

# SLOVENSKI STANDARD

## SIST EN ISO 898-1:2001

01-julij-2001

Nadomešča:

SIST EN 20898-1:1996

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### Mehanske lastnosti veznih elementov iz ogljikovega ali legiranega jekla - 1. del: Vijaki, zatiči in stebelni vijaki (ISO 898-1:1999)

Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs (ISO 898-1:1999)

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

Ta slovenski standard je istoveten z: **EN ISO 898-1:1999**

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#### **ICS:**

21.060.10 Sorniki, vijaki, stebelni vijaki Bolts, screws, studs

**SIST EN ISO 898-1:2001**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 898-1**

August 1999

ICS 21.060.10

Supersedes EN 20898-1:1991

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.

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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).

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**Annex ZA** (informative)**Clauses of this European standard addressing essential requirements of the Council Directive 87/404/EEC**

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 the Council Directive 87/404/EEC of 25 June 1987 on the harmonization of the laws of the Member States relating to simple pressure vessels.

This standard supports the essential safety requirements in Annex I, clause 1.3, of the above directive so far as bolts and screws made of carbon steel are concerned. The application of this standard is restricted to bolts and screws of property class 5.6, which is the only one suitable for simple pressure vessels.

Compliance with this standard provides one means of conforming with specific essential requirements of the Directive.

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**Annex ZB (normative)**  
**Normative references to international publications**  
**with their relevant European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN</u>	<u>Year</u>
ISO 273	1979	Fasteners - Clearance holes for bolts and screws	EN 20273	1991
ISO 898-2	1992	Mechanical properties of fasteners - Part 2: Nuts with specified proof load values - Coarse thread	EN 20898-2	1993
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	EN ISO 898-5	1998
ISO 898-7	1992	Mechanical properties of fasteners - Part 7: Torsional test and minimum torques for bolts and screws with nominal diameters 1 mm to 10 mm	EN 20898-7	1995
ISO 6157-1	1988	Fasteners - Surface discontinuities - Part 1: Bolts, screws and studs for general requirements	EN 26157-1	1991
ISO 6157-3	1988	Fasteners - Surface discontinuities - Part 3: Bolts, screws and studs for special requirements	EN 26157-3	1991
ISO 6507-1	1997	Metallic materials - Vickers hardness test - Part 1: Test method	EN ISO 6507-1	1997

# INTERNATIONAL STANDARD

**ISO**  
**898-1**

Third edition  
1999-08-01

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## 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*

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Reference number  
ISO 898-1:1999(E)

## ISO 898-1:1999(E)

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## 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.

# 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.

## 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.*

ISO 965-2:1998, *ISO general purpose metric screw threads – Tolerances – Part 2: Limits of sizes for general purpose external and internal screw threads – Medium quality.*

ISO 6157-1:1988, *Fasteners – Surface discontinuities – Part 1: Bolts, screws and studs for general requirements.*

ISO 6157-3:1988, *Fasteners – Surface discontinuities – Part 3: Bolts, screws and studs for special requirements.*

ISO 6506:1981, *Metallic materials – Hardness test – Brinell test.*

ISO 6507-1:1997, *Metallic material – Hardness test – Vickers test – Part 1: Test method.*

ISO 6508:1986, *Metallic materials – Hardness test – Rockwell test (scales A - B - C - D - E - F - G - H - K).*

ISO 6892:1998, *Metallic materials – Tensile testing at ambient temperature.*

## 3 Designation system

The designation system for property classes of bolts, screws and studs is shown in table 1. The abscissae show the nominal tensile strength values,  $R_m$ , in newtons per square millimetre, while the ordinates show those of the minimum elongation after fracture,  $A_{min}$ , as a percentage.

The property class symbol consists of two figures:

- the first figure indicates 1/100 of the nominal tensile strength in newtons per square millimetre (see 5.1 in table 3);
- the second figure indicates 10 times the ratio between lower yield stress  $R_{eL}$  (or stress at 0,2 % non-proportional elongation  $R_{p0,2}$ ) and nominal tensile strength  $R_{m, nom}$  (yield stress ratio).