
Eurocode 6: Projektiranje zidanih konstrukcij – 1-1. del: Splošna pravila za stavbe – Pravila za armirano in nearmirano zidovje

Eurocode 6: Design of masonry structures - Part 1-1: General rules for buildings - Rules for reinforced and unreinforced masonry

Eurocode 6: Bemessung und Konstruktion von Mauerwerksbauten - Teil 1-1: Allgemeine Regeln - Regeln für bewehrtes und unbewehrtes Mauerwerk

Eurocode 6: Calcul des ouvrages en maçonnerie - Partie 1-1: Règles générales - Règles pour la maçonnerie armée et non armée

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| 91.080.30 | Zidane konstrukcije | Masonry |

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EUROPEAN PRESTANDARD

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PRÉNORME EUROPÉENNE

EUROPÄISCHE VORNORM

June 1995

ICS 91.080.30

Descriptors: buildings, construction, masonry work, building codes, computation, generalities

English version

**Eurocode 6: Design of masonry structures - Part
1-1: General rules for buildings - Rules for
reinforced and unreinforced masonry**

Eurocode 6: Calcul des ouvrages en maçonnerie
- Partie 1-1: Règles générales - Règles pour la
maçonnerie armée et non armée

Eurocode 6: Bemessung und Konstruktion von
Mauerwerksbauten - Teil 1-1: Allgemeine Regeln
- Regeln für bewertes und bewertes Mauerwerk

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This European Prestandard (ENV) was approved by CEN on 1994-06-10 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

| Contents | Page |
|----------------------------------------------------------|------|
| Foreword | 8 |
| 1 General | 11 |
| 1.1 Scope | 11 |
| 1.1.1 Scope of Eurocode 6 | 11 |
| 1.1.2 Scope of Part 1.1 of Eurocode 6 | 11 |
| 1.1.3 Further parts of Eurocode 6 | 13 |
| 1.2 Distinction between principles and application rules | 13 |
| 1.3 Assumptions | 14 |
| 1.4 Definitions | 14 |
| 1.4.1 Terms common to all Eurocodes | 14 |
| 1.4.2 Special terms used in this ENV 1996-1-1 | 16 |
| 1.5 S.I. units | 21 |
| 1.6 Symbols used in this ENV 1996-1-1 | 22 |
| 2 Basis of design | 30 |
| 2.1 Fundamental requirements | 30 |
| 2.2 Definitions and classifications | 30 |
| 2.2.1 Limit states and design situations | 30 |
| 2.2.2 Actions | 31 |
| 2.2.3 Material properties | 34 |
| 2.2.4 Geometrical data | 35 |
| 2.2.5 Load arrangement and load cases | 35 |
| 2.3 Design requirements | 35 |
| 2.3.1 General | 35 |
| 2.3.2 Ultimate limit states | 36 |
| 2.3.3 Partial safety factors for ultimate limit states | 38 |
| 2.3.4 Serviceability limit states | 39 |
| 2.4 Durability | 42 |
| 3 Materials | 43 |
| 3.1 Masonry units | 43 |
| 3.1.1 Types of masonry units | 43 |
| 3.1.2 Properties of masonry units | 45 |
| 3.2 Mortar | 46 |
| 3.2.1 Types of mortar | 46 |
| 3.2.2 Properties of mortar | 46 |
| 3.3 Concrete infill | 47 |
| 3.3.1 General | 47 |
| 3.3.2 Specification for concrete infill | 48 |
| 3.3.3 Properties of concrete infill | 48 |
| 3.4 Reinforcing steel | 49 |



| | | |
|----------|---------------------------------------------------------------------------------|-----------|
| 3.4.1 | General | 49 |
| 3.4.2 | Properties of reinforcing steel | 49 |
| 3.4.3 | Durability of reinforcing steel | 50 |
| 3.5 | Prestressing steel | 50 |
| 3.5.1 | General | 50 |
| 3.5.2 | Durability of prestressing steel | 50 |
| 3.6 | Mechanical properties of unreinforced masonry | 50 |
| 3.6.1 | General | 50 |
| 3.6.2 | Characteristic compressive strength of unreinforced masonry | 51 |
| 3.6.3 | Characteristic shear strength of unreinforced masonry | 56 |
| 3.6.4 | Characteristic flexural strength of unreinforced masonry | 59 |
| 3.7 | Mechanical properties of reinforced, prestressed and confined masonry | 60 |
| 3.7.1 | General | 60 |
| 3.7.2 | Characteristic anchorage bond strength | 60 |
| 3.8 | Deformation properties of masonry | 61 |
| 3.8.1 | Stress-strain relationship | 61 |
| 3.8.2 | Modulus of elasticity | 62 |
| 3.8.3 | Shear modulus | 63 |
| 3.8.4 | Creep, shrinkage and thermal expansion | 63 |
| 3.9 | Ancillary components | 63 |
| 3.9.1 | Damp proof courses | 63 |
| 3.9.2 | Wall ties | 63 |
| 3.9.3 | Straps, hangers, brackets and support angles | 65 |
| 3.9.4 | Prefabricated lintels | 65 |
| 3.9.5 | Prestressing devices | 65 |
| 4 | Design of masonry | 66 |
| 4.1 | Structural behaviour and overall stability | 66 |
| 4.1.1 | Design models for structural behaviour | 66 |
| 4.1.2 | Structural behaviour in accidental situations (other than earthquakes and fire) | 66 |
| 4.1.3 | Design of structural members | 67 |
| 4.2 | Actions, combinations and partial coefficients | 67 |
| 4.2.1 | Characteristic permanent action | 67 |
| 4.2.2 | Characteristic variable action | 67 |
| 4.2.3 | Characteristic wind action | 67 |
| 4.2.4 | Characteristic lateral earth pressure | 67 |
| 4.2.5 | Design combinations | 68 |
| 4.3 | Design strength of masonry | 68 |
| 4.4 | Unreinforced masonry walls subjected to vertical loading | 68 |
| 4.4.1 | General | 68 |
| 4.4.2 | Verification of unreinforced masonry walls | 69 |
| 4.4.3 | Reduction factor for slenderness and eccentricity | 70 |
| 4.4.4 | Effective height of walls | 72 |
| 4.4.5 | Effective thickness of walls | 77 |
| 4.4.6 | Slenderness ratio of walls | 77 |
| 4.4.7 | Out-of-plane eccentricity | 77 |
| 4.4.8 | Concentrated loads | 78 |

| | | |
|-------------------------------|---------------------------------------------------------------------------------------|-----|
| 4.4.9 | Stresses due to restraints | 80 |
| 4.5 | Unreinforced masonry shear walls | 81 |
| 4.5.1 | General | 81 |
| 4.5.2 | Analysis of shear walls | 82 |
| 4.5.3 | Verification of shear walls | 83 |
| 4.6 | Unreinforced walls subjected to lateral loads | 84 |
| 4.6.1 | General | 84 |
| 4.6.2 | Walls subjected to lateral wind loads | 85 |
| 4.6.3 | Walls subjected to lateral earth pressure | 89 |
| 4.6.4 | Horizontal accidental loads (excluding seismic actions) | 89 |
| 4.7 | Reinforced masonry | 89 |
| 4.7.1 | Reinforced masonry members subjected to bending, bending and axial load or axial load | 89 |
| 4.7.2 | Reinforced masonry members subjected to shear | 97 |
| 4.7.3 | Reinforced masonry deep beams subjected to vertical loading | 99 |
| 4.7.4 | Reinforced masonry members under the serviceability limit state | 102 |
| 4.8 | Prestressed masonry | 103 |
| 4.8.1 | General | 103 |
| 4.8.2 | Prestressed masonry members under the serviceability limit state | 103 |
| 4.8.3 | Prestressed masonry members under the ultimate limit state | 104 |
| 4.8.4 | Other design matters | 105 |
| 4.9 | Confined masonry | 106 |
| 5 Structural detailing | | |
| 5.1 | General | 107 |
| 5.1.1 | Masonry materials | 107 |
| 5.1.2 | Types of walls | 107 |
| 5.1.3 | Minimum thickness of walls | 109 |
| 5.1.4 | Bonding of masonry | 109 |
| 5.1.5 | Mortar joints | 110 |
| 5.1.6 | Bearings under concentrated loads | 113 |
| 5.2 | Reinforcement detailing | 113 |
| 5.2.1 | General | 113 |
| 5.2.2 | Protection of reinforcing steel | 115 |
| 5.2.3 | Minimum area of reinforcement | 118 |
| 5.2.4 | Size of reinforcement | 119 |
| 5.2.5 | Anchorage and laps | 119 |
| 5.2.6 | Shear reinforcement | 123 |
| 5.2.7 | Restraint of compression reinforcement | 123 |
| 5.2.8 | Spacing of reinforcement | 123 |
| 5.2.9 | Confined masonry | 124 |
| 5.3 | Prestressing details | 125 |
| 5.3.1 | General | 125 |
| 5.3.2 | Prestressing tendons | 125 |
| 5.4 | Connection of walls | 126 |

SIST ENV 1996-1-1:2004

<https://standards.iteh.ai/catalog/standards/sist/bd86dcb5-4785-46f7-8174-ccfdc98e918a/sist-env-1996-1-1-2004>

(standards.iteh.ai)

| | | |
|----------|--------------------------------------------------------------------------------------------------------|------------|
| 5.4.1 | Interconnection of walls, floors and roofs | 126 |
| 5.4.2 | Connection between intersecting walls | 127 |
| 5.5 | Chases and recesses | 129 |
| 5.5.1 | General | 129 |
| 5.5.2 | Vertical chases and recesses | 129 |
| 5.5.3 | Horizontal and inclined chases | 129 |
| 5.6 | Damp proof courses | 129 |
| 5.7 | Thermal and long term movement | 130 |
| 5.8 | Masonry below ground | 132 |
| 5.9 | Particular details for seismic design | 132 |
| 5.10 | Particular details for structural fire design | 132 |
| 6 | Construction | 133 |
| 6.1 | Masonry units | 133 |
| 6.2 | Storage of masonry units and other materials | 133 |
| 6.2.1 | General | 133 |
| 6.2.2 | Storage of masonry units | 133 |
| 6.2.3 | Storage of materials for mortar and concrete infill | 133 |
| 6.2.4 | Storage and use of reinforcement | 134 |
| 6.3 | Mortar and concrete infill | 134 |
| 6.3.1 | General | 134 |
| 6.3.2 | Site made mortar and concrete infill | 134 |
| 6.3.3 | Factory made mortars, pre-batched mortars, pre-mixed lime sand mortars and ready mixed concrete infill | 135 |
| 6.3.4 | Strength of mortar and concrete infill | 135 |
| 6.4 | Construction of masonry | 136 |
| 6.4.1 | General | 136 |
| 6.4.2 | Mortar joints | 136 |
| 6.5 | Connection of walls | 137 |
| 6.6 | Fixing reinforcement | 137 |
| 6.7 | Protection of newly constructed masonry | 137 |
| 6.7.1 | General | 137 |
| 6.7.2 | Curing of masonry | 138 |
| 6.7.3 | Protection against frost | 138 |
| 6.7.4 | Loading of masonry | 138 |
| 6.8 | Permissible deviations in masonry | 138 |
| 6.9 | Category of execution | 139 |
| 6.10 | Other construction matters | 140 |
| 6.10.1 | Movement joints | 140 |
| 6.10.2 | Construction height | 140 |
| 6.10.3 | Reinforced concrete filled cavity walls | 140 |
| 6.10.4 | Reinforced walls incorporating pockets | 140 |
| 6.11 | Prestressing steel and accessories | 141 |
| 6.11.1 | Storage of the tendons | 141 |
| 6.11.2 | Fabrication of tendons | 141 |
| 6.11.3 | Placing of tendons | 142 |
| 6.11.4 | Tensioning of tendons | 142 |

Annexes

| | | |
|----------|---------------------------------------------------------------------------------------------------------------------|-----|
| A | Derivation of the value of the reduction factor for slenderness and eccentricity within the middle height of a wall | 143 |
| B | Graphs showing values of ρ_3 and ρ_4 , using equations 4.13, 4.14, 4.15 and 4.16 | 145 |
| C | A simplified method for calculating the out-of-plane eccentricity of loading on walls | 146 |
| D | Graph showing the enhancement factor as given in 4.4.8 : Concentrated loads under bearings | 149 |
| E | An empirical method for designing basement walls subjected to lateral earth pressure | 150 |
| F | Verification of reinforced masonry cantilever walls subject to bending | 152 |
| G | Points to be considered in categorising execution | 153 |

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SIST ENV 1996-1-1:2004

<https://standards.iteh.ai/catalog/standards/sist/bd86dcb5-4785-46f7-8174-ccfdc98e918a/sist-env-1996-1-1-2004>

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 it is necessary to indicate the quality of the construction products, and the standard of workmanship needed on and off site to comply with the assumptions of the design rules.
- (3) Until the necessary set of harmonized technical specifications for products and for the methods for testing their performance are available, some of the Structural Eurocodes cover some of these aspects in informative annexes.

Background of 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

(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 of structures for earthquake resistance.

EN 1999 Eurocode 9 : Design of aluminium alloy structures.

(8) Separate sub-committees have been formed by CEN/TC250 for the various Eurocodes listed above.

(9) This ENV 1996-1-1 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/TC 250/SC6 at the following address:-

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or to your national standards organization.

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 1996-1-1 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, may 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 Organisation.

(15) It is intended that this prestandard is used in conjunction with the NAD valid in the country where the building and civil engineering work is located.

Matters specific to this prestandard

(16) The general scope of Eurocode 6 is defined in clause 1.1.1 of this ENV 1996-1-1 and the scope of this part of Eurocode 6 is defined in clause 1.1.2. Additional parts of Eurocode 6 which are planned are indicated in clause 1.1.3 of this ENV 1996-1-1.

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1 General

1.1 Scope

1.1.1 Scope of Eurocode 6

(1)P Eurocode 6 applies to the design of buildings and civil engineering works in unreinforced, reinforced, prestressed and confined masonry.

(2)P Eurocode 6 is only concerned with the requirements for resistance, serviceability and durability of structures. Other requirements, for example, concerning thermal or sound insulation, are not considered.

(3)P Execution¹⁾ is covered to the extent that is necessary to indicate the quality of the construction materials and products that should be used and the standard of workmanship on site needed to comply with the assumptions made in the design rules. Generally, the rules related to execution and workmanship should be considered as minimum requirements which may have to be further developed for particular types of buildings or civil engineering works¹⁾ and methods of construction¹⁾.

(4)P Eurocode 6 does not cover the special requirements of seismic design. Provisions related to such requirements are given in Eurocode 8 "Design of structures in seismic regions"²⁾ which complements, and is consistent with, Eurocode 6.

(5)P Numerical values of the actions on buildings and civil engineering works to be taken into account in the design are not given in Eurocode 6. They are provided in Eurocode 1 "Basis of design and actions on structures"³⁾.

1.1.2 Scope of Part 1-1 of Eurocode 6

(1)P Part 1-1 of Eurocode 6 gives a general basis for the design of buildings and civil engineering works in unreinforced, reinforced, prestressed and confined masonry made with the following masonry units laid in mortar made with natural sand, or crushed sand, or lightweight aggregate:

- fired clay units, including lightweight clay units;
- calcium silicate units;
- concrete units, made with dense or lightweight aggregates;

¹⁾ For the meaning of these terms, see 1.4.1

²⁾ At present at the draft stage

³⁾ At present at the draft stage.

- autoclaved aerated concrete units;
- manufactured stone units;
- dimensioned natural stone units.

(2)P Part 1-1 deals with reinforced masonry where the reinforcement is added to provide ductility, strength or serviceability. The principles of the design of prestressed masonry and confined masonry are given, but application rules are not provided.

(3) In so far as Part 1-1 gives the basis for the design of reinforced and prestressed masonry, the designer should consider the extent of any concrete infill and the contribution of the masonry to the load resistance and, where the concrete infill makes a much greater contribution to the load resistance than the masonry, Eurocode 2 should be used and the strength of the masonry should be ignored.

(4) For those types of structures not covered entirely, new structural uses for established materials, new materials, or where actions and other influences outside normal experience have to be resisted, the same principles and application rules may be applicable, but may need to be supplemented.

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(5) In addition, Part 1-1 gives detailed rules which are mainly applicable to ordinary buildings. The applicability of these rules may be limited, for practical reasons or due to simplifications; their use and any limits of applicability are explained in the text where necessary.

(6)P The following subjects are dealt with in Part 1-1:

- Section 1 : General.
- Section 2 : Basis of design.
- Section 3 : Materials.
- Section 4 : Design of masonry.
- Section 5 : Structural detailing.
- Section 6 : Construction.

(7)P Sections 1 and 2 are common to all Eurocodes, with the exception of some additional clauses which are required for masonry.

Note: The material independent clauses in Section 2 will be replaced by references to ENV 1991-1, when it is published.

(8)P Part 1-1 does not cover :

- resistance to fire (which is dealt with in ENV 1996-1-2);
- particular aspects of special types of building (for example, dynamic effects on tall buildings);
- particular aspects of special types of civil engineering works (such as masonry bridges, dams, chimneys or liquid-retaining structures);
- particular aspects of special types of structures (such as arches or domes).

1.1.3 Further parts of Eurocode 6

(1)P Part 1-1 of Eurocode 6 will be supplemented by further parts which will complement or adapt it for particular aspects of special types of building or civil engineering works, special methods of construction and certain other aspects of design which are of general practical importance.

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(2)P Further parts of Eurocode 6 which, at present, are being prepared or are planned, include the following:

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- Part 1-2 : Structural fire design.
- Part 1-3 : Detailed rules on lateral loading.
- Part 1-X : Complex shape sections in masonry structures.
- Part 2 : Design, selection of materials and execution of masonry.
- Part 3 : Simplified and simple rules for masonry structures.
- Part 4 : Constructions with lesser requirements for reliability and durability.

1.2 Distinction between principles and application rules

(1)P Depending on the character of the individual clauses, distinction is made in this Part 1-1 of ENV 1996 between principles and application rules.

(2)P The principles comprise:

- general statements and definitions for which there is no alternative;
- requirements and analytical models for which no alternative is permitted unless specifically

stated.

(3)P The principles are defined by the letter P, following the paragraph number, for example, (1)P.

(4)P The application rules are generally recognised rules which follow the principles and satisfy their requirements.

(5)P It is permissible to use alternative design rules differing from the application rules given in this Eurocode, provided that it is shown that the alternative rules accord with the relevant principles and have not less than the same reliability.

(6)P The application rules are all clauses not indicated as being principles.

1.3 Assumptions

(1)P The following assumptions apply:

- Structures are designed by appropriately qualified and experienced personnel.
- Adequate supervision and quality control is provided in factories, in plants, and on site.
- Construction is carried out by personnel having the appropriate skill and experience.
- The construction materials and products are used as specified in this Eurocode or in the relevant material or product specifications.
- The structure will be adequately maintained.
- The structure will be used in accordance with the design brief.

(2)P The design procedures are valid only when the requirements for execution and workmanship given in Section 6 of this ENV 1996-1-1 are also complied with.

(3)P Numerical values identified by are given as indications. Other values may be specified by Member States.

1.4 Definitions

1.4.1 Terms common to all Eurocodes

(1)P Unless otherwise stated in the following, the terminology used in International Standard ISO 8930 applies.

(2)P The following terms are used in common for all Eurocodes with the following meanings: