SLOVENSKI STANDARD
oSIST prEN 1999-1-1:2021

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Evrokod 9: Projektiranje konstrukcij iz aluminijevih zlitin - 1-1. del: Splošna pravila za konstrukcije

Eurocode 9: Design of aluminium structures - Part 1-1: General structural rules

Eurocode 9: Bemessung und Konstruktion von Aluminiumtragwerken - Teil 1-1: Allgemeine Bemessungsregeln

Eurocode 9: Calcul des structures en aluminium - Partie 1-1: Règles générales

Ta slovenski standard je istoveten z: prEN 1999-1-1

ICS:

91.010.30	Tehnični vidiki	Technical aspects
91.080.17	Aluminijaste konstrukcije	Aluminium structures

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EUROPEAN STANDARD

NORME EUROPÉENNE

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Will supersede EN 1999-1-1:2007

English Version

Eurocode 9: Design of aluminium structures - Part 1-1: General structural rules

Eurocode 9: Calcul des structures en aluminium - Partie 1-1: Règles générales

Eurocode 9: Bemessung und Konstruktion von Aluminiumtragwerken - Teil 1-1: Allgemeine Bemessungsregeln

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

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN 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.

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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 1999-1-1:2021) has been prepared by Technical Committee CEN/TC250 "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 1999-1-1:2007.

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>

The Eurocodes are intended for use by designers, clients, manufacturers, constructors, relevant authorities (in exercising their duties in accordance with national or international regulations), educators, software developers, and committees drafting standards for related product, testing and execution standards.

NOTE Some aspects of design are most appropriately specified by relevant authorities or, where not specified, can be agreed on a project-specific basis between relevant parties such as designers and clients. The Eurocodes identify such aspects making explicit reference to relevant authorities and relevant parties.

0.2 Introduction to EN 1999 Eurocode 9

EN 1999 applies to the design of buildings and civil engineering and structural works made of aluminium. 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 1999 is only concerned with requirements for resistance, serviceability, durability and fire resistance of aluminium structures. Other requirements, e.g. concerning thermal or sound insulation, are not considered.

EN 1999 does not cover the special requirements of seismic design. Provisions related to such requirements are given in EN 1998, which complements, and is consistent with EN 1999.

For the design of new structures, prEN 1999 is intended to be used, for direct application, together with EN 1990, EN 1991, EN 1992, EN 1993, EN 1994, EN 1995, EN 1997, EN 1998 and EN 1999.

EN 1999 is subdivided in five parts:

— EN 1999-1-1 Design of Aluminium Structures: General structural rules.

— EN 1999-1-2 Design of Aluminium Structures: Structural fire design.

— EN 1999-1-3 Design of Aluminium Structures: Structures susceptible to fatigue.

— EN 1999-1-4 Design of Aluminium Structures: Cold-formed structural sheeting.

— EN 1999-1-5 Design of Aluminium Structures: Shell structures.

0.3 Introduction to EN 1999-1-1

This document gives basic design rules for structures made of wrought aluminium alloys and limited guidance for cast alloys.

This document is the first of the five parts of EN 1999. It gives generic design rules that are intended to be used with the other parts EN 1999-1-2 to EN 1999-1-5.

EN 1999-1-1 can be used for design cases not covered by the Eurocodes (other structures, other actions, other materials) and serving as a reference document for other CEN TC´s concerning structural matters.

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 prEN 1999-1-1

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 1999-1-1 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 1999-1-1 through the following clauses:

— 4.1.2(3) NOTE

— 4.4.3(2) NOTE

— 4.5(1) NOTE

— 5.2.1(1) NOTE

— 5.2.2(2) NOTE 2

— 5.2.3.1(2) NOTE

— 5.3.2.1(4) NOTE

— 5.3.2.2(1) NOTE

— 8.1.6.2(3) NOTE

— 8.3.1.7(5) NOTE

— 9.1(3) NOTE

— 9.2.1(2) NOTE

— 10.6.1(3) NOTE

— 10.6.2.2 Table 10.6

— 10.8(2) NOTE

— 10.9.1(4) NOTE

— 10.13(2) NOTE

— A.3.2(1) NOTE

— A.4(1) NOTE

— A.4(3) NOTE 1

— A.4(3) NOTE 2

— A.4(4) NOTE

— A.5(1) NOTE

— E.3.1(2) NOTE

— E.3.1(3) NOTE

— H.2(6) NOTE

— O.2(2) NOTE

— S.8.4(1) NOTE

National choice is allowed in EN 1999-1-1 on the application of the following informative annexes:

Annex B (Informative) Finite element Methods of analysis (FEM)

Annex C (Informative) Materials selection

Annex D (Informative) Corrosion and surface protection

Annex F (Informative) Analytical models for stress-strain relationship

Annex G (Informative) Geometrical properties of cross-sections

Annex H (Informative) Behaviour of cross-sections beyond elastic limit

Annex I (Informative) Lateral torsional buckling of beams and torsional or torsional-flexural buckling of compressed members

Annex J (Informative) Shear lag effects in member design

Annex K (Informative) Plastic hinge method for continuous beams

Annex L (Informative) Cross-sectional ductility and rotation capacity

Annex M (Informative) Classification of joints

Annex N (Informative) The use of the component method for joints

Annex O (Informative) Screw grooves

Annex P (Informative) Adhesive bonded joints

Annex Q (Informative) Determining the extent of HAZ from hardness tests

Annex T (Informative) Lattice Spatial Roof Structures

Annex U (Informative) Composite Aluminium Concrete Beams

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 1999-1-1

(1) This document gives basic design rules for structures made of wrought aluminium alloys and limited guidance for cast alloys (see Clause 5 and Annex C).

This document does not cover the following unless otherwise explicitly stated in this standard:

— components with material thickness less than 0,6 mm;

— welded components with material thickness less than 1,5 mm;

— connections with:

  — steel bolts and pins with diameter less than 5 mm;

  — aluminium bolts and pins with diameter less than 8 mm;

  — rivets and thread forming screws with diameter less than 3,9 mm.

1.2 Assumptions

(1) In addition to the general assumptions of EN 1990 the following assumptions apply:

— execution complies with EN 1090-3;

— the aluminium products comply with EN 573 and the products listed in 2.3.

— the mechanical properties comply with the tabulated values in Parts 2 of the product standards listed in 2.3.

(2) EN 1999 is intended to be used in conjunction with:

— European Standards for construction products relevant for aluminium structures

— EN 1090-1, *Execution of steel structures and aluminium structures – Part 1: Requirements for conformity assessment of structural components*

— EN 1090-3, *Execution of steel structures and aluminium structures – Part 3: Technical requirements for aluminium structures*