

Australian Standard™

**Mechanical properties of fasteners
made of carbon steel and alloy steel**

Part 1: Bolts, screws and studs

This Australian Standard was prepared by Committee ME/29, Fasteners. It was approved on behalf of the Council of Standards Australia on 15 February 2000 and published on 3 April 2000.

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Australian Building Codes Board
Australian Chamber of Commerce and Industry
Australian Industry Group
Bureau of Steel Manufacturers of Australia
Electricity Supply Association of Australia
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PREFACE

This Standard was prepared by the Standards Australia Committee ME/29, Fasteners, to supersede AS/NZS 4291.1:1995, *Mechanical properties of fasteners, Part 1: Bolts, screws and studs*.

The objective of this Standard is to provide manufacturers and users of threaded fasteners with the material requirements and mechanical properties for carbon steel and alloy steel bolts, screws and studs with ISO metric threads.

The following changes have been incorporated in this edition:

- (a) Updating of references.
- (b) Addition of a permissible boron content in material composition.
- (c) Introduction of a torsional strength requirement for bolts and screws with property classes 8.8 to 12.9 with nominal thread diameters equal to or less than 4 mm and for short bolts and screws with nominal thread diameters greater than 4 mm and equal to and less than 10 mm.
- (d) Modification of marking requirements including the clock-face system for property class.

This Standard is identical with and has been reproduced from ISO 898-1:1999, *Mechanical properties of fasteners made of carbon steel and alloy steel, Part 1: Bolts, screws and studs*.

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

As this Standard is reproduced from an international Standard, the following applies:

- (i) Its number appears on the cover and title page while the International Standard number appears only on the cover.
- (ii) In the source text, 'this part of ISO 898' should read 'this Australian Standard'.
- (iii) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

<i>Reference to International Standard</i>		<i>Australian Standard</i>	
ISO		AS	
68	ISO general purpose screw threads—Basic profile	1721	General purpose metric screw threads
68-1	Part 1: Metric screw threads		
83	Steel—Charpy impact test (U-notch)	1544 1544.3	Methods for impact tests on metals Part 3: Charpy U-notch and keyhole notch—
261	ISO general purpose metric screw threads—General plan	1721	General purpose metric screw threads
262	ISO general purpose metric screw threads—Selected sizes for screws, bolts and nuts	1721	General purpose metric screw threads
273	Fasteners—Clearance holes for bolts and screws	—	
724	ISO general purpose metric screw threads—Basic dimensions	1721	General purpose metric screw threads

ISO		AS/NZS	
898	Mechanical properties of fasteners made of carbon steel and alloy steel	4291	Mechanical properties of fasteners
898-2	Part 2: Nuts with specified proof load values—Coarse thread	4291.2	Part 2: Nuts with specified proof load values—Coarse thread
		AS	
898-5	Part 5: Set screws and similar fasteners not under tensile stresses	4291.5	Part 5: Set screws and similar fasteners not under tensile stresses
		AS/NZS	
898-7	Part 7: Torsional test and minimum torques for bolts and screws with nominal diameters 1 mm to 10 mm	4291.7	Part 7: Torsional test and minimum torques for bolts and screws with nominal diameters 1 mm to 10 mm
		AS	
965	ISO general purpose metric screw threads—Tolerances	1721	General purpose metric screw threads
965-1	Part 1: Principles and basic data		
965-2	Part 2: Limits of sizes for general purpose bolt and nut threads—Medium quality		
6157	Fasteners—Surface discontinuities	—	
6157-1	Part 1: Bolts, screws and studs for general requirements	—	
6157-3	Part 3: Bolts, screws and studs for special requirements	—	
6506	Metallic materials—Hardness test—Brinell test	1816	Metallic materials—Brinell hardness test
6507	Metallic materials—Hardness test—Vickers test	1817	Metallic materials—Vickers hardness test
6507-1	Part 1: Test method		
6508	Metallic materials—Hardness test—Rockwell test (Scales A, B, C, D, E, F, G, H, K)	1815	Metallic materials—Rockwell hardness test
6892	Metallic materials—Tensile testing at ambient temperature	1391	Methods for tensile testing of metals

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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AUSTRALIAN STANDARD

Mechanical properties of fasteners made of carbon steel and alloy steel —**Part 1:
Bolts, screws and studs****1 Scope**

This part of ISO 898 specifies the mechanical properties of bolts, screws and studs made of carbon steel and alloy steel when tested at an ambient temperature range of 10 °C to 35 °C.

Products conforming to the requirements of this part of ISO 898 are evaluated only in the ambient temperature range and may not retain the specified mechanical and physical properties at higher and lower temperatures. Attention is drawn to annex A which provides examples of lower yield stress and stress at 0,2 % non-proportional elongation at elevated temperatures.

At temperatures lower than the ambient temperature range, a significant change in the properties, particularly impact strength, may occur. When fasteners are to be used above or below the ambient temperature range it is the responsibility of the user to ensure that the mechanical and physical properties are suitable for his particular service conditions.

Certain fasteners may not fulfill the tensile or torsional requirements of this part of ISO 898 because of the geometry of the head which reduces the shear area in the head as compared to the stress area in the thread such as countersunk, raised countersunk and cheese heads (see clause 6).

This part of ISO 898 applies to bolts, screws and studs

- with coarse pitch thread M1,6 to M39, and fine pitch thread M8 × 1 to M39 × 3;
- with triangular ISO thread in accordance with ISO 68-1;
- with diameter/pitch combinations in accordance with ISO 261 and ISO 262;
- with thread tolerance in accordance with ISO 965-1 and ISO 965-2;
- made of carbon steel or alloy steel.

It does not apply to set screws and similar threaded fasteners not under tensile stresses (see ISO 898-5).

It does not specify requirements for such properties as

- weldability;
- corrosion-resistance;
- ability to withstand temperatures above + 300 °C (+ 250 °C for 10.9) or below – 50 °C;
- resistance to shear stress;
- fatigue resistance.

NOTE The designation system of this part of ISO 898 may be used for sizes outside the limits laid down in this clause (e.g. $d > 39$ mm), provided that all mechanical requirements of the property classes are met.