

**EUROKODEKS 3: TERASKONSTRUKTSIOONIDE
PROJEKTEERIMINE. OSA 1-4: ÜLDREEGLID. TÄIENDAVAD
REEGLID ROOSTEVABA TERASE JAOKS**

**Eurocode 3 - Design of steel structures - Part 1-4:
General rules - Supplementary rules for stainless steels**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-EN 1993-1-4:2006+A1+NA+A2:2021 sisaldab Euroopa standardi EN 1993-1-4:2006 ja selle muudatuste A1:2015 ja A2:2021 ja rahvusliku lisa NA:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 1993-1-4:2006+A1+NA+A2:2021 consists of the English text of the European standard EN 1993-1-4:2006 and its amendments A1:2015 and A2:2021 and national annex NA:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 25.10.2006, muudatused A1 17.06.2015 ja A2 23.12.2020.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 25.10.2006, for A1 17.06.2015 and A2 23.12.2020.
Muudatusega A1 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega $\boxed{A_1}$ $\langle A_1 \rangle$. Muudatusega A2 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega $\boxed{A_2}$ $\langle A_2 \rangle$. Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.	The start and finish of text introduced or altered by amendment A1 is indicated in the text by tags $\boxed{A_1}$ $\langle A_1 \rangle$. The start and finish of text introduced or altered by amendment A2 is indicated in the text by tags $\boxed{A_2}$ $\langle A_2 \rangle$. The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 91.010.30; 91.080.13

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN 1993-1-4 + A1 + A2

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2006, June 2015, December 2020

ICS 91.010.30; 91.080.13

Supersedes ENV 1993-1-4:1996

English Version

Eurocode 3 - Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels

Eurocode 3 - Calcul des structures en acier - Partie 1-4:
Règles générales - Règles supplémentaires pour les
aciers inoxydables

Eurocode 3 - Bemessung und Konstruktion von
Stahlbauten - Teil 1-4: Allgemeine Bemessungsregeln -
Ergänzende Regeln zur Anwendung von
nichtrostender Stählen

This European Standard was approved by CEN on 9 January 2006. Amendment A1 was approved by CEN on 1 March 2015. Amendment A2 was approved by CEN on 20 November 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this European Standard and its amendments into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard and its Amendments A1 and A2 exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

Foreword	3
[A1] Amendment 1 foreword [A1]	4
[A2] Amendment 2 European foreword [A2]	5
1 General	6
1.1 Scope.....	6
1.2 Normative references.....	6
1.3 Assumptions.....	7
1.4 Distinction between principles and application rules.....	7
1.5 Definitions.....	7
1.6 Symbols.....	7
2.. Materials	8
2.1 Structural stainless steels.....	8
2.2 Bolts.....	11
2.3 Welding consumables.....	12
3.. Durability	12
4.. Serviceability limit states	12
4.1 General.....	12
4.2 Determination of deflections.....	12
5.. Ultimate limit states	14
5.1 General.....	14
5.2 Classification of cross-sections.....	15
5.3 Resistance of cross-sections.....	19
5.4 Buckling resistance of members.....	20
5.5 Uniform members in bending and axial compression.....	22
5.6 Shear resistance.....	23
5.7 Transverse web stiffeners.....	24
6 Connection design	24
6.1 General.....	24
6.2 Bolted connections.....	25
6.3 Design of welds.....	25
7.. Design assisted by testing	25
8.. Fatigue	26
9.. Fire resistance	26
[A1] Annex A (normative) Selection of materials and durability [A1]	27
Annex B (informative) [A1] Stainless steel in the cold worked condition [A1]	32
Annex C (informative) Modelling of material behaviour	33
Annex NA (informative) National Annex of Estonia	35

Foreword

This European Standard EN 1993-1-4, Eurocode 3: Design of steel structures: Part 1-4 General Rules – Supplementary rules for stainless steels, has been prepared by Technical Committee CEN/TC250 «Structural Eurocodes», the Secretariat of which is held by BSI. CEN/TC250 is responsible for all Structural Eurocodes.

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 April 2007 and conflicting National Standards shall be withdrawn at latest by March 2010.

This Eurocode supersedes ENV 1993-1-4.

According to the CEN-CENELEC Internal Regulations, the National Standard Organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

National Annex for EN 1993-1-4

This standard gives alternative procedures, values and recommendations with notes indicating where national choices may have to be made. The National Standard implementing EN 1993-1-4 should have a National Annex containing all Nationally Determined Parameters to be used for the design of steel structures to be constructed in the relevant country.

National choice is allowed in EN 1993-1-4 through clauses:

- 2.1.4(2)
- 2.1.5(1)
- 5.1(2)
- 5.5(1)
- 5.6(2)
- 6.1(2)
- 6.2(3)
- $\boxed{A_1}$ 7(1),
- A.2(8) and
- A.3, Table A.4. $\boxed{A_1}$

A1 Amendment 1 foreword

This document (EN 1993-1-4:2006/A1:2015) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI.

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 June 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. **A1**

A2 Amendment 2 European foreword

This document (EN 1993-1-4:2006/A2:2020) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI.

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 December 2021 and conflicting national standards shall be withdrawn at the latest by December 2021.

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

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. **A2**

1 General

1.1 Scope

(1) This Part 1.4 of EN 1993 gives supplementary provisions for the design of buildings and civil engineering works that extend and modify the application of EN 1993-1-1, EN 1993-1-3, EN 1993-1-5 and EN 1993-1-8 to austenitic, austenitic-ferritic and ferritic stainless steels.

NOTE 1: Information on the durability of stainless steels is given in Annex A.

NOTE 2: The execution of stainless steel structures is covered in EN 1090.

NOTE 3: Guidelines for further treatment, including heat treatment, are given in EN 10088.

1.2 Normative references

The following normative documents contain provisions which, through reference to this text, constitute provisions of this European Standard. For dated references, subsequent amendments to or revisions of any of these publications do not apply. However, parties to agreements based on this European Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

EN 1990	<i>Eurocode 0: Basis of structural design</i>
EN 508-3	<i>Roofing products from metal sheet. Specification for self-supporting products of steel, aluminium or stainless steel sheet. Stainless steel;</i>
EN 1090-2	<i>Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures;</i>
EN 1993-1-1:2005	<i>Design of steel structures: General rules and rules for buildings;</i>
EN 1993-1-2	<i>Design of steel structures: Structural fire design;</i>
EN 1993-1-3	<i>Design of steel structures: Cold formed thin gauge members and sheeting;</i>
EN 1993-1-5	<i>Design of steel structures: Plated structural elements;</i>
EN 1993-1-6	<i>Design of steel structures: Strength and stability of shell structures;</i>
EN 1993-1-8	<i>Design of steel structures: Design of joints;</i>
EN 1993-1-9	<i>Design of steel structures: Fatigue;</i>
EN 1993-1-10	<i>Design of steel structures: Material toughness and through-thickness properties;</i>
EN 1993-1-11	<i>Design of steel structures: Design of structures with tension components made of steel;</i>
EN 1993-1-12	<i>Design of steel structures: Additional rules for the extension of EN 1993 up to steel grades S 700;</i>
EN ISO 3506-1	<i>Mechanical properties of corrosion resistant stainless steel fasteners – Part 1: Bolts, screws and studs;</i>
EN ISO 3506-2	<i>Mechanical properties of corrosion resistant stainless steel fasteners – Part 2: Nuts</i>
EN ISO 3506-3	<i>Mechanical properties of corrosion resistant stainless steel fasteners – Part 3: Set screws and similar fasteners under tensile tests;</i>
EN ISO 7089	<i>Plain washers - Normal series - Product grade A;</i>
EN ISO 7090	<i>Plain washers, chamfered - Normal series - Product grade A;</i>

EN ISO 9445	<i>Continuously cold-rolled stainless steel narrow strip, wide strip, plate/sheet and cut lengths - Tolerances on dimensions and form</i>
EN 10029	<i>Specification for tolerances on dimensions, shape and mass for hot rolled steel plates 3 mm thick or above;</i>
EN 10052	<i>Vocabulary of heat treatment terms for ferrous products;</i>
EN 10088 (all parts),	<i>Stainless steels</i>
EN 10162	<i>Cold rolled steel sections. Technical delivery conditions. Dimensional and cross-sectional tolerances;</i>
EN 10219-2	<i>Cold formed welded structural sections of non-alloy and fine grain steels. Tolerances, dimensions and sectional properties;</i>

1.3 Assumptions

- (1) In addition to the general assumptions of EN 1990 the following assumptions apply:
- fabrication and erection complies with EN 1090-2.

1.4 Distinction between principles and application rules

- (1) The rules in EN 1990 clause 1.4 apply.

1.5 Definitions

- (1) The rules in EN 1990 clause 1.5 apply.
- (2) Unless otherwise stated, the vocabulary of treatment terms for ferrous products used in EN 10052 applies.

1.6 Symbols

In addition to those given in EN 1990, EN 1993-1-1, EN 1993-1-3, EN 1993-1-5 and 1993-1-8, the following symbols are used:

$f_{u,red}$	reduced value of bearing strength
$E_{s,ser}$	secant modulus of elasticity used for serviceability limit state calculations
$E_{s,1}$	secant modulus corresponding to the stress in the tension flange
$E_{s,2}$	secant modulus corresponding to the stress in the compression flange
$\sigma_{1,Ed,ser}$	serviceability design stress
n	coefficient