

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

Part 1: Bolts, screws and studs

The European Standard EN ISO 898-1:1999 has the status of a
British Standard

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National foreword

This British Standard is the English language version of EN ISO 898-1:1999. It is identical with ISO 898-1:1999. It supersedes BS EN 20898-1:1992 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee FME/9, Bolts, nuts and accessories, to Subcommittee FME/9/1, Mechanical properties of fasteners, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN ISO title page, page 2, the ISO title page, pages ii to iv, pages 1 to 24 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 October 1999

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English version

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

(ISO 898-1:1999)

Caractéristiques mécaniques des éléments de
fixation en acier au carbone et en acier allié —
Partie 1: Vis et goujons
(ISO 898-1:1999)

Mechanische Eigenschaften von
Verbindungselementen aus Kohlenstoffstahl
und legiertem Stahl — Teil 1: Schrauben
(ISO 898-1:1999)

This European Standard was approved by CEN on 16 July 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

The text of the International Standard ISO 898-1:1999 has been prepared by Technical Committee ISO/TC 2 “Fasteners” in collaboration with Technical Committee CEN/TC 185 “Threaded and non-threaded mechanical fasteners and accessories”, the secretariat of which is held by DIN.

This European Standard supersedes EN 20898-1:1991.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 898-1:1999 was approved by CEN as a European Standard without any modification.

NOTE Normative references to International Standards are listed in Annex ZB (normative).

INTERNATIONAL STANDARD

ISO
898-1

Third edition
1999-08-01

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

Part 1: Bolts, screws and studs

*Caractéristiques mécaniques des éléments de fixation en acier au carbone
et en acier allié —*

Partie 1: Vis et goujons



Reference number
ISO 898-1:1999(E)

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Descriptors: Fasteners, steel products, bolts, screws, studs, specifications, materials specifications, mechanical properties, physical properties, tests, mechanical tests, identification methods, designation, marking.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 898-1 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 1, *Mechanical properties of fasteners*.

This third edition cancels and replaces the second edition (ISO 898-1:1988) which has been technically revised.

ISO 898 consists of the following parts, under the general title *Mechanical properties of fasteners made of carbon steel and alloy steel*:

- *Part 1: Bolts, screws and nuts;*
- *Part 2: Nuts with specified proof load values — Coarse thread;*
- *Part 5: Set screws and similar threaded fasteners not under tensile stresses;*
- *Part 6: Nuts with specified proof load values — Fine pitch thread;*
- *Part 7: Torsional test and minimum torques for bolts and screws with nominal diameter from 1 mm to 10 mm.*

Annex A of this part of ISO 898 is for information only.

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.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 898. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 898 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 68-1:1998, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads*.

ISO 83:1976, *Steel — Charpy impact test (U-notch)*.

ISO 261:1998, *ISO general purpose metric screw threads — General plan*.

ISO 262:1998, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*.

ISO 273:1979, *Fasteners — Clearance holes for bolts and screws*.

ISO 724:1978, *ISO general purpose metric screw threads — Basic dimensions*.

ISO 898-2:1992, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified proof load values — Coarse thread*.

ISO 898-5:1998, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 5: Set screws and similar threaded fasteners not under tensile stresses*.

ISO 898-7:1992, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 7: Torsional test and minimum torques for bolts and screws with nominal diameters 1 mm to 10 mm*.

ISO 965-1:1998, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*.