SLOVENSKI STANDARD
SIST EN ISO 898-2:2022

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Nadomešča:
SIST EN ISO 898-2:2012

Vezni elementi - Mehanske lastnosti veznih elementov, narejenih iz ogljikovega jekla in jeklene zlitine - 2. del: Matice z določenimi razredi trdnosti (ISO 898-2:2022)

Fasteners - Mechanical properties of fasteners made of carbon steel and alloy steel - Part 2: Nuts with specified property classes (ISO 898-2:2022)

Mechanische Verbindungselemente - Mechanische Eigenschaften von Verbindungselementen aus Kohlenstoffstahl und legiertem Stahl - Teil 2: Muttern mit festgelegten Festigkeitsklassen (ISO 898-2:2022)

Fixations - Caractéristiques mécaniques des fixations en acier au carbone et en acier allié - Partie 2: Écrous de classes de qualité spécifiées (ISO 898-2:2022)

Ta slovenski standard je istoveten z: **EN ISO 898-2:2022**

ICS:

21.060.20 Matice Nuts

SIST EN ISO 898-2:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 898-2

October 2022

ICS 21.060.20

Supersedes EN ISO 898-2:2012

English Version

Fasteners - Mechanical properties of fasteners made of carbon steel and alloy steel - Part 2: Nuts with specified property classes (ISO 898-2:2022)

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This European Standard was approved by CEN on 9 September 2022.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN ISO 898-2:2022) has been prepared by Technical Committee ISO/TC 2 "Fasteners" in collaboration with Technical Committee CEN/TC 185 “Fasteners” the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 898-2:2012.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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Endorsement notice

The text of ISO 898-2:2022 has been approved by CEN as EN ISO 898-2:2022 without any modification.

INTERNATIONAL STANDARD

ISO 898-2

Fourth edition
2022-09

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

Part 2: Nuts with specified property classes

Fixations — Caractéristiques mécaniques des fixations en acier au carbone et en acier allié —

Partie 2: Écrous de classes de qualité spécifiées

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 12, *Fasteners with metric internal thread,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 185, *Fasteners*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 898-2:2012) which has been technically revised.

The main changes are as follows:

— property class 9 has been deleted completely, and nuts with fine pitch thread and property class 5 have been deleted (see Introduction);

— nuts with fine pitch thread in style 2 and property class 12 have been added for diameters 18 mm to 39 mm (see Tables 4, 6 and 10);

— styles have been more precisely specified for standard hexagon nuts according to their minimum height, and styles have been specified for other nuts according to their minimum design thread height (see 5.1);

— additional statements for thin nuts and jam nuts have been added (see Clause 6);

— additional statements for hot dip galvanized nuts have been added by referencing ISO 10684;

— in relation to material, heat treatment and steel microstructure (see Clause 7):

  — the minimum carbon content has been added (see Tables 3 and 4),

  — the minimum manganese content has been specified to 0,25 % for all Non-Quenched and Tempered nuts (NQT) and has been raised to 0,45 % for all Quenched and Tempered nuts (QT) (see Tables 3 and 4),

  — the table footnote for free cutting steel has been reworked (see Tables 3 and 4),

- the minimum tempering temperature has been added for QT nuts (see Tables 3 and 4), and a reference retempering test has been added (see 10.4),
- for nuts that may optionally be quenched and tempered at the manufacturer's discretion, detailed specifications have been added (see 7.2),
- specifications for steel microstructure have been added for NQT and QT nuts (see 7.4.1, 7.4.2 and 10.3);

— in relation to proof load:

- the proof load values for nuts with coarse pitch thread and property classes 6 and 8 have been raised for sizes M27 to M39 (see Introduction, Table 5, and Annex C),
- the maximum hole diameter for the grip has been corrected for diameters 5 mm and 6 mm (see Table 11), and reference to additional proof load specifications has been added for prevailing torque nuts (see 10.1);

— in relation to hardness:

- the reference Vickers hardness values have been recalculated, and conversion into Brinell and Rockwell hardness has been adjusted (see Introduction and 8.3),
- hardness determined on the bearing surface (see 10.2.4 a) and hardness determined in the transverse section at mid-height of the nut (see 10.2.4 b) have been added for routine inspection,
- the test method for hardness determined in the thread has been improved and the test force has been specified according to the pitch dimension (see 10.2.5),
- for QT nuts, the test methods for hardness in the core (see 10.2.6) and uniformity of hardness (see 10.2.7) have been added,
- requirements for hardness have been clarified (see 10.2.8 and 10.2.9);

— inspection documents have been referenced in accordance with ISO 16228 for fasteners (see 9.4);

— marking and labelling have been revised, and all nuts conforming to this document are to be marked whatever their shape (see Clause 11);

— Annex B, *Design principles for nuts*, has been improved;

— Annex C, *Nominal stress under proof load*, has been added.

A list of all parts in the ISO 898 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

ISO 898, the basic standard for fasteners with ISO metric thread made of carbon steel and alloy steel, was developed in several parts, and includes diameters 5 mm to 39 mm only for nuts. Property classes are specified in the ISO 898 series in relation to materials and mechanical properties, so that nuts in accordance with ISO 898-2 are matching with bolts, screws and studs specified in ISO 898-1 and with flat washers specified in ISO 898-3, as necessary, in order to design suitable assemblies for a given application.

More parts are under development for bolts, screws, studs and nuts with sizes above 39 mm.

The nuts specified in this document result from the adequate combination of nut heights (regular, style 1 – high, style 2 – thin, style 0), diameter ranges, coarse or fine pitch thread, and property classes in relation to heat treatment (Non-Quenched and Tempered = NQT, or Quenched and Tempered = QT). These combinations are based on bolt/nut compatibility, manufacturing processes and market needs. If other combinations are needed, e.g. for nuts designed for particular applications, see ISO/TR 16224.

In order to assure the necessary material strength in relation to property classes:

— Quenched and Tempered nuts (QT) are specified with a minimum carbon content and a minimum tempering temperature, and are characterized by a homogeneous martensitic structure;

— Non-Quenched and Tempered nuts (NQT) are also specified with a minimum carbon content but are characterized by a non-quenched microstructure.

Some property classes (in relation to nut style, diameter and coarse or fine pitch thread) specified as NQT may be optionally quenched and tempered as specified in 7.2, and in this case all requirements for QT nuts apply.

For fully loadable non-standard nuts which are to meet the requirements of this document, the relevant style 1 or style 2 is assigned in relation to their minimum design thread height.

Nut loadability is primarily checked by proof load. For nuts with coarse pitch thread and property classes 6 and 8, proof load values have been raised for sizes M27 to M39 due to the latest calculations of Masaya Hagiwara[20] in accordance with the Alexander's theory[21], see ISO/TR 16224. For those nuts it was necessary to develop full strength in relation to the mating bolts, screws and studs specified in ISO 898-1, the difference between the proof loads of ISO 898-2:2012 and the recalculated values being more than 5 % (see Annex C).

The Vickers hardness values specified for each individual group (consisting of property class, style, diameter range and pitch) have been chosen according to the same latest calculations, but adjusted to conventional figures taken over from the former versions of Parts 2 and 6 which were merged in 2012.

ISO 18265 presents no hardness to tensile strength correlation for steel in work hardened condition, which is typical for cold forged high volume NQT nuts: therefore, minimum hardness is just informative for NQT nuts and does not constitute a criterion in case of dispute. The maximum hardness of 334 HV is specified in order to prevent unexpected manufacturing processes which can lead to brittle behaviour of the NQT nuts: this limit is therefore mandatory and valid in case of dispute. However, it should be noted that work hardening is usually not severe enough to reach 302 HV when typical material and forging processes are used; nevertheless, inappropriate hardness testing or scattering due to just local properties is also covered by this specified limit of 334 HV.

Due to missing or decreasing market needs, nuts of property class 5 with fine pitch thread in style 1 and nuts of property class 9 were deleted (property class 5 or 9 can be substituted by property class 6 or 10 respectively).