

ISO/FDIS 3506-4:2024 (En)

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Contents

Foreword.....	iv
Introduction.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	2
4 Designation system for stainless steel grades and hardness classes.....	3
4.1 General.....	3
4.2 Designation of stainless steel grades (first block).....	4
4.3 Designation of hardness classes (second block).....	4
5 Materials.....	4
5.1 Chemical composition.....	4
5.2 Heat treatment for martensitic stainless steel tapping screws.....	6
5.3 Surface condition (finish and/or coating).....	6
5.4 Corrosion resistance.....	6
5.5 Magnetic properties.....	7
6 Requirements for mechanical, physical and functional properties.....	7
6.1 General.....	7
6.2 Surface hardness for martensitic grades.....	7
6.3 Core hardness.....	7
6.4 Thread forming ability.....	8
6.5 Torsional strength.....	8
7 Inspection.....	9
7.1 Manufacturer's inspection.....	9
7.2 Supplier's inspection.....	9
7.3 Purchaser's inspection.....	9
7.4 Delivery of test results.....	9
8 Test methods.....	9
8.1 General.....	9
8.2 Hardness test.....	9
8.3 Drive test.....	11
8.4 Torsional test.....	12
9 Marking and labelling.....	13
9.1 General.....	13
9.2 Marking on the tapping screws.....	13
9.3 Labelling of the packages.....	13
Bibliography.....	15

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- applicability of test methods has been added, and hardness test, torsional test and drive 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.

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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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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 process. Austenitic, ferritic 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 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 behaviour 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 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).

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

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

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 1478, Tapping screws thread</std>~~

~~<std>ISO 1891-4, Tapping screws thread</std>~~

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

~~<std>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>~~

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

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

~~Metallic materials — Vickers hardness test — Part 1: Test method~~

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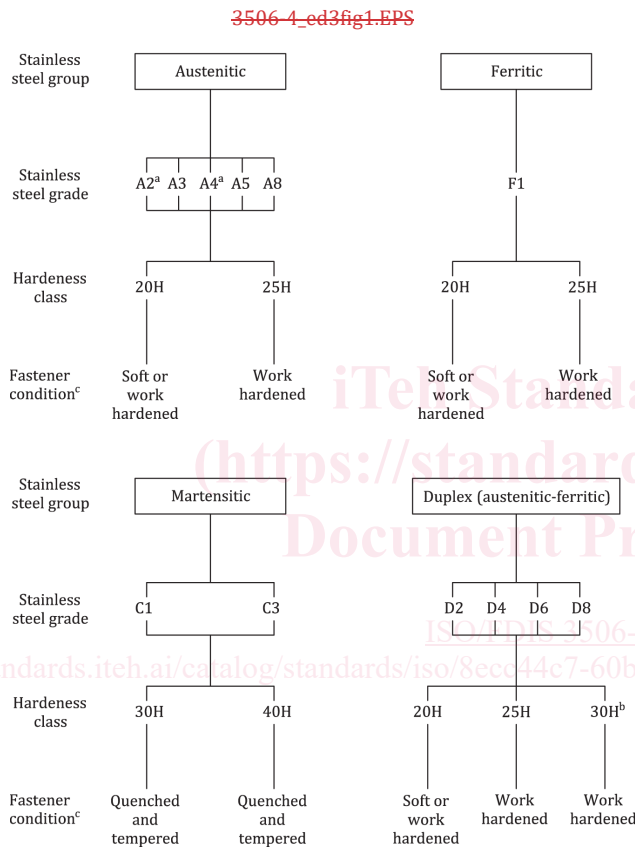
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4 Designation system for stainless steel grades and hardness classes

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.



^a For low carbon austenitic stainless steels with carbon content not exceeding 0,030 %, tapping screws can additionally be designated with the letter "L" just after the grade. EXAMPLE: A4L-25H.

^b This hardness class requires a prior agreement between the purchaser and the manufacturer.

^c For information only.

Figure 1 — Designation system for stainless steel tapping screws

Although a great number of stainless steel grades combined with hardness classes are specified in this document for tapping screws, this does not mean that all combinations are appropriate due to the properties of the material in conjunction with the fastener geometry. Nevertheless, some combinations of grades and property classes may not be available on the market. For non-standard fasteners, it is recommended that a fastener expert be consulted.

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

This designation system may be used for sizes outside the diameter limits specified in this document (i.e. for threads <ST2,2 or >ST8), provided that all applicable chemical, mechanical, and physical requirements are met.

4.2 Designation of stainless steel grades (first block)

The designation of stainless steel grade (first block) consists of one letter which specifies the stainless steel group:

- **A** for austenitic,
- **C** for martensitic,
- **F** for ferritic,
- **D** for duplex (austenitic-ferritic),

and

- a digit which specifies the range of chemical compositions within this stainless steel group.

The chemical compositions of stainless steel groups and grades classified in Figure 1 are specified in Table 2.

4.3 Designation of hardness classes (second block)

The designation of the hardness class (second block) consists of two parts, as specified in Table 1:

- the number to the left corresponds to 1/10 of the minimum Vickers hardness, and
- the letter H to the right represents Vickers hardness.

Table 1 — Designation of hardness classes in relation to Vickers hardness

Hardness class	20H	25H	30H	40H
Vickers hardness, HV_{min}	200	250	300	400

EXAMPLE 1 A4-25H specifies a tapping screw in austenitic stainless steel of grade A4, work hardened, with a minimum hardness of 250 HV.

EXAMPLE 2 C3-40H specifies a tapping screw in martensitic stainless steel of grade C3, quenched and tempered, with a minimum hardness of 400 HV.

5 Materials

5.1 Chemical composition

Table 2 specifies the limits for chemical composition of the stainless steel grades for fasteners. The chemical composition shall be assessed in accordance with the relevant International Standards.

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