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**EUROCODE 9: DESIGN OF ALUMINIUM
STRUCTURES - PART 2: STRUCTURES
SUSCEPTIBLE TO FATIGUE**

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Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN PRESTANDARD
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English version

**Eurocode 9: Design of aluminium structures - Part 2: Structures
susceptible to fatigue**

Eurocode 9: Conception et dimensionnement des
structures en aluminium - Partie 2: Structures sensibles à la
fatigue

Eurocode 9: Bemessung und Konstruktion von
Aluminiumbauten - Teil 2: Ermüdungsanfällige Tragwerke

This European Prestandard (ENV) was approved by CEN on 26 October 1997 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 a European Standard.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

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Foreword

Objectives of the Eurocodes

The Structural Eurocodes comprise a group of standards for the structural and geotechnical design of buildings and civil engineering works.

They are intended to serve as reference documents for the following purposes:

- a) As a means to prove compliance of building and civil engineering works with the essential requirements of the Construction Products Directive (CPD).
- b) As a framework for drawing up harmonised technical specifications for construction products.

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.

Until the necessary set of harmonised 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

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".

In 1990, after consulting their respective Member States, the CEC transferred the work of further development, issue and updates of the Structural Eurocodes to CEN, and the EFTA Secretariat agreed to support the CEN work.

CEN Technical Committee CEN/TC 250 is responsible for all Structural Eurocodes.

Eurocode programme

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 of structures for earthquake resistance
EN 1999	Eurocode 9	Design of aluminium structures

Separate sub-committees have been formed by CEN/TC 250 for the various Eurocodes listed above.

This part of the Structural Eurocode for Design of Aluminium Alloy Structures, which had been finalised and approved for publication under the direction of CEC, is being issued by CEN as a European Prestandard (ENV) with an initial life of three years.

This Prestandard is intended for experimental practical application in the design of the building and civil engineering works covered by the scope as given in 1.1 and for the submission of comments.

After approximately two years CEN members will be invited to submit formal comments to be taken into account in determining future action.

Meanwhile feedback and comments on this Prestandard should be sent to Secretariat of sub-committee CEN/TC 250/SC 9 at the following address:

Secretariat of CEN/TC 250/SC 9
c/o Norwegian Council for Building Standardization
Postboks 129 Blindern
N - 0314 OSLO

or to your national standards organisation.

National Applications Documents

In view of the responsibilities of authorities in member countries for the safety, health and other matters covered by the essential requirements of the CPD, certain safety elements in this ENV have been assigned indicative values which are identified by □. The authorities in each member country are expected to assign definitive values to these safety elements.

Some of the harmonised supporting prestandards, including the Eurocodes giving values of actions to be taken into account and measures required for fire protection, may not be available by the time this Prestandard is issued. It is therefore anticipated that a National Application Document (NAD) giving definitive values for safety elements, referencing compatible supporting standards and providing national guidance on the application of this Prestandard, will be issued by each member country or its Standards Organisation.

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

Matters specific to this Prestandard

General

The scope of Eurocode 9 is defined in Part 1.1 and the scope of this Part of Eurocode 9 is defined in 1.1.

In using this Prestandard in practice, particular regard should be paid to the underlying assumptions and conditions given in 1.4.

In developing this Prestandard, background documents have been prepared, which give commentaries on, and justifications for, some of the provisions in the Prestandard.

Use of annexes

The six chapters of this Prestandard are complemented by five Annexes, some normative and some informative.

The normative annexes have the same status as the chapters to which they relate. Most have been introduced by moving some of the more detailed Application Rules, which are needed only in particular cases, out of the main part of the text to aid its clarity.

Concept of reference standards

In order to use this Prestandard reference needs to be made to various CEN and ISO standards. These are used to define the product characteristics and processes which have been assumed to apply in formulating the design rules.

This Prestandard mentions certain "Reference Standards". Each Reference Standard makes reference to the whole or, part of, a number of CEN and/or ISO standards. Where any referenced CEN or ISO standard is not yet available, the National Application Document should be consulted for the standard to be used instead. It is assumed that only those grades and qualities given in normative Annex B of Part 1.1 will be used for buildings and civil engineering works designed to this Prestandard.

Partial safety factors

This Prestandard gives general rules for the design of aluminium structures which relate to the limit states of members and connections which involve structural failure due to fatigue.

Most of the rules have been calibrated against test results in order to obtain consistent values of the partial safety factors for resistance γ_{Mf} .

Guidance is given on appropriate partial factors γ_{Ff} for loading where the loading cannot be obtained from existing loading codes.

Fabrication and erection

Chapter 6 of this Prestandard is intended to indicate some minimum standards of workmanship and normal tolerances that have been assumed in deriving the design rules given in this Prestandard.

It also indicates the information relating to particular fatigue critical parts of a structure that the designer needs to supply in order to define the execution and maintenance requirements.

Design assisted by testing

Section 2.4 is not generally required in the course of routine design, but is provided, together with Annex C, for use in the special circumstances in which it may become appropriate.

1 General

1.1 Scope of Eurocode 9 Part 2

1.1.1 Application

(1) This Part 2 gives the basis for the design of aluminium alloy structures with respect to the limit state of fatigue induced fracture. Design for other limit states is covered in Part 1.

(2) This Part 2 gives rules for design by the following methods:

- Safe life
- Damage tolerance
- Design by testing

(3) This Part 2 contains the manufacturing quality requirements necessary to ensure that the design assumptions are met in practice.

1.1.2 Structural forms

(1) This Part 2 covers:

- Beams and braced and unbraced framed structures
- Latticed structures
- Stiffened plate structures of flat or shell construction
- Solid bodies

(2) This Part 2 does not cover pressurised containment vessels, or pipework.

1.1.3 Basic products

(1) This Part 2 covers:

- Rolled sections
- Extrusions
- Drawn Tubes
- Formed Profiles
- Forgings
- Castings

1.1.4 Member forms

(2) This Part 2 covers open and hollow sections, including members built up from combinations of these products.

1.1.5 Materials

(1) This Part 2 covers the wrought alloys listed with a tick in Table 1.1.1 and the cast alloys listed in Table 1.1.2.

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