
**Eurocode 3: Projektiranje jeklenih konstrukcij - Del 1- 4: Splošna pravila -
Dodatna pravila za nerjavna jekla (prevzet ENV 1993-1- 4:1996 z metodo
platnice)**

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
nichtrostenden Stählen

Deskriptorji: stavbe, inženirski objekti, jeklene konstrukcije, jekla, konstrukcijska jekla,
nerjavna jekla, projektiranje, predpisi za projektiranje konstrukcij, računanje

ICS 91.040.01; 91.080.10

Referenčna številka
SIST ENV 1993-1-4:2001 ((sl),en)

Nadaljevanje na straneh od II do V in od 1 do 55

NACIONALNI UVOD

Predstandard SIST ENV 1993-1-4 ((sl),en), Eurocode 3: Projektiranje jeklenih konstrukcij - Del 1-4: Splošna pravila - Dodatna pravila za nerjavna jekla, prva izdaja, 2001, ima status slovenskega predstandarda in je z metodo platnice prevzet evropski predstandard ENV 1993-1-4 (en), Eurocode 3: Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels, September 1996.

NACIONALNI PREDGOVOR

Evropski predstandard ENV 1993-1-4:1996 je pripravil tehnični odbor Evropskega komiteja za standardizacijo CEN/TC 250, Konstrukcijski evrokodi.

Pripravo tega predstandarda sta CEN poverila Evropska komisija in Evropsko združenje za prosto trgovino.

Odločitev za prevzem tega predstandarda po metodi platnice je sprejela delovna skupina USM/TC KON/WG 3 Jeklene konstrukcije, ki je pripravila tudi nacionalni dokument za uporabo v Sloveniji, potrdil pa tehnični odbor USM/TC KON Konstrukcije.

Ta slovenski predstandard se lahko uporablja samo v skladu z nacionalnim dokumentom, ki je sestavni del SIST ENV 1993-1-4:2001.

Ta slovenski predstandard je dne 2000-12-04 odobril direktor USM.

Rok veljavnosti tega predstandarda je do izdaje evropskega standarda EN 1993-1-4.

ZVEZE S STANDARDI

S prevzemom tega evropskega predstandarda veljajo za omejeni namen referenčnih standardov vsi standardi, navedeni v izvorniku, razen tistih, ki so že sprejeti kot nacionalni standardi:

SIST ENV 1991-1:1998	((sl),en)	Eurocode 1: Osnove projektiranja in vplivi na konstrukcije - 1. del: Osnove projektiranja
SIST ENV 1991-2-1:1998	((sl),en)	Eurocode 1: Osnove projektiranja in vplivi na konstrukcije - Del 2-1: Vplivi na konstrukcije - Gostote, lastna teža in koristne obtežbe
SIST ENV 1991-2-3:1998	((sl),en)	Eurocode 1: Osnove projektiranja in vplivi na konstrukcije - Del 2-3: Vplivi na konstrukcije - Obtežbe snega
SIST ENV 1991-2-4:1998	((sl),en)	Eurocode 1: Osnove projektiranja in vplivi na konstrukcije - Del 2-4: Vplivi na konstrukcije - Vplivi vetra
SIST ENV 1993-1-1:1996	((sl),en)	Eurocode 3: Projektiranje jeklenih konstrukcij - Del 1-1: Splošna pravila in pravila za stavbe
SIST ENV 1993-1-1:1996/A1:1996	((sl),en)	Projektiranje jeklenih konstrukcij - Del 1-1: Splošna pravila in pravila za stavbe - Dodatka D in K
SIST ENV 1993-1-1:1996/A2:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 1-1: Splošna pravila in pravila za stavbe - Dodatki G, H, J, N in Z
SIST ENV 1993-1-2:1999	((sl),en)	Projektiranje jeklenih konstrukcij - Del 1-2: Splošna pravila - Projektiranje požarnovarnih konstrukcij
SIST ENV 1993-1-3:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 1-3: Splošna pravila - Dodatna pravila za hladno oblikovane tankostenske profile in pločevine

SIST ENV 1993-1-5:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 1-5: Splošna pravila - Dodatna pravila za ravninske pločevinaste konstrukcije (ortotropne plošče) brez prečne obremenitve
SIST ENV 1993-1-6:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 1-6: Splošna pravila - Dodatna pravila za lupinaste konstrukcije
SIST ENV 1993-1-7:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 1-7: Splošna pravila - Dodatna pravila za ravninske pločevinaste konstrukcije (ortotropne plošče), obremenjene s prečno obtežbo
SIST ENV 1993-2:2001	((sl),en)	Projektiranje jeklenih konstrukcij – 2. del: Jekleni mostovi
SIST ENV 1993-3-1:2001	((sl),en)	Projektiranje jeklenih konstrukcij –Del 3-1: Stolpi, jambori in dimniki - Stolpi in jambori
SIST ENV 1993-3-2:2001	((sl),en)	Projektiranje jeklenih konstrukcij – Del 3-2: Stolpi, jambori in dimniki - Dimniki
SIST ENV 1993-4-1:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 4-1: Silosi, rezervoarji in cevovodi - Silosi
SIST ENV 1993-4-2:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 4-2: Silosi, rezervoarji in cevovodi - Rezervoarji
SIST ENV 1993-4-3:2001	((sl),en)	Projektiranje jeklenih konstrukcij - Del 4-3: Silosi, rezervoarji in cevovodi - Cevovodi
SIST ENV 1993-5:2001	((sl),en)	Projektiranje jeklenih konstrukcij – 5. del: Piloti in zagatne stene
SIST ENV 1993-6:2001	((sl),en)	Projektiranje jeklenih konstrukcij – 6. del: Žerjavne proge

[SIST ENV 1993-1-4:2001](https://standards.iteh.ai/catalog/standards/sist/124f1d81-b1bd-446b-967c-528e0bbb1945/sist-env-1993-1-4-2001)
<https://standards.iteh.ai/catalog/standards/sist/124f1d81-b1bd-446b-967c-528e0bbb1945/sist-env-1993-1-4-2001>

OPOMBI

- Povsod, kjer se v besedilu predstandarda uporablja izraz “evropski predstandard”, v SIST ENV 1993-1-4:2001 to pomeni “slovenski predstandard”.
- Nacionalni uvod in nacionalni predgovor nista sestavni del predstandarda.

VSEBINA

Stran

Nacionalni dokument za uporabo v Sloveniji	V
ENV 1993-1-4:1996	1

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SIST ENV 1993-1-4:2001

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Nacionalni dokument za uporabo v Sloveniji

Za vrednosti parametrov, podanih v okvirju (večinoma delni varnostni faktorji odpornosti ali zunanjih vplivov), se v SIST ENV 1993-1-4:2001 privzamejo priporočene vrednosti, podane v ENV 1993-1-4:1996.

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ICS 91.040.01; 91.080.10

Descriptors: buildings, civil engineering, steel construction, steels, structural steels, stainless steels, design, building codes, computation

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 nichtrostenden Stählen

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This European Prestandard (ENV) was approved by CEN on 1994-09-30 as a prospective standard for provisional application. The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into an European Standard (EN).

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

Objectives of the Eurocodes

- (1) The “Structural Eurocodes” comprise a group of standards for the structural and geotechnical design of buildings and civil engineering works.
- (2) They cover execution and control only to the extent that is necessary to indicate the quality of the construction products, and the standard of the workmanship, needed to comply with the assumptions of the design rules.
- (3) Until the necessary set of harmonized technical specifications for products and for methods of testing their performance is available, some of the Structural Eurocodes cover some of these aspects in informative annexes.

Background to the Eurocode programme

- (4) The Commission of the European Communities (CEC) initiated the work of establishing a set of harmonized technical rules for the design of building and civil engineering works which would initially serve as an alternative to the different rules in force in the various member states and would ultimately replace them. These technical rules became known as the “Structural Eurocodes”.
- (5) In 1990, after consulting their respective member states, the CEC transferred the work of further development, issue and updating of the Structural Eurocodes to CEN, and the EFTA Secretariat agreed to support the CEN work.
- (6) CEN Technical Committee CEN/TC 250 is responsible for all Structural Eurocodes.

Eurocode programme

- SIST ENV 1993-1-4:2001
<https://standards.iteh.ai/catalog/standards/sist/124fd81-b1bd-446b-967c-528e0bbb1945/sist-env-1993-1-4-2001>
- (7) Work is in hand on the following Structural Eurocodes, each generally consisting of a number of parts:
 - EN 1991 Eurocode 1 Basis of design and actions on structures;
 - EN 1992 Eurocode 2 Design of concrete structures;
 - EN 1993 Eurocode 3 Design of steel structures;
 - EN 1994 Eurocode 4 Design of composite steel and concrete structures;
 - EN 1995 Eurocode 5 Design of timber structures;
 - EN 1996 Eurocode 6 Design of masonry structures;
 - EN 1997 Eurocode 7 Geotechnical design;
 - EN 1998 Eurocode 8 Design provisions for earthquake resistance of structures;
 - EN 1999 Eurocode 9 Design of aluminium alloy structures.
 - (8) Separate sub-committees have been formed by CEN/TC 250 for the various Eurocodes listed above.
 - (9) This Part 1.4 of Eurocode 3 is published by CEN as a European Prestandard (ENV) with an initial life of three years.
 - (10) This Prestandard is intended for experimental application and for the submission of comments.
 - (11) After approximately two years CEN members will be invited to submit formal comments to be taken into account in determining future actions.

(12) Meanwhile feedback and comments on this Prestandard should be sent to the secretariat of CEN/TC 250/SC 3 at the following address:

BSI Standards
British Standards House
389 Chiswick High Road
London W4 4AL
England

or to your national standards organization.

National Application Documents (NAD's)

(13) In view of the responsibilities of the authorities in member countries for safety, health and other matters covered by the essential requirements of the Construction Products Directive (CPD), certain safety elements in this ENV have been assigned indicative values which are identified by ("boxed values"). The authorities in each member country are expected to review the "boxed values" and may substitute alternative definitive values for these safety elements for use in national application.

(14) Some of the supporting European or International Standards might not be available by the time this Prestandard is issued. It is therefore anticipated that a National Application Document (NAD) giving any substitute definitive values for safety elements, referencing compatible supporting standards and providing guidance on the national application of this Prestandard, will be issued by each member country or its Standards Organization.

(15) It is intended that this Prestandard is used in conjunction with the NAD valid in the country where the building or civil engineering works is located.

Matters specific to this Prestandard

- (16) The Parts of ENV 1993 that are currently envisaged are:
- ENV 1993-1-1 General rules: General rules and rules for buildings;
 - ENV 1993-1-2 General rules: Structural fire design;
 - ENV 1993-1-3 General rules: Supplementary rules for cold formed thin gauge members and sheeting;
 - ENV 1993-1-4 General rules: Supplementary rules for stainless steels;
 - ENV 1993-2 Steel bridges;
 - ENV 1993-3 Towers, masts and chimneys;
 - ENV 1993-4 Silos, tanks and pipelines;
 - ENV 1993-5 Piling;
 - ENV 1993-6 Crane supporting structures;
 - ENV 1993-7 Marine and maritime structures;
 - ENV 1993-8 Agricultural structures.

(17) Design provisions for ferritic stainless steels are not yet included in this Prestandard, but interim guidance on a conservative design approach for ferritic stainless steels is given in annex D.

(18) It is expected that in the future EN 1090 "Execution of steel structures" will contain provisions for stainless steels that will supersede the information on fabrication given in annex C of this Prestandard.

1 General

1.1 Scope

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

(2)P The relevant provisions of ENV 1993-1-1 and ENV 1993-1-3 also apply unless otherwise specified in this Part 1.4.

NOTE 1: Information on stainless steels and their durability is given in annexes A and B.

NOTE 2: Guidance on special aspects of fabrication using stainless steels is given in annex C. It is expected that in the future EN 1090 will contain provisions for the fabrication of stainless steels that will supersede the guidance given in annex C.

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

(3) Design provisions for ferritic stainless steels are not yet included in this Part 1.4.

NOTE: Interim guidance on a design approach for ferritic stainless steels is given in annex D.

(4) For seismic applications, reference should be made to ENV 1998.

1.2 Distinction between principles and application rules

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(1)P Depending on the character of the individual paragraphs, a distinction is made in this Part between principles and application rules.

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[https://standards.iteh.ai/catalog/standards/sist/124f1d81-b1bd-446b-967c-](https://standards.iteh.ai/catalog/standards/sist/124f1d81-b1bd-446b-967c-528e0bbb1945/sist-env-1993-1-4-2001)

(2)P The principles comprise: [528e0bbb1945/sist-env-1993-1-4-2001](https://standards.iteh.ai/catalog/standards/sist/124f1d81-b1bd-446b-967c-528e0bbb1945/sist-env-1993-1-4-2001)

- general or definitive statements for which there is no alternative;
- requirements and analytical models for which no alternative is permitted unless specifically stated.

(3) The principles are identified by the letter P following the paragraph number.

(4)P The application rules are generally recognized rules that follow the principles and satisfy their requirements. Alternative design rules different from the application rules given in the Eurocode may be used, provided that it is shown that the alternative rule accords with the relevant principles and has at least the same reliability.

(5) In this Part the application rules are identified by a number in brackets, as in this paragraph.

1.3 Normative references

This European Prestandard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- EN 10052 *Vocabulary of heat treatment terms for ferrous products;*
- EN 10088 *Stainless steels:*
- Part 1: *List of stainless steels;*
- Part 2: *Technical delivery conditions for sheet/plate and strip for general purposes;*
- Part 3: *Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes;*
- ENV 1090 *Execution of steel structures:*
- Part 1: *General rules and rules for buildings;*
- Part 2: *Rules for cold formed thin gauge members and sheeting;*
- Part 6: *Supplementary rules for stainless steels;*
- ENV 1993 *Eurocode 3: Design of steel structures:*
- Part 1.1: *General rules: General rules and rules for buildings;*
- Part 1.2: *General rules: Structural fire design;*
- Part 1.3: *General rules: Supplementary rules for cold formed thin gauge members and sheeting;*
- ENV 1998 *Eurocode 8: Design provisions for earthquake resistance of structures;*
- ECISS-IC 10 *Designation systems for steel - Additional symbols for steel names;*
- ISO 3506 *Corrosion-resistant stainless steel fasteners - Specifications;*
- ISO 7089 *Plain washers - Normal series - Product grade A;*
- ISO 7090 *Plain washers, chamfered - Normal series - Product grade A.*

1.4 Definitions

Unless otherwise stated, the vocabulary of treatment terms for ferrous products used in EN 10052 applies.

NOTE: Brief definitions and descriptions of stainless steels are given in annex A.

2 Materials

2.1 Structural stainless steels

2.1.1 General

(1)P The provisions given in this Part 1.4 shall be applied only to design using austenitic and austenitic-ferritic stainless steels.

NOTE: Guidance on an interim design approach for ferritic stainless steels is given in annex D.

(2)P The nominal values of the material properties given in 2.1.2 may be used as characteristic values in structural design calculations.

(3) For further information about material properties reference should be made to EN 10088.

NOTE: A table correlating various designations of common grades of austenitic and austenitic-ferritic stainless steels is given in annex A.

(4)P The design provisions specified in this Part 1.4 shall not be used for materials of nominal yield strength f_y greater than 480 N/mm².

(5)P If a higher strength can be demonstrated (see 2.1.3) this may be taken into account in the design, provided that doing so is justified by appropriate tests in accordance with Section 8.

2.1.2 Material properties for stainless steel in the heat-treated condition

(1)P In design calculations the values shall be taken as follows, independent of the direction of rolling:

- **yield strength f_y :** the nominal 0,2% proof stress specified in table 2.1;
- **ultimate tensile strength f_u :** the nominal ultimate tensile strength specified in table 2.1.

NOTE: Assignments to the nominal strength classes specified in table 2.1 for common austenitic and austenitic-ferritic stainless steels to EN 10088 are given in annex A.

(2)P For structural hollow sections made by a seamless process, the values given in table 2.1 for material of the relevant thickness shall be used, irrespective of the product form of the base material. For structural hollow sections made by welding, the values given in table 2.1 for the relevant product form of the base material (cold-rolled strip, hot rolled strip or hot rolled plate) shall be used.

2.1.3 Material properties for stainless steel in the work hardened condition

(1)P For material delivered in the cold worked conditions specified in EN 10088, increased nominal values of yield strength f_{yc} and ultimate tensile strength f_{uc} may be adopted.

NOTE: Nominal values f_{yc} and f_{uc} for various levels of cold working, plus information on austenitic and austenitic-ferritic stainless steels to EN 10088 at these levels, are given in annex A.

(2)P Alternatively, increased values f_{yc} and f_{uc} for work hardened conditions other than the cold worked conditions specified in EN 10088 may be adopted, provided that these values are verified by full size cross-section tests in accordance with Section 8.

(3)P Increased mechanical properties for work hardened conditions shall not be adopted for stainless steels that are supplied as cold worked or as heat treated during manufacture, such as quenched and tempered (QT) steels, if they are required to be welded or heat treated during fabrication, unless it can be demonstrated by testing, in accordance with Section 8, that the fabrication process will not reduce the mechanical properties below the values to be adopted.

Table 2.1: Nominal values of the yield strength f_y and the ultimate tensile strength f_u for structural stainless steels to EN 10088 ¹⁾

Nominal strength class	Product form							
	Cold rolled strip		Hot rolled strip		Hot rolled plate		Bars, rods and sections	
	Nominal thickness t							
	$t \leq 6$ mm		$t \leq 12$ mm		$t \leq 75$ mm		$t \leq 250$ mm	
	f_y N/mm ²	f_u N/mm ²	f_y N/mm ²	f_u N/mm ²	f_y N/mm ²	f_u N/mm ²	f_y N/mm ²	f_u N/mm ²
S 220	220	520	200	520	200	500	180	460
S 240	240	530	220	530	220	520	200	500
S 290	290	580	270	580	270	580	270	580
S 350	350	650	330	650	330	630	—	—
S 480	480	660	460	660	460	640	450 ²⁾	650 ²⁾

¹⁾ The nominal values of f_y and f_u given in this table may be used in design without taking special account of anisotropy or strain hardening effects.

²⁾ $t \leq 160$ mm.

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(4)P Increased mechanical properties for work hardened conditions shall not be adopted for stainless steels that are work hardened during fabrication, if they are required to be welded or heat treated after cold working, unless it can be demonstrated by testing, in accordance with Section 8, that the welding or heat treatment will not reduce the mechanical properties below the values to be adopted.

2.1.4 Material coefficients

(1)P The following values of the material coefficients may be assumed for the global analysis and in determining the resistances of members and cross-sections:

- modulus of elasticity $E = 200\,000$ N/mm²
- shear modulus $G = 77\,000$ N/mm²

NOTE: Typical room temperature values of physical properties of structural stainless steels in the annealed condition are given in annex A.

(2) For calculating deflections, the secant modulus appropriate to the stress in the member at the serviceability limit state should be used, see 4.2(8).

2.1.5 Fracture toughness

(1) The austenitic and austenitic-ferritic stainless steels covered in this Part 1.4 may be assumed to be adequately tough and not susceptible to brittle fracture, for service temperatures down to -40 °C.

2.1.6 Non-magnetic applications

(1) Expert advice should be sought if a non-magnetic application is required.

NOTE: Information on non-magnetic applications is given in annex A.