

**Eurokoodeks 2: Betoonkonstruktsioonide
projekteerimine. Osa 1-2: Üldeeskirjad.
Tulepüsivusarvutus**

Eurocode 2: Design of concrete structures - Part 1-2:
General rules - Structural fire design

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-ENV 1992-1-2:1999 sisaldab Euroopa standardi ENV 1992-1-2:1995 ingliskeelset teksti.	This Estonian standard EVS-ENV 1992-1-2:1999 consists of the English text of the European standard ENV 1992-1-2:1995.
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Võtmesõnad: betoonarandid, ehitised, ehitusnormid, ohutusnõuded, projekteerimiseeskirjad, tarindite tulepüsivuse projekteerimine,

Inglisekeelsed võtmesõnad: building codes, buildings, concrete structures, design rules, safety requirements, structural fire design,

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English version

**Eurocode 2: Design of concrete structures - Part
1-2: General rules - Structural fire design**

Eurocode 2: Calcul des structures en béton -
Partie 1-2: Règles générales - Calcul du
comportement au feu

Eurocode 2: Planung von Stahlbeton- und
Spannbetontragwerken - Teil 1-2: Allgemeine
Regeln - Tragwerksbemessung für den Brandfall

This European Prestandard (ENV) was approved by CEN on 1994-01-14 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).

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CEN

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

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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 the methods of testing their performance are available, some of the Structural Eurocodes cover some of these aspects in informative Annexes.

Background of the Eurocode program

- (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/TC250 is responsible for all Structural Eurocodes.

Eurocode program

- (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 subcommittees have been formed by CEN/TC250 for the various Eurocodes listed above.
- (9) This Part 1-2 of Eurocode 2 is being published 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/TC250/SC2 at the following address:

Deutsches Institut für Normung e.V. (DIN)
Burggrafenstrasse 6
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or to your national standards organisation

National Application Documents (NAD'S)

(13) In view of the responsibilities of 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 assign definitive values to these safety elements.

(14) Some of the supporting European or International standards 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.

(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 scope of Eurocode 2 is defined in 1.1.1 of ENV 1992-1-1 and the scope of this Part of Eurocode 2 is defined in 1.1. Additional Parts of Eurocode 2 which are planned are indicated in 1.1.3 of ENV 1992-1-1; these will cover additional technologies or applications, and will complement and supplement this Part.

(17) In using this Prestandard in practice, particular regard should be paid to the underlying assumptions and conditions given in 1.3 of ENV 1992-1-1.

(18) The provisions of this Prestandard are based substantially on recent CEB and FIP documents.

(19) This Part 1-2 of Eurocode 2 complements ENV 1992-1-1 for the particular aspects of structural fire design of concrete structures. The provisions in this Part 1-2 have to be considered additionally to those in other Parts of ENV 1992.

(20) The framework and structure of this Part 1-2 do not correspond to ENV 1992-1-1.

(21) This Part 1-2 contains five sections and four informative Annexes. These Annexes have been introduced by moving some of the more detailed Application Rules, which are needed in particular cases, out of the main part of the text to aid its clarity.

(22) Required functions and levels of performance are generally specified by the National Authorities - mostly in terms of standard fire resistance rating. Where fire safety engineering for assessing passive and active measures is accepted, requirements by authorities will be less prescriptive and may allow for alternative strategies.

1 General

1.1 Scope

(1)P ENV 1992-1-2 deals with the design of concrete structures for the accidental situation of fire exposure and shall be used in conjunction with ENV 1992-1-1 and ENV 1991-2-2. It provides additions to and identifies differences from the design of structures at normal temperatures.

(2)P Part 1-2 applies only to passive methods of fire protection. Active methods are not included.

(3)P Part 1-2 applies to structures which for reasons of general fire safety, are required to fulfil the following criteria when exposed to fire:

- avoid premature collapse of the structure (load-bearing function)
- limit fire spread (flames, hot gases, excessive heat) beyond designated areas (separation function)

(4)P Part 1-2 gives Principles and Application Rules (see 1.2 in ENV 1992-1-1) in respect to the design of structures to fulfil the criteria given in (3)P (e.g. in terms of required standard fire resistance).

(5)P Part 1-2 applies to those structures or parts of structures which are within the scope of Part 1-1, 1-3 to 1-6. However, it does not cover:

- structures with prestressing by external tendons
- shell structures.

(6) For structures using unbonded tendons reference should be made to 4.1(6) and 4.2.2(6).

1.2 Distinction between principles and application rules

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

(2) The principles comprise:

- general statements and definitions for which there is no alternative, as well as
- 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) The application rules are generally recognized rules which follow the principles and satisfy their requirements.

(5) It is permissible to use alternative rules different from the application rules given in this Eurocode, provided it is shown that the alternative rules accord with the relevant principles and have at least the same reliability.

(6) In this Part the application rules are identified by a number in brackets eg. as this clause.

1.3 Normative references

(1) European standards for fire tests are under preparation. In National Application Documents reference may be made to national or international standards. For structural members ISO 834 is generally used.

1.4 Definitions

1.4.1 critical temperature of reinforcement : The temperature at which failure is expected to occur in reinforcement at a given load level.

1.4.2 design fire : A specified fire development assumed for design purposes.

1.4.3 effects of actions E (as described in ENV 1992-1-1, 2.2.2.5) : The effects of actions (E) are responses (for example internal forces and moments, stresses, strains) of the structure to the actions.

1.4.4 fire compartment : A space within a building extending over one or several floors which is enclosed by separating members such, that fire spread beyond the compartment is prevented during the relevant fire exposure.

1.4.5 fire resistance : The ability of a structure or part of it to fulfil its required functions (load-bearing and/or separating function) for a specified fire exposure, for a specified period of time.

1.4.6 global structural analysis (for fire) : The analysis of the entire structure, when either the entire structure or only parts of it are exposed to fire. Indirect fire actions are considered throughout the structure.

1.4.7 indirect fire actions : Thermal expansions or thermal deformations causing forces and moments.

1.4.8 integrity criterion "E" : A criterion by which the ability of a separating member to prevent passage of flames and hot gases is assessed.

1.4.9 load-bearing criterion "R" : A criterion by which the ability of a structure or a member to sustain specified actions during the relevant fire, is assessed.

1.4.10 load-bearing function : The ability of a structure or member to sustain specified actions during the relevant fire.