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# iTeh Standards (<https://standards.iteh.ai>) Document Preview

ISO/FDIS 3506-3

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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 document 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](http://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 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](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 2, *Fasteners*, 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 third edition cancels and replaces the second edition (ISO 3506-3:2009), which has been technically revised.

The main changes 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 3506-6 which is to be used with this document;
- austenitic stainless steel of grade A8 and duplex (austenitic-ferritic) stainless steels of grades D2 to D8 for hardness class 21H 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 5.2.5.2 and 5.3);
- manufacturer's, supplier's and purchaser's inspections have been added (see Clause 7);

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ISO 3506-1, Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes

ISO 3506-2, Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts with specified grades and property classes

ISO 3506-3, Mechanical properties of corrosion-resistant stainless steel fasteners — Part 3: Set screws and similar fasteners not under tensile stress

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**ISO/FDIS 3506-43:2024(en)**

- hardness test and proof torque 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.

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](http://www.iso.org/members.html).

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ISO 3506-3, Mechanical properties of corrosion-resistant stainless steel fasteners — Part 3: Set screws and similar fasteners not under tensile stress

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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 manufacturing process. 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 steels 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 steels 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.

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

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

## Part 3: Set screws (and similar fasteners not under tensile stress) with specified grades and hardness classes

### 1 Scope

This document specifies the mechanical and physical properties of set screws and similar fasteners not under tensile stress, made of corrosion resistant austenitic and duplex stainless steels, with specified grades and hardness classes.

~~ISO 2506-6 provides general rules and additional technical information on suitable stainless steels and their properties (detailed properties of stainless steel grades, corrosion behaviour with regards to pitting, crevice and intergranular corrosion, magnetic properties, etc.).~~

**WARNING** — Set 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 application ranging from -20 °C to +150 °C. It is possible that they do not retain the specified mechanical and physical properties at lower and/or elevated temperatures. Therefore, it is the responsibility of the user to determine the appropriate choices based on service environment conditions of the assembly (see also [Clauses 5 and 6](#))-[Clauses 5 and 6](#)).

This document applies to set screws and similar fasteners not under tensile stress:

- with ISO metric thread in accordance with [ISO 68-1](#),
- with diameter/pitch combinations in accordance with [ISO 261](#) and [ISO 262](#),
- with nominal thread diameter 1,6 mm to 24 mm,
- with thread tolerances in accordance with [ISO 965-1](#) and [ISO 965-2](#),
- with specified hardness classes, and
- of any shape.

**NOTE** The term set screw is used in the following for all screws and similar fasteners not under tensile stress within the scope of this document.

This document does not apply to screws under tensile stress (see [ISO 3506-1](#)). It does not specify requirements for functional properties such as shear strength or weldability.

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## 2 Normative references

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.

<std>ISO 965-3, ISO general purpose metric screw threads — Tolerances — Part 3: Limit deviations for screw threads</std>

<std>ISO 1891-4, Fasteners — Vocabulary — Part 4: Control, inspection, delivery, acceptance and quality</std>

<std>ISO 3506-3, ISO 965-3, ISO general purpose metric screw threads — Tolerances — Part 3: Limit deviations for screw threads

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</std>

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<std>ISO 6506-1, Metallic materials — Brinell hardness test — Part 1: Test method</std>

<std>ISO 6507-1, Metallic materials — Vickers hardness test — Part 1: Test method</std>

<std>ISO 6508-1, Metallic materials — Rockwell hardness test — Part 1: Test method</std>

<std>ISO 16228, Fasteners — Types of inspection documents</std>

ISO 6506-1, Metallic materials — Brinell hardness test — Part 1: Test method

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

ISO 6508-1, Metallic materials — Rockwell hardness test — Part 1: Test method

ISO 16228, Fasteners — Types of inspection documents

## 3 Terms and definitions

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

ISO and IEC maintain terminology 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/>

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### 3.1 3.1

#### set screw

headless screw with ISO metric thread designed to be used under compression load

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### 3.2 3.2

#### stainless steel

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

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

3.3 ~~3.3~~

**austenitic stainless steel**

stainless steel (3.2)(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 ~~3.4~~

**duplex stainless steel**

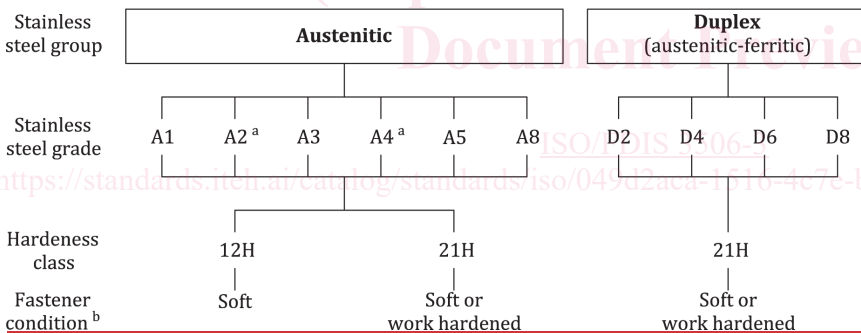
stainless steel (3.2)(3.2) with a micro-structure that includes both austenitic and ferritic phases providing excellent resistance to corrosion, containing a higher amount of chromium and a reduced quantity of nickel compared to austenitic steel, with high strength, and with magnetic properties

[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 set screws consists of two blocks, separated by a hyphen: the stainless steel grade and the hardness class, as specified in Figure 1. Figure 1.



<sup>a</sup> For low carbon austenitic stainless steels with carbon content not exceeding 0,030 %, set screws can additionally be designated with the letter "L" just after the grade. Example: A4L-21H.

<sup>b</sup> For information only.

**Figure 1. — Designation system for stainless steel set screws**

The marking, labelling and designation of set screws with stainless steel grade and hardness class shall be as specified in Clause 9. Clause 9.

This designation system may be used for sizes outside the diameter limits specified in this document (e.g. for  $d > 24$  mm), provided that all applicable chemical, mechanical and physical requirements are met.

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