

Mechanical properties of fasteners —

Part 1: Bolts, screws and studs

The European Standard EN 20898-1:1991 has the status of a British Standard

Cooperating organizations

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United Kingdom	British Standards Institution

This British Standard, having been prepared under the direction of the General Mechanical Engineering Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 1 April 1992

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Contents

	Page
Cooperating organizations	Inside front cover
National foreword	ii
Foreword	2
1 Scope and field of application	3
2 References	3
3 Designation system	3
4 Materials	3
5 Mechanical properties	6
6 Mechanical properties to be determined	7
7 Minimum ultimate tensile loads and proofing loads	8
8 Test methods	11
9 Marking	18
Annex Properties at elevated temperature	20
National annex NA (informative)	Inside back cover
National annex NB (informative)	Inside back cover
Figure 1 — Test piece for tensile test	12
Figure 2 — Application of proofing load to full-size bolts	13
Figure 3 — Wedge loading of full-size bolts	14
Figure 4 — Head soundness test	15
Figure 5 — Zones of decarburization	17
Figure 6 — Hardness measurements for decarburization test	17
Figure 7 — Examples of marking on hexagon bolts and screws	18
Figure 8 — Examples of marking on hexagon socket head cap screws	18
Figure 9 — Marking of stud	19
Figure 10 — Left-hand thread marking	19
Figure 11 — Alternative left-hand thread marking	19
Table 1 — System of coordinates	4
Table 2 — Steels	5
Table 3 — Mechanical properties of bolts, screws and studs	6
Table 4 — Key to test programmes	7
Table 5 — Test programmes A and B for acceptance purposes	7
Table 6 — Minimum ultimate tensile loads — ISO metric coarse pitch thread	8
Table 7 — Proofing loads — ISO metric coarse pitch thread	9
Table 8 — Minimum ultimate tensile loads — ISO metric fine pitch thread	10
Table 9 — Proofing loads — ISO metric fine pitch thread	10
Table 10 — Hole diameters for wedge loading test	14
Table 11 — Wedge dimensions	15
Table 12 — Values of angle β	15
Table 13 — Values for H_1 and E	17
Table 14 — Marking symbols	18
Table 15 — Identification marks for studs	19
Table 16 — Properties at elevated temperature	20

National foreword

This British Standard has been prepared under the direction of the General Mechanical Engineering Standards Policy Committee and is the English language version of EN 20898-1 “*Mechanical properties of fasteners — Part 1: Bolts, screws and studs*”, published by the European Committee for Standardization (CEN). EN 20898-1 was produced as a result of international discussion in which the UK took an active part. It is one of a series of standards that are under preparation based on ISO 898.

This Part of this standard is based on ISO 898-1:1988 “*Mechanical properties of fasteners — Part 1: Bolts, screws and studs*”, published by the International Organization for Standardization (ISO).

BS EN 20898-2 is also published.

BS 6104-1:1981, which was technically equivalent to ISO 898-1:1988, is now superseded by this British Standard and has been withdrawn in accordance with the CEN/CENELEC Internal Regulations.

Attention is drawn to the fact that at a recent meeting of Technical Committee ISO/TC2/SC1 a resolution was approved which put forward an amendment to ISO 898-1:1988 (upon which BS EN 20898-1:1992 is based), altering clause 1 by rewriting the last paragraph, to insert after + 300 °C “(+ 250 °C for 10.9)”.

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 title page, pages 2 to 20, an inside back cover 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.

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Descriptors: Fasteners, bolts, screws, studs, specifications, mechanical properties, tests, designation, marking

English version

Mechanical properties of fasteners — Part 1: Bolts, screws and studs

(ISO 898-1:1988)

Caractéristiques mécaniques des éléments de
fixation —
Partie 1: Boulons, vis et goujons
(ISO 898-1:1988)

Mechanische Eigenschaften von
Verbindungselementen —
Teil 1: Schrauben
(ISO 898-1:1988)

This European Standard was approved by CEN on 1991-02-11. 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.

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CEN

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

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Foreword

In 1989, ISO 898-1:1988 was submitted to the CEN Primary Questionnaire Procedure.

According to the results of this questionnaire, the BT asked CEN/TC 185 to prepare a prEN for submission to the Formal Vote. CEN/TC 185 decided to submit ISO 898-1:1988 to the Formal Vote procedure without modifications.

The text of the International Standard ISO 898-1:1988 having been approved by CEN as a European Standard without modifications, the following countries are bound to implement this standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of the International Standard ISO 898-1:1988 was approved by CEN as a European Standard without modifications.

NOTE In Table 3, line **5.10**, the sign “%” shall be added after the symbol A . In the first line of Table 5 and in the head-lines of Table 6 and Table 8, the symbol “ R_m ” shall be replaced by “ R_m min”.

1 Scope and field of application

This part of ISO 898 specifies the mechanical properties of bolts, screws and studs when tested at room temperature (see ISO 1). Properties will vary at higher and lower temperature.

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

- with nominal thread diameter $d \leq 39$ mm (coarse and fine pitch);
- with triangular ISO thread according to ISO 68;
- with diameter/pitch combinations according to ISO 261 and ISO 262;
- with thread tolerance according to ISO 965-1 and ISO 965-2;
- of any shape;
- made of carbon steel or alloy steel.

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

It does not specify requirements for such properties as

- weldability;
- corrosion-resistance (see ISO 3506);
- ability to withstand temperatures above + 300 °C or below – 50 °C.

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 References

ISO 1, *Standard reference temperature for industrial length measurements.*

ISO 68, *ISO general purpose screw threads — Basic profile.*

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

ISO 225, *Fasteners — Bolts, screws, studs and nuts — Symbols and designations of dimensions.*

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

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

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

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

ISO 965-2, *ISO general purpose metric screw threads — Tolerances — Part 2: Limits or sizes for general purpose bolt and nut threads — Medium quality.*

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

ISO 6157-3, *Fasteners — Surface discontinuities — Part 3: Bolts, screws and studs for special requirements.*¹⁾

ISO 6506, *Metallic materials — Hardness test — Brinell test.*

ISO 6507-1, *Metallic materials — Hardness test — Vickers test — Part 1: HV 5 to HV 100.*

ISO 6507-2, *Metallic materials — Hardness test — Vickers test — Part 2: HV 0,2 to less than HV 5.*

ISO 6508, *Metallic materials — Hardness test — Rockwell test — Scales A, B, C, D, E, F, G, H, K.*

ISO 6892, *Metallic materials — Tensile testing.*

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 indicates 1/100 of the nominal tensile strength in newtons per square millimetre (see R_m in Table 3);
- the second figure indicates 10 times the ratio between lower yield stress R_{eL} (or proof stress $R_{p0,2}$) and nominal tensile strength R_m (yield stress ratio).

The multiplication of these two figures will give 1/10 of the yield stress in newtons per square millimetre.

Lower yield stress R_{eL} (or proof stress $R_{p0,2}$) and minimum tensile strength R_m are equal to or greater than the nominal values (see Table 3).

4 Materials

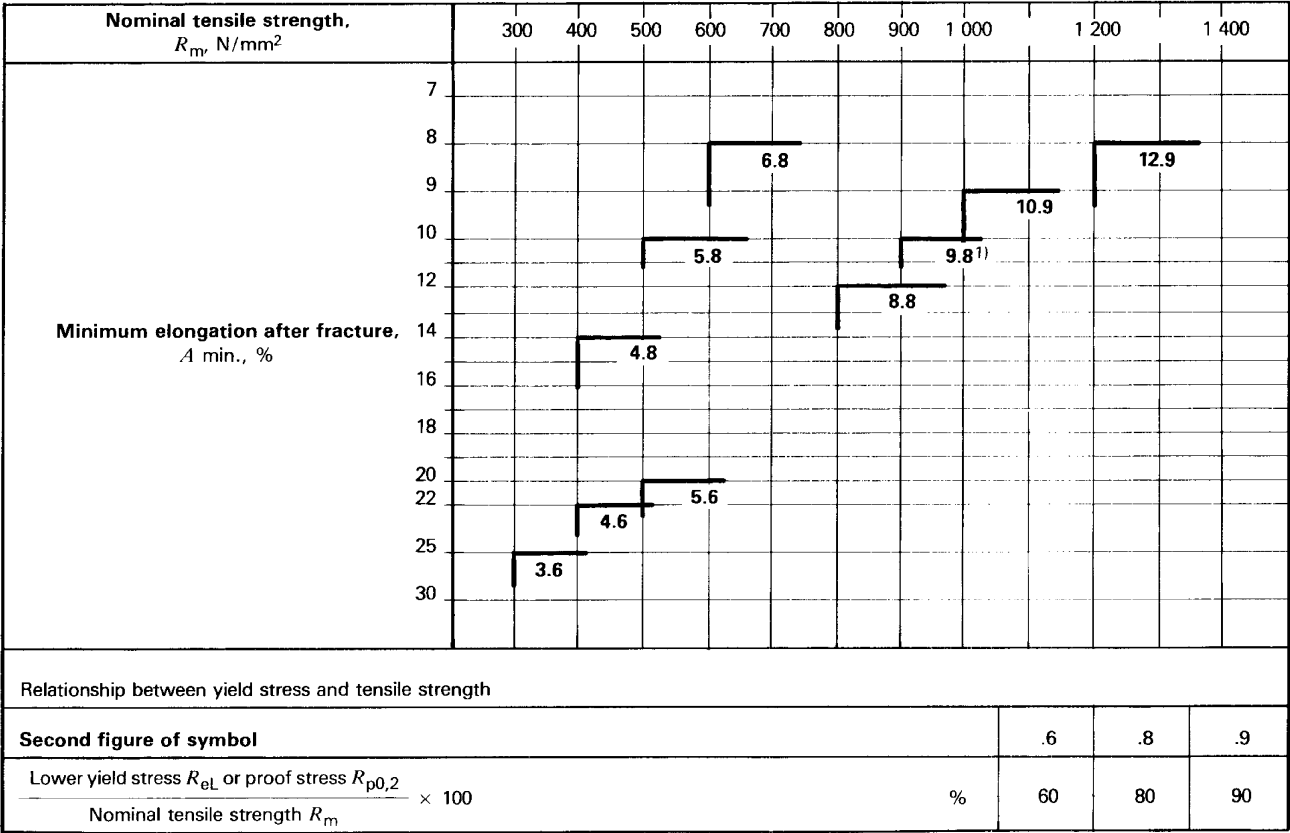
Table 2 specifies steels for the different property classes of bolts, screws and studs.

The minimum tempering temperatures listed in Table 2 are mandatory for property classes 8.8 to 12.9 in all cases.

The chemical composition limits are mandatory only for those fasteners which are not subject to tensile testing.

¹⁾ At present at the stage of draft.

Table 1 — System of coordinates



NOTE Although a great number of property classes are specified in this part of ISO 898, this does not mean that all classes are appropriate for all items. Further guidance for application of the specific property classes is given in the relevant product standard. For non-standard items, it is advisable to follow as closely as possible the choice already made for similar standard items.

1) Applies only to thread diameter $d \leq 16$ mm.