	2.42			
23	416	3.49	26.5	551	4.48
26	531	4.43			
29	661	5.48	32	804	6.53
32	804	6.64			
35	962	7.91	36	1 018	8.27
38	1 134	9.29			

NOTES:

- Nominal area is the area of the threaded portion of the bar
- Nominal mass is the mass of the bar as delivered.
- Nominal mass is calculated on the basis of average actual diameter after cold-rolling and a steel density of 7850 kg/m³.