INTERNATIONAL STANDARD

ISO 3506-1

Second edition
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Mechanical properties of corrosion-resistant stainless steel fasteners —

Part 1: Bolts, screws and studs

Caractéristiques mécaniques des éléments de fixation en acier inoxydable résistant à la corrosion —

Partie 1: Vis et goujons

Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3506-1 was prepared by Technical Committee ISO/TC 2, *Fasteners*, Subcommittee SC 1, *Mechanical properties of fasteners*.

This second edition cancels and replaces the first edition (ISO 3506-1:1997), which has been technically revised.

ISO 3506 consists of the following parts, under the general title *Mechanical properties of corrosion-resistant stainless steel fasteners*:

— *Part 1: Bolts, screws and studs*

— *Part 2: Nuts*

— *Part 3: Set screws and similar fasteners not under tensile stress*

— *Part 4: Tapping screws*

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 $d \leqslant 39$ 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[1)] 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).

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