



SLOVENSKI STANDARD
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Vezni elementi - Mehanske lastnosti veznih elementov iz korozijsko odpornega nerjavnega jekla - 4. del: Navojni vijaki z določenimi kakovostmi in razredi trdote (ISO/DIS 3506-4:2023)

Fasteners - Mechanical properties of corrosion-resistant stainless steel fasteners - Part 4: Tapping screws with specified grades and hardness classes (ISO/DIS 3506-4:2023)

Mechanische Verbindungselemente - Mechanische Eigenschaften von Verbindungselementen aus nichtrostenden Stählen - Teil 4: Blechsrauben mit festgelegten Stahlsorten und Härteklassen (ISO/DIS 3506-4:2023)

Fixations - Caractéristiques mécaniques des fixations en acier inoxydable résistant à la corrosion - Partie 4: Vis à tôle de grades et classes de dureté spécifiées (ISO/DIS 3506-4:2023)

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Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners —

Part 4:

Tapping screws with specified grades and hardness classes

ICS: 21.060.10

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Introduction

The properties of stainless steel fasteners result from the chemical composition of the material (especially corrosion resistance) and from the mechanical properties due to the manufacturing processes. Ferritic, austenitic, and duplex (austenitic-ferritic) stainless steel fasteners are generally manufactured by cold working; they consequently do not have homogeneous local material properties when compared to quenched and tempered fasteners.

Austenitic-ferritic stainless steels referred to as duplex stainless steel grades were originally invented in the 1930s and have been increasingly used since the 1980s. This document was revised to reflect their standardization for fasteners.

All duplex stainless steel grades show improved resistance to stress corrosion cracking compared to the commonly used A2 to A5 austenitic grades. Most duplex grades also show higher levels of pitting corrosion resistance, where D2 matches at least A2 and where D4 matches at least A4.

Complementary detailed explanations about stainless steel grades and properties are specified in ISO 3506-6.

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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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO [had/had not] received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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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*.

This third edition cancels and replaces the second edition (ISO 3506-4:2009), which has been technically revised.

The main changes compared to the previous edition are as follows:

- annexes common to several parts of the ISO 3506 series have been withdrawn from this document and are now included in the new Part 6 of ISO 3506;
- austenitic stainless steel of grade A8 and duplex (austenitic-ferritic) stainless steels of grades D2 to D8 for hardness classes 20H, 25H and 30H have been added (see [Figure 1](#));
- operational temperature ranges have been clarified (see [Clause 1](#));
- terms and definitions have been added (see [Clause 3](#));
- wording for surface conditions and corrosion resistance have been improved (see [5.3](#) and [5.4](#));
- inspection has been added (see [Clause 7](#));
- applicability of test methods has been added and hardness test methods have been improved (see [Clause 8](#));
- marking and labelling have been improved (see [Clause 9](#));
- structure and content of this document have been brought in line with other parts of ISO 3506 published recently.

A list of all parts in the ISO 3506 series can be found on the ISO website.

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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.

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Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners —

Part 4:

Tapping screws with specified grades and hardness classes

1 Scope

This document specifies the mechanical and physical properties of tapping screws made of corrosion-resistant austenitic, martensitic, ferritic, and duplex stainless steels, with specified grades and hardness classes.

ISO 3506-6 provides general rules and additional technical information on suitable stainless steels and their properties (detailed properties of stainless steel grades, corrosion behavior with regards to pitting, crevice and intergranular corrosion, magnetic properties, etc.).

WARNING — Tapping screws conforming to the requirements of this document are tested at the ambient temperature range of 10 °C to 35 °C and are used in applications ranging from -20 °C to +150 °C. It is possible that they do not retain the specified mechanical and physical properties at elevated and/or lower temperatures. Therefore, it is the responsibility of the user to determine the appropriate choice based on service environment conditions of the assembly (see also [Clauses 5](#) and [6](#)).

This document applies to tapping screws with threads from ST2,2 up to and including ST8, in accordance with ISO 1478.

This document does not apply to tapping screws with special properties, such as weldability.

2 Normative references [oSIST prEN ISO 3506-4:2024](https://standards.iteh.ai/catalog/standards/sist/d5408b5d-c4f6-428c-a841-06a64cd78555/osist-pren-iso-3506-4-2024)

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1478, *Tapping screws thread*

ISO 1891-4, *Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality*

ISO 3506-6, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 6: General rules for the selection of stainless steels and nickel alloys for fasteners*

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 16048, *Passivation of corrosion-resistant stainless-steel fasteners*

ISO 16228, *Fasteners — Types of inspection documents*

ISO 16426, *Fasteners — Quality assurance system*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO/DIS 3506-4:2023(E)

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

tapping screw sheet metal screw

screw with thread in accordance with ISO 1478 which, when driven into a hole, creates its own mating threads in the materials of the parts being assembled (usually thin metal sheets) without deforming its own thread

3.2

stainless steel

steel with at least 10,5 % (mass fraction) of chromium (Cr) and maximum 1,2 % (mass fraction) of carbon (C)

[SOURCE: ISO 3506-1:2020, 3.5]

3.3

austenitic stainless steel

stainless steel (3.2) with high amounts of chromium and nickel which usually cannot be hardened by heat treatment, providing excellent resistance to corrosion, good ductility, and usually low or non-magnetic properties

[SOURCE: ISO 3506-1:2020, 3.6]

3.4

martensitic stainless steel

stainless steel (3.2) with high amounts of chromium but very little nickel or other alloying elements, which can be hardened by heat treatment for increasing strength but with reduced ductility, and with highly magnetic properties

[SOURCE: ISO 3506-1:2020, 3.7]

3.5

ferritic stainless steel

stainless steel (3.2) containing less than 0,1 % carbon and typically 11 % to 18 % chromium, which usually cannot be hardened by heat treatment, and with highly magnetic properties

[SOURCE: ISO 3506-1:2020, 3.8]

3.6

duplex stainless steel

stainless steel (3.2) with a micro-structure that includes both austenitic and ferritic phases providing excellent resistance to corrosion, containing a higher amount of chromium and a reduced quantity of nickel compared to austenitic steel, with high strength, and with magnetic properties

[SOURCE: ISO 3506-1:2020, 3.9]

4 Designation system for stainless steel grades and hardness classes

4.1 General

The designation system for stainless steel tapping screws consists of two blocks, separated by a hyphen: the stainless steel grade and the hardness class, as specified in [Figure 1](#).