

Mechanical properties of corrosion-resistant stainless steel fasteners - Part 4: Tapping screws

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NATIONAL FOREWORD

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English Version

Mechanical properties of corrosion-resistant stainless steel fasteners - Part 4: Tapping screws (ISO 3506-4:2009)

Caractéristiques mécaniques des éléments de fixation en acier inoxydable résistant à la corrosion - Partie 4: Vis à tête (ISO 3506-4:2009)

Mechanische Eigenschaften von Verbindungselementen aus nichtrostenden Stählen - Teil 4: Blechschrauben (ISO 3506-4:2009)

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Foreword

This document (EN ISO 3506-4:2009) 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 DIN.

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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.

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Endorsement notice

The text of ISO 3506-4:2009 has been approved by CEN as a EN ISO 3506-4:2009 without any modification.

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Introduction

In the preparation of this part of ISO 3506, special attention has been given to the fundamentally different property characteristics of the stainless steel fastener grades compared with those of carbon steel and low-alloy steel fasteners. Ferritic and austenitic stainless steels are strengthened only by cold working and consequently, the components do not have as homogeneous local material properties as hardened and tempered parts. These special features have been recognized in the elaboration of the hardness classes and the test procedures for mechanical properties.

The primary objective of this part of ISO 3506 is to ensure that corrosion-resistant austenitic, martensitic and ferritic stainless steel tapping screws will form mating threads in materials such as aluminium into which they are normally driven without deforming their own thread and without breaking during assembly or service. Selection of the steel group is based on the intended application.

Mechanical properties of corrosion-resistant stainless steel fasteners —

Part 4: Tapping screws

1 Scope

This part of ISO 3506 specifies the mechanical properties of tapping screws made of austenitic, martensitic and ferritic steel grades of corrosion-resistant stainless steels, when tested over an ambient temperature range of 10 °C to 35 °C. Properties vary at higher or lower temperatures.

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

It does not apply to screws with special properties, such as weldability.

NOTE The designation system of this part of ISO 3506 can be used for sizes outside the limits given in this clause (e.g. $d > ST8$), provided that all applicable mechanical and physical requirements of the hardness classes are met.

This part of ISO 3506 does not define corrosion or oxidation resistance in particular environments. However, some information on materials for particular environments is given in Annex C. Regarding definitions of corrosion and corrosion resistance, see ISO 8044.

The aim of this part of ISO 3506 is the classification of corrosion-resistant stainless steel tapping screws into hardness classes.

Corrosion and oxidation performances and mechanical properties for use at elevated or sub-zero temperatures can be agreed on between the user and the manufacturer in each particular case. Annex D shows how the risk of intergranular corrosion at elevated temperatures depends on the carbon content.

All austenitic stainless steel fasteners are normally non-magnetic in the annealed condition; after cold working, some magnetic properties can be evident (see Annex E).

2 Normative references

The following referenced documents are indispensable for the application 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 3651-1, *Determination of resistance to intergranular corrosion of stainless steels — Part 1: Austenitic and ferritic-austenitic (duplex) stainless steels — Corrosion test in nitric acid medium by measurement of loss in mass (Huey test)*

ISO 3651-2, *Determination of resistance to intergranular corrosion of stainless steels — Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels — Corrosion test in media containing sulfuric acid*

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

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

ISO 16426, *Fasteners — Quality assurance system*

3 Designation, marking and finish

3.1 Designation

The designation system for stainless steel grades and hardness classes for tapping screws is given in Figure 1. The designation of the material consists of two blocks, which are separated by a hyphen. The first block designates the steel grade and the second block, the hardness class.

The designation of the steel grade (first block) consists of one of the letters

- **A** for austenitic steel,
- **C** for martensitic steel, or
- **F** for ferritic steel

which indicates the group of steel and a digit, which indicates a range of chemical compositions within this steel group (see Table 2).

The designation of the hardness class (second block) consists of two digits representing 1/10 of the minimum Vickers hardness and the letter H, referring to hardness (see Table 1).

Table 1 — Designations 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** indicates: austenitic steel of steel grade A4, cold worked, minimum hardness 250 HV.

EXAMPLE 2 **C3-40H** indicates: martensitic steel of steel grade C3, hardened and tempered, minimum hardness 400 HV.