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kruvid ja tikkpoldid**

Mechanical properties of corrosion-resistant stainless-steel fasteners - Part 1: Bolts, screws and studs

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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English Version

## Mechanical properties of corrosion-resistant stainless steel fasteners - Part 1: Bolts, screws and studs (ISO 3506-1:2009)

Caractéristiques mécaniques des éléments de fixation en acier inoxydable résistant à la corrosion - Partie 1: Vis et goujons (ISO 3506-1:2009)

Mechanische Eigenschaften von Verbindungselementen aus nichtrostenden Stählen - Teil 1: Schrauben (ISO 3506-1:2009)

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## Foreword

This document (EN ISO 3506-1:2009) 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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.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 3506-1:2009 has been approved by CEN as a EN ISO 3506-1:2009 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 property classes and the test procedures for mechanical properties. The latter differ from the carbon steel and low-alloy steel fastener test procedures with regard to the measurement of the stress at 0,2 % permanent strain (yield stress) and ductility (total elongation after fracture).

# Mechanical properties of corrosion-resistant stainless steel fasteners —

## Part 1: Bolts, screws and studs

### 1 Scope

This part of ISO 3506 specifies the mechanical properties of bolts, screws and studs 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.

This part of ISO 3506 applies to bolts, screws and studs

- with nominal thread diameter  $d \leq 39$  mm,
- of triangular ISO metric threads with diameters and pitches in accordance with ISO 68-1, ISO 261 and ISO 262, and
- of any shape.

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.  $d > 39$  mm), provided that all applicable mechanical and physical requirements of the property 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 E. 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 fasteners<sup>1)</sup> into property classes. Some materials can be used at temperatures down to – 200 °C, while some can be used at temperatures up to + 800 °C in air. Information on the influence of temperature on mechanical properties is found in Annex F.

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 G 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 H).

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1) The term “fasteners” is used when bolts, screws and studs are considered all together.

## 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 68-1, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads*

ISO 261, *ISO general purpose metric screw threads — General plan*

ISO 262, *ISO general purpose metric screw threads — Selected sizes for screws, bolts and nuts*

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch 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 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 (scales A, B, C, D, E, F, G, H, K, N, T)*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

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

ISO 16426, *Fasteners — Quality assurance system*

## 3 Symbols

$A$	elongation after fracture
$A_{s,nom}$	nominal stress area
$d$	nominal thread diameter
$d_1$	basic minor diameter of external thread
$d_2$	basic pitch diameter of external thread
$d_3$	minor diameter of external thread (for stress calculation)
$H$	height of the fundamental triangle of the thread
$L_1$	total length of fastener
$L_2$	total length of fastener after fracture
$L_3$	distance between the underside of the head and the threaded adapter
$l$	nominal length of the fastener
$l_s$	plain shank length