SLOVENSKI STANDARD
oSIST prEN 1993-1-8:2021

01-maj-2021

Evrokod 3: Projektiranje jeklenih konstrukcij – 1-8. del: Projektiranje spojev

Eurocode 3: Design of steel structures - Part 1-8: Design of joints

Eurocode 3: Bemessung und Konstruktion von Stahlbauten - Teil 1-8: Bemessung von Anschlüssen

Eurocode 3: Calcul des structures en acier - Partie 1-8 : Calcul des assemblages

Ta slovenski standard je istoveten z: **prEN 1993-1-8**

ICS:

91.010.30	Tehnični vidiki	Technical aspects
91.080.13	Jeklene konstrukcije	Steel structures

oSIST prEN 1993-1-8:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT prEN 1993-1-8

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ICS 91.010.30; 91.080.13

Will supersede EN 1993-1-8:2005

English Version

Eurocode 3: Design of steel structures - Part 1-8: Design of joints

Eurocode 3: Calcul des structures en acier - Partie 1-8 : Calcul des assemblages

Eurocode 3: Bemessung und Konstruktion von Stahlbauten - Teil 1-8: Bemessung von Anschlüssen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 250.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 1993-1-8:2021) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI. CEN/TC 250 is responsible for all Structural Eurocodes and has been assigned responsibility for structural and geotechnical design matters by CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1993-1-8:2005.

The first generation of EN Eurocodes was published between 2002 and 2007. This document forms part of the second generation of the Eurocodes, which have been prepared under Mandate M/515 issued to CEN by the European Commission and the European Free Trade Association.

The Eurocodes have been drafted to be used in conjunction with relevant execution, material, product and test standards, and to identify requirements for execution, materials, products and testing that are relied upon by the Eurocodes.

The Eurocodes recognize the responsibility of each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level through the use of National Annexes.

Introduction

0.1 Introduction to the Eurocodes

The Structural Eurocodes comprise the following standards generally consisting of a number of Parts:

— EN 1990 Eurocode: Basis of structural and geotechnical design

— EN 1991 Eurocode 1: 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 of structures for earthquake resistance

— EN 1999 Eurocode 9: Design of aluminium structures

— New parts are under development, e.g. Eurocode for design of structural glass

0.2 Introduction to EN 1993

EN 1993 (all parts) applies to the design of buildings and civil engineering works in steel. It complies with the principles and requirements for the safety and serviceability of structures, the basis of their design and verification that are given in EN 1990 – Basis of structural design.

EN 1993 (all parts) is concerned only with requirements for resistance, serviceability, durability and fire resistance of steel structures. Other requirements, e.g. concerning thermal or sound insulation, are not covered.

EN 1993 is subdivided in various parts:

EN 1993-1, *Design of Steel Structures — Part 1: General rules and rules for buildings;*

EN 1993-2, *Design of Steel Structures — Part 2: Steel bridges;*

EN 1993-3, *Design of Steel Structures — Part 3: Towers, masts and chimneys;*

EN 1993-4, *Design of Steel Structures — Part 4: Silos and tanks;*

EN 1993-5, *Design of Steel Structures — Part 5: Piling;*

EN 1993-6, *Design of Steel Structures — Part 6: Crane supporting structures;*

EN 1993-7, *Design of steel structures — Part 7: Design of sandwich panels.*

EN 1993-1 in itself does not exist as a physical document, but comprises the following 14 separate parts, the basic part being EN 1993-1-1:

EN 1993-1-1, *Design of Steel Structures — Part 1-1: General rules and rules for buildings;*

EN 1993-1-2, *Design of Steel Structures — Part 1-2: Structural fire design;*

EN 1993-1-3, *Design of Steel Structures — Part 1-3: Cold-formed members and sheeting;*

NOTE Cold formed hollow sections supplied according to EN 10219 are covered in EN 1993-1-1.

EN 1993-1-4, *Design of Steel Structures — Part 1-4: Stainless steels;*

EN 1993-1-5, *Design of Steel Structures — Part 1-5: Plated structural elements;*

EN 1993-1-6, *Design of Steel Structures — Part 1-6: Strength and stability of shell structures;*

EN 1993-1-7, *Design of Steel Structures — Part 1-7: Strength and stability of planar plated structures transversely loaded;*

EN 1993-1-8, *Design of Steel Structures — Part 1-8: Design of joints;*

EN 1993-1-9, *Design of Steel Structures — Part 1-9: Fatigue strength of steel structures;*

EN 1993-1-10, *Design of Steel Structures — Part 1-10: Selection of steel for fracture toughness and through-thickness properties;*

EN 1993-1-11, *Design of Steel Structures — Part 1-11: Design of structures with tension components made of steel;*

EN 1993-1-12, *Design of Steel Structures — Part 1-12: Additional rules for steel grades up to S960;*

EN 1993-1-13, *Design of Steel Structures — Part 1-13: Beams with large web openings;*

EN 1993-1-14, *Design of Steel Structures — Part 1-14: Design assisted by finite element analysis.*

All subsequent parts EN 1993-1-2 to EN 1993-1-14 treat general topics that are independent from the structural type like structural fire design, cold-formed members and sheeting, stainless steels, plated structural elements, etc.

All subsequent parts numbered EN 1993-2 to EN 1993-7 treat topics relevant for a specific structural type like steel bridges, towers, masts and chimneys, silos and tanks, piling, crane supporting structures, etc. EN 1993-2 to EN 1993-7 refer to the generic rules in EN 1993-1 and supplement, modify or supersede them.

0.3 Introduction to EN 1993-1-8

EN 1993-1-8 gives guidance and recommendations for the design of joints and connections in steel structures. It has been assumed that the execution of its provisions follows the requirements given in EN 1090.

0.4 Verbal forms used in the Eurocodes

The verb “shall" expresses a requirement strictly to be followed and from which no deviation is permitted in order to comply with the Eurocodes.

The verb “should” expresses a highly recommended choice or course of action. Subject to national regulation and/or any relevant contractual provisions, alternative approaches could be used/adopted where technically justified.

The verb “may" expresses a course of action permissible within the limits of the Eurocodes.

The verb “can" expresses possibility and capability; it is used for statements of fact and clarification of concepts.

0.5 National Annex for EN 1993-1-1

National choice is allowed in this standard where explicitly stated within notes. National choice includes the selection of values for Nationally Determined Parameters (NDPs).

The national standard implementing EN 1993-1-8 can have a National Annex containing all national choices to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

When no national choice is given, the default choice given in this standard is to be used.

When no national choice is made and no default is given in this standard, the choice can be specified by a relevant authority or, where not specified, agreed for a specific project by appropriate parties.

National choice is allowed in EN 1993-1-8 through the following clauses:

- 4.2(4) NOTE
- 4.3.2(1) NOTE 1
- 5.1.1(3) NOTE
- 5.2(1) NOTE
- 5.7.4(1) NOTE 1 and NOTE 2
- 5.7.4(3) NOTE
- 6.2(3) NOTE
- 7.3.1(2) NOTE
- 9.1.1(4) Note 1 and Note 2
- B.3.2.2(9) NOTE
- C.2(4) NOTE

The National Annex can contain, directly or by reference, non-contradictory complementary information for ease of implementation, provided it does not alter any provisions of the Eurocodes.

1 Scope

1.1 Scope of EN 1993-1-8

(1) This document gives design methods for the design of joints subject to predominantly static loading using all steel grades from S235 up to and including S700 unless otherwise stated in individual clauses.

1.2 Assumptions

(1) The assumptions of EN 1990 and EN 1993-1-1 apply to this document.

(2) The design methods given in this part of EN 1993 are applicable when the quality of construction is as specified in EN 1090-2 or EN 1090-4, and that the construction materials and products used are those specified in the relevant parts of EN 1993, or in the relevant material and product specifications.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE See the Bibliography for a list of other documents cited that are not normative references, including those referenced as recommendations (i.e. through 'should' clauses) and permissions (i.e. through 'may' clauses).

EN 1090-2:2018, *Execution of steel structures and aluminium structures — Part 2: Technical requirements for steel structures*

EN 1090-4, *Execution of steel structures and aluminium structures — Part 4: Technical requirements for cold-formed steel elements and structures for roof, ceiling, floor and wall applications*

EN 1990, *Eurocode: Basis of structural and geotechnical design*

prEN 1993-1-1:2020, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*

EN 1993-1-9, *Eurocode 3: Design of steel structures — Part 1-9: Fatigue*

3 Terms, definitions and symbols

3.1 Terms and definitions

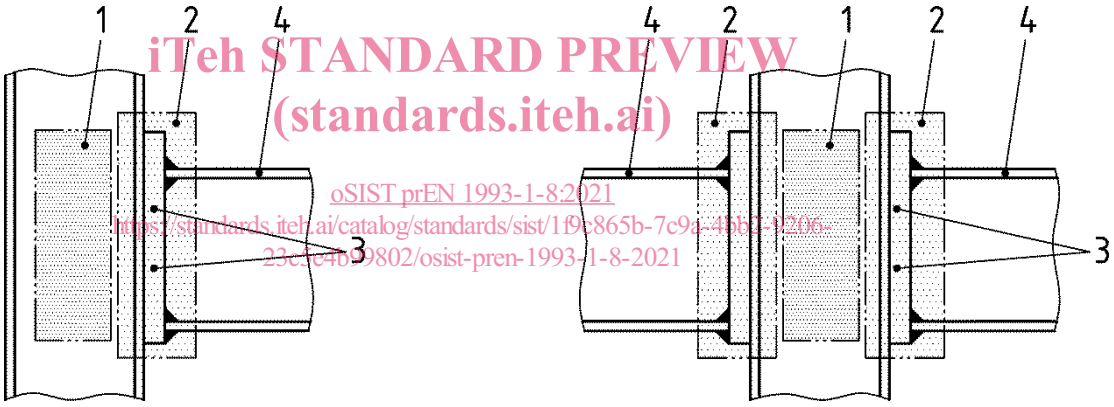
For the purposes of this document, the terms and definitions given in EN 1993-1-1 and the following apply.

3.1.1
joint
zone where two or more members are interconnected

3.1.2
joint configuration
type or layout of the joint or joints in a zone within which the axes of two or more inter-connected members intersect

Note 1 to entry: See Figure 3.1 and Figure 8.1.

Note 2 to entry: A planar major-axis beam-to-column joint consists of a web panel and either one connection (single-sided joint configuration) or two connections (double-sided joint configuration).



Joint = web panel in shear + connection

Left Joint = web panel in shear + left connection
Right joint = web panel in shear + right connection

a) Single-sided joint configuration

b) Double-sided joint configuration

Key
1 web panel in shear
2 connection
3 components (e.g. bolts, endplate)
4 connected member

Figure 3.1 — Parts of a major-axis beam-to-column joint configuration

3.1.3
connection
set of components used to transfer forces and/or moments between two or more members at the location at which two or more members meet

3.1.4
connected member
any member that is joined to another member or element

3.1.5
basic component (of a joint)
part of a joint that makes a contribution to one or more of its structural properties

3.1.6
structural properties (of a joint)
resistance to internal forces and moments in the connected members, rotational stiffness and rotation capacity

3.1.7
rotational stiffness
moment required to produce a unit rotation in a joint

3.1.8
rotation capacity
angle through which the joint can rotate for a given resistance level

3.1.9
injection bolt
special fastener that allows filling of the clearance between the bolt and the inside surface of the hole by injecting resin through a small hole in the head of the bolt

Note 1 to entry: After injection and complete curing of the resin, the behaviour of the connection is identical to that of a connection with bolts in fitted holes, depending on deformation property of the confined injected material.

3.1.10
uniplanar joint
joint that connects members in a lattice structure that are situated in a single plane

3.1.11
multiplanar joint
joint that connects members in a lattice structure that are situated in more than one plane

3.1.12
concentric shear load
internal axial or shear load that does not produce a bending moment on a group of fasteners

3.2 Symbols and abbreviations

For the purposes of this document, the following symbols apply.

Clause 4

γ_{M0}	partial factor for resistance of cross-sections;
γ_{M1}	partial factor for resistance of members to instability;
γ_{M2}	partial factor for resistance of cross-sections in tension to fracture;
γ_{M2}	partial factor for resistance of bolts, rivets, pins, welds and plates in bearing;
γ_{M3}	partial factor for slip resistance at ultimate limit state (Category C);
$\gamma_{M3,ser}$	partial factor for slip resistance at serviceability limit state (Category B);
γ_{M4}	partial factor for bearing resistance of an injection bolt;
γ_{M5}	partial factor for resistance of joints in hollow section lattice girders;
$\gamma_{M6,ser}$	partial factor for resistance of pins at serviceability limit state;
γ_{M7}	partial factor for preload of high strength bolts;
γ_{M5}	partial factor for resistance of joints in hollow section lattice girder;
γ_{Mu}	partial factor for tying resistance;

Clause 5

A	gross cross-section area of bolt;
A_0	area of the rivet hole;
A_{gv}	gross area subjected to shear;
A_{net}	net area;
A_{nt}	net area subjected to tension;
A_{nv}	net area subjected to shear;
A_s	tensile stress area of the bolt or of the anchor bolt;
$B_{p,Rd}$	design punching shear resistance of the bolt head and the nut;
d	nominal bolt diameter, diameter of the pin or diameter of the fastener;