

Geregistreeerde Belgische norm

NBN EN 1996-2

1e uitg., maart 2006

Normklasse: B 24

Eurocode 6 - Ontwerp en berekening van constructies van metselwerk - Deel 2 : Ontwerp, materiaalkeuze en uitvoering van constructies van metselwerk (+ AC:2009)

Eurocode 6 - Calcul des ouvrages en maçonnerie - Partie 2 : Conception, choix des matériaux et mise en oeuvre des maçonneries (+ AC:2009)

Eurocode 6 - Design of masonry structures - Part 2 : Design considerations, selection of materials and execution of masonry (+ AC:2009)

Toelating tot publicatie: 28 februari 2006

Vervangt NBN ENV 1996-2 (1999), NBN B 24-401 (1981).

Deze Europese norm EN 1996-2:2006 heeft de status van een Belgische norm.

Deze Europese norm bestaat in drie officiële versies (Duits, Engels, Frans).

Er is bij het NBN ook een Nederlandstalige versie beschikbaar, die dezelfde statut heeft als de officiële versies.

Deze norm mag in België slechts samen met zijn nationale bijlage (ANB) worden toegepast. Deze laatste legt hoofdzakelijk de waarden van de parameters vast die op nationaal vlak worden bepaald.

*norme belge
enregistrée*

NBN EN 1996-2

1e éd., mars 2006

Indice de classement: B 24

Eurocode 6 - Calcul des ouvrages en maçonnerie - Partie 2 : Conception, choix des matériaux et mise en oeuvre des maçonneries (+ AC:2009)

Eurocode 6 - Ontwerp en berekening van constructies van metselwerk - Deel 2 : Ontwerp, materiaalkeuze en uitvoering van constructies van metselwerk (+ AC:2009)

Eurocode 6 - Design of masonry structures - Part 2 : Design considerations, selection of materials and execution of masonry (+ AC:2009)

Autorisation de publication: 28 février 2006

Remplace NBN ENV 1996-2 (1999), NBN B 24-401 (1981).

La présente norme européenne EN 1996-2:2005 a le statut d'une norme belge.

La présente norme européenne existe en trois versions officielles (allemand, anglais, français).

Une version en néerlandais, ayant le même statut que les versions officielles, est également disponible au NBN.

Cette norme ne peut être utilisée en Belgique qu'en combinaison avec son annexe nationale (ANB) qui fixe principalement la valeur des paramètres à déterminer au niveau national.

Nationaal voorwoord van NBN EN 1996-2:2006

- De norm NBN EN 1996-2:2006 « Eurocode 6 - Ontwerp en berekening van constructies van metselwerk - Deel 2 : Ontwerp, materiaalkeuze en uitvoering van constructies van metselwerk (+ AC:2009) » omvat de nationale bijlage NBN EN 1996-2 ANB:2010 met een normatief karakter in België. Hij vervangt vanaf de datum van de publicatie in het Belgisch Staatsblad van de bekrachtiging van de norm NBN EN 1996-2 ANB:2010 de volgende normen:
 - NBN ENV 1996-2:1999 «Eurocode 6: Berekening van metselwerk - Deel 2: Ontwerp, keuze van bouwstoffen en uitvoering van metselwerk»
 - NBN B 24-401:1981 «Uitvoering van metselwerk»

Het corrigendum EN 1996-2/AC:2009, zoals door CEN gepubliceerd, is na deze norm toegevoegd.

- De Europese normen (EN) waarnaar de tekst van deze norm met hun Engelse titel verwijst, dragen in België de volgende Nederlandstalige titels:

Vermelde norm (CEN)	Belgische norm (NBN)	Nederlandstalige titel bij het NBN
EN 206-1	NBN EN 206-1	Beton – Deel 1: Specificatie, eigenschappen, vervaardiging en conformiteit
EN 771-1	NBN EN 771-1	Voorschriften voor metselstenen – Deel 1: Metselbaksteen
EN 771-2	NBN EN 771-2	Voorschriften voor metselstenen – Deel 2: Metselstenen van kalkzandsteen
EN 771-3	NBN EN 771-3	Voorschriften voor metselstenen – Deel 3: Betonmetselstenen (gewone en lichte granulaten)
EN 771-4	NBN EN 771-4	Voorschriften voor metselstenen – Deel 4: Geautoclaveerde cellenbetonmetselstenen
EN 771-5	NBN EN 771-5	Voorschriften voor metselstenen – Deel 5: Metselstenen van kunststeen
EN 771-6	NBN EN 771-6	Voorschriften voor metselstenen – Deel 6: Metselstenen van natuursteen
EN 845-1	NBN EN 845-1	Voorschriften voor metselwerktoebehoren - Deel 1: Spouwankers, muurankers, raveel-/gordingschoenen en ondersteuningsproducten
EN 845-2	NBN EN 845-2	Voorschriften voor metselwerktoebehoren – Deel 2: Lateien
EN 845-3	NBN EN 845-3	Voorschriften voor metselwerktoebehoren – Deel 3: Lintvoegwapening van staal
EN 998-2	NBN EN 998-2	Specificaties voor mortels voor metselwerk – Deel 2: Metselmortel
EN 1015-11	NBN EN 1015-11	Proeven voor metselmortel - Deel 11: Bepalen van de buigsterkte en druksterkte van verharde mortel
EN 1015-17	NBN EN 1015-17	Proeven voor metselmortel - Deel 17: Wateroplosbare chloridegehalte van verse mortel
EN 1052-1	NBN EN 1052-1	Beproevingmethoden voor metselwerk – Deel 1: Bepaling van de druksterkte
EN 1052-2	NBN EN 1052-2	Beproevingmethoden voor metselwerk – Deel 2: Bepalen van de buigsterkte
EN 1052-3	NBN EN 1052-3	Beproevingmethoden voor metselwerk – Deel 3: Aanvangsschuifsterkte
EN 1052-4	NBN EN 1052-4	Beproevingmethoden voor metselwerk – Deel 4: Schuifsterkte met inbegrip van de waterkerende laag
EN 1052-5	NBN EN 1052-5	Beproevingmethoden voor metselwerk – Deel 5: Bepaling van de hechtsterkte met de hefboomproef
EN 1990	NBN EN 1990	Eurocode – Grondslagen van het constructief ontwerp
EN 1996-1-1	NBN EN 1996-1-1	Eurocode 6 - Ontwerp en berekening van constructies van metselwerk - Deel 1-1: Gemeenschappelijke regels voor constructies van gewapend en ongewapend metselwerk
EN 13914-1	NBN EN 13914-1	Ontwerp, voorbereiding en uitvoering van stucadoorwerk - Deel 1: Buitenpleisterwerk

Avant-propos national à la NBN EN 1996-2:2006

1. La norme NBN EN 1996-2:2006 « Eurocode 6 - Calcul des ouvrages en maçonnerie - Partie 2 : Conception, choix des matériaux et mise en œuvre des maçonneries (+AC:2009) » comprend l'annexe nationale NBN EN 1996-2 - ANB:2010 qui a un caractère normatif en Belgique. Elle remplace à partir de la date de publication au Moniteur Belge de l'homologation de la norme NBN EN 1996-2 ANB:2010 les normes suivantes :
 - NBN ENV 1996-2:1999 «Eurocode 6: Calcul des ouvrages en maçonnerie - Partie 2: Calcul, choix des matériaux et mise en œuvre des maçonneries»
 - NBN B 24-401:1981 «Exécution des maçonneries»

Le corrigendum EN 1996-2/AC:2009 , tel que publié par le CEN, est joint à cette norme.

2. La version de langue française de l'EN 1996-2 a été rédigée en France par l'AFNOR. En conséquence, on y rencontre certaines expressions d'usage moins courant en Belgique.

Une liste de termes équivalents est donnée ci-après :

Termes de l'EN 1996-2	Termes équivalents en Belgique
Client	Le maître de l'ouvrage assisté de ses bureaux d'architectes, d'ingénierie et de consultance
Joint de rupture	Joint de mouvement

English Version

Eurocode 6 - Design of masonry structures - Part 2: Design considerations, selection of materials and execution of masonry

Eurocode 6 - Calcul des ouvrages en maçonnerie - Partie 2: Conception, choix des matériaux et mise en oeuvre des maçonneries

Eurocode 6 - Bemessung und Konstruktion von Mauerwerksbauten - Teil 2: Planung, Auswahl der Baustoffe und Ausführung von Mauerwerk

This European Standard was approved by CEN on 24 November 2005.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents	Page
Background of the Eurocode programme	4
Status and field of application of Eurocodes	5
National Standards implementing Eurocodes	6
Links between Eurocodes and harmonised technical specifications (ENs and ETAs) for products	7
Additional information specific to EN 1996-2	7
National annex for EN 1996-2	7
1 General	8
1.1 Scope of Part 2 of Eurocode 6	8
1.2 Normative references	9
1.3 Assumptions	9
1.4 Distinction between principles and application rules	9
1.5 Definitions	10
1.5.1 General	10
1.5.2 Terms and definitions relating to communication of design	10
1.5.3 Terms relating to climatic factors and exposure conditions	10
1.5.4 Term relating to masonry units	10
1.5.5 Other terms	11
1.6 Symbols	11
2 Design Considerations	11
2.1 Factors affecting the durability of masonry	11
2.1.1 General	11
2.1.2 Classification of environmental conditions	11
2.1.2.1 Micro conditions of exposure	11
2.1.2.2 Climatic factors (macro conditions of exposure)	12
2.1.3 Aggressive chemical environments	12
2.2 Selection of materials	13
2.2.1 General	13
2.2.2 Masonry units	13
2.2.3 Masonry mortar and concrete infill	14
2.2.3.1 General	14
2.2.3.2 Selection of factory made masonry mortar and concrete infill	14
2.2.3.3 Selection of site-made masonry mortar and concrete infill	14
2.2.4 Ancillary components and reinforcement	15
2.3 Masonry	15
2.3.1 Detailing	15
2.3.2 Joint finishes	15
2.3.3 Masonry movement	15
2.3.4 Movement joints	16

2.3.4.1	General	16
2.3.4.2	Spacing of movement joints.....	17
2.3.5	Permissible deviations.....	17
2.3.6	Resistance to moisture penetration through external walls	18
3	Execution.....	18
3.1	General	18
3.2	Acceptance, handling and storage of materials	18
3.2.1	General	18
3.2.2	Reinforcement and prestressing materials	18
3.3	Preparation of materials.....	19
3.3.1	Site-made mortars and concrete infill	19
3.3.1.1	General.....	19
3.3.1.2	Chloride content	19
3.3.1.3	Strength of mortar and concrete infill.....	19
3.3.1.4	Admixtures and additions	19
3.3.1.5	Gauging	19
3.3.1.6	Mixing method and mixing time	20
3.3.1.7	Workable life of mortars and concrete infill containing cement	20
3.3.1.8	Mixing in cold weather	20
3.3.2	Factory made mortars, pre-batched mortars, pre-mixed lime sand mortars and ready mixed concrete infill	20
3.4	Permissible deviations.....	21
3.5	Execution of masonry.....	23
3.5.1	General	23
3.5.2	Laying masonry units.....	23
3.5.3	Pointing and jointing for masonry other than thin layer masonry	24
3.5.3.1	Pointing	24
3.5.3.2	Jointing.....	24
3.5.4	Incorporation of damp proof course membranes	24
3.5.5	Movement joints	24
3.5.6	Incorporation of thermal insulation materials	24
3.5.7	Cleaning facing masonry	24
3.6	Curing and protective procedures during execution	24
3.6.1	General	24
3.6.2	Protection against rain.....	25
3.6.3	Protection against freeze/thaw cycling.....	25
3.6.4	Protection against effects of low humidity	25
3.6.5	Protection against mechanical damage	25
3.6.6	Construction height of masonry.....	25
A.1	Classification.....	26
A.2	Exposure to wetting.....	27
B.1	Selection of masonry units and mortar.....	29
C.1	Exposure classes	31
C.2	Selection of materials	31

Foreword

This document EN 1996-2 has been prepared by Technical Committee CEN/TC250 “Structural Eurocodes”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2006, and conflicting national standards shall be withdrawn at the latest by March 2010.

CEN/TC 250 is responsible for all Structural Eurocodes.

This document supersedes ENV 1996-2:1998

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Background of the Eurocode programme

In 1975, the Commission of the European Community decided on an action programme in the field of construction, based on Article 95 of the Treaty. The objective of the programme was the elimination of technical obstacles to trade and the harmonisation of technical specifications.

Within this action programme, the Commission took the initiative to establish a set of harmonised technical rules for the design of construction works which, in a first stage, would serve as an alternative to the national rules in force in the Member States and, ultimately, would replace them.

For fifteen years, the Commission, with the help of a Steering Committee with Representatives of Member States, conducted the development of the Eurocodes programme, which led to the first generation of European codes in the 1980s.

In 1989, the Commission and the Member States of the EU and EFTA decided, on the basis of an agreement¹⁾ between the Commission and CEN, to transfer the preparation and the publication of the Eurocodes to the CEN through a series of Mandates, in order to provide them with a future status of European Standard (EN). This links de facto the Eurocodes with the provisions of all the Council’s Directives and/or Commission’s Decisions dealing with European standards (eg. the Council Directive 89/106/EEC on construction products - CPD - and Council Directives 93/37/EEC,

¹⁾ Agreement between the Commission of the European Communities and the European Committee for Standardisation (CEN) concerning the work on EUROCODES for the design of building and civil engineering works (BC/CEN/03/89).

92/50/EEC and 89/440/EEC on public works and services and equivalent EFTA Directives initiated in pursuit of setting up the internal market).

The Structural Eurocode programme comprises the following standards generally consisting of a number of parts:

EN 1990, *Eurocode: Basis of structural 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.*

Eurocode standards recognise the responsibility of regulatory authorities in each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level where these continue to vary from State to State.

Status and field of application of Eurocodes

The Member States of the EU and EFTA recognise that Eurocodes serve as reference documents for the following purposes:

- as a means to prove compliance of building and civil engineering works with the essential requirements of Council Directive 89/106/EEC, particularly Essential Requirement N°1 — Mechanical resistance and stability — and Essential Requirement N°2 — Safety in case of fire;
- as a basis for specifying contracts for construction works and related engineering services;
- as a framework for drawing up harmonised technical specifications for construction products (ENs and ETAs).

The Eurocodes, as far as they concern the construction works themselves, have a direct relationship with the Interpretative Documents²⁾ referred to in Article 12 of the CPD, although they are of a

²⁾ According to Article 3.3 of the CPD, the essential requirements (ERs) shall be given concrete form in interpretative documents for the creation of the necessary links between the essential requirements and the mandates for harmonised ENs and ETAGs/ETAs.

different nature from harmonised product standards³⁾. Therefore, technical aspects arising from the Eurocodes work need to be adequately considered by CEN Technical Committees and/or EOTA Working Groups working on product standards with a view to achieving full compatibility of these technical specifications with the Eurocodes.

The Eurocode standards provide common structural design rules for everyday use for the design of whole structures and component products of both a traditional and an innovative nature. Unusual forms of construction or design conditions are not specifically covered and additional expert consideration will be required by the designer in such cases.

National Standards implementing Eurocodes

The National Standards implementing Eurocodes will comprise the full text of the Eurocode (including any annexes), as published by CEN, which may be preceded by a National title page and National foreword, and may be followed by a National Annex (informative).

The National Annex may only contain information on those parameters which are left open in the Eurocode for national choice, known as Nationally Determined Parameters, to be used for the design of buildings and civil engineering works to be constructed in the country concerned, ie.:

- values and/or classes where alternatives are given in the Eurocode,
- values to be used where a symbol only is given in the Eurocode,
- country specific data (geographical, climatic etc), eg. snow map,
- the procedure to be used where alternative procedures are given in the Eurocode

and it may also contain:

- decisions on the application of informative annexes,
- references to non-contradictory complementary information to assist the user to apply the Eurocode.

³⁾ According to Article 12 of the CPD the interpretative documents shall:

- a) give concrete form to the essential requirements by harmonising the terminology and the technical bases and indicating classes or levels for each requirement where necessary;
- b) indicate methods of correlating these classes or levels of requirement with the technical specifications, e. g. methods of calculation and of proof, technical rules for project design, etc.;
- c) serve as a reference for the establishment of harmonised standards and guidelines for European technical approvals. The Eurocodes, *de facto*, play a similar role in the field of ER 1 and a part of ER 2.