

# *Geregistreeerde Belgische norm*

**NBN EN 1997-2**

2e uitg., augustus 2007

**Normklasse: B 03**

## **Eurocode 7 - Geotechnisch ontwerp - Deel 2 : Grondonderzoek en beproeving (+ AC:2010)**

Eurocode 7 - Calcul géotechnique - Partie 2 : Reconnaissance des terrains et essais (+ AC:2010)

Eurocode 7 - Geotechnical design - Part 2 : Ground investigation and testing (+ AC:2010)

### **Toelating tot publicatie: 19 juni 2007**

Vervangt NBN ENV 1997-2 (1999), NBN ENV 1997-3 (1999).

Deze Europese norm EN 1997-2:2007 heeft de status van een Belgische norm.

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

Er is bij het NBN ook een Nederlandstalige versie beschikbaar, die dezelfde status 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 1997-2**

2e éd., août 2007

**Indice de classement: B 03**

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**Eurocode 7 - Calcul géotechnique - Partie 2 : Reconnaissance des terrains et essais (+ AC:2010)**

Eurocode 7 - Geotechnisch ontwerp - Deel 2 : Grondonderzoek en beproeving (+ AC:2010)

Eurocode 7 - Geotechnical design - Part 2 : Ground investigation and testing (+ AC:2010)

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**Autorisation de publication: 19 juin 2007**

Remplace NBN ENV 1997-2 (1999), NBN ENV 1997-3 (1999).

La présente norme européenne EN 1997-2:2007 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.

## Avant-propos national à la NBN EN 1997-2:2007

1. La norme NBN EN 1997-2:2007 « Eurocode 7 - Calcul géotechnique - Partie 2 : Reconnaissance des terrains et essais » (+AC:2010) comprend l'annexe nationale NBN EN 1997-2 ANB:2013 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 1997-2 ANB:2013 les normes suivantes :
  - NBN ENV 1997-2:1999 « Eurocode 7: Calcul géotechnique - Partie 2: Calcul sur la base d'essais de laboratoire » ;
  - NBN ENV 1997-3:1999 « Eurocode 7: Calcul géotechnique - Partie 3: Calcul sur la base d'essais en place ».

Le corrigendum EN 1997-2:2007/AC:2010, tel que publié par le CEN, est joint à cette norme.

2. La version de langue française de l'EN 1997-2 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 :

Terme de l'EN 1997-2	Terme équivalent en Belgique
client	le maître de l'ouvrage assisté de ses bureaux d'architectes, d'ingénierie et de consultance

## Nationaal voorwoord van NBN EN 1997-2:2007

1. De norm NBN EN 1997-2:2007 « Eurocode 7 - Geotechnisch ontwerp - Deel 2 : Grondonderzoek en beproeving (+AC:2010) » omvat de nationale bijlage NBN EN 1997-2 ANB:2013 met een normatief karakter in België. Hij vervangt vanaf de datum van de publicatie in het Belgische Staatsblad van de bekrachtiging van de norm NBN EN 1997-2 ANB:2013 de volgende normen:

- NBN ENV 1997-2:1999 “Eurocode 7: Grondmechanisch ontwerp - Deel 2: Ontwerp steunend op laboratoriumproeven”;
- NBN ENV 1997-3:1999 “Eurocode 7: Grondmechanisch ontwerp - Deel 3: Ontwerp steunend op veldonderzoek”.

Het corrigendum EN 1997-2:2007/AC:2010, zoals door CEN gepubliceerd, is na deze norm toegevoegd.

2. De Nederlandstalige versie van EN 1997-2 werd opgesteld op basis van een voorkeurterminologie die in samenwerking tussen NBN en NEN opgesteld was. Daarbij werd voor elk begrip een unieke woordkeuze gemaakt. Dit heeft voor gevolg dat in de norm uitdrukkingen voorkomen die in één van de twee landen minder gebruikelijk zijn. Hierna volgt een lijst met synoniemen:

Oorspronkelijke term (Engels)	Verplichte term (Nederlands)	Synoniem (B); (N)
accidental situation	buitengewone situatie	bijzondere situatie (N); buitengewone toestand (B)

- 2bis. De Europese normen (EN) waarnaar de tekst van deze norm met hun Engelse titel verwijst, dragen in België de volgende Nederlandstalige titels :

Vermelde norm met Engelse titel	Nederlandstalige titel (NBN)
EN 1990:2002 Eurocode — Basis of structural design	NBN EN 1990:2002 Eurocode - Grondslag voor constructief ontwerp
EN 1997-1:2004 Eurocode 7 — Geotechnical design — Part 1: General rules	NBN EN 1997-1:2005 Eurocode 7: Geotechnisch ontwerp - Deel 1: Algemene regels
EN ISO 14688-1 Geotechnical investigation and testing — Identification and classification of soil — Part 1: Identification and description	NBN EN ISO 14688-1 Grondmechanica - Onderzoek en proeven - Vereenzelviging en indeling van gronden - Deel 1 : Vereenzelviging en beschrijving
EN ISO 14688-2 Geotechnical investigation and testing — Identification and classification of soil — Part 2: Classification principles	NBN EN ISO 14688-2 Geotechnisch onderzoek en beproeving - Identificatie en classificatie van grond - Deel 2: Grondslagen voor een classificatie
EN ISO 14689-1 Geotechnical investigation and testing — Identification and classification of rock - Part 1: Identification and description	NBN EN ISO 14689-1 Geotechnisch onderzoek en beproeving - Identificatie en classificatie van rots - Deel 1: Identificatie en beschrijving
EN ISO 22475-1 Geotechnical investigation and testing — Sampling by drilling and excavation and groundwater measurements — Part 1: Technical principles of execution	NBN EN ISO 22475-1 Geotechnisch onderzoek en beproeving - Monsternemingsmethoden en grondwatermetingen - Deel 1: Technische uitvoeringsprincipes
EN ISO 22476-1 Geotechnical investigation and testing — Field testing — Part 1: Electrical CPT and CPTU	NBN EN ISO 22476-1 Geotechnisch onderzoek en beproeving - Veldproeven - Deel 1: Penetratieproef met elektrische conus en piëzoconus

**NBN EN 1997-2 ANB (2013)**

EN ISO 22476-2 Geotechnical investigation and testing — Field testing — Part 2: Dynamic probing	NBN EN ISO 22476-2 Geotechnisch onderzoek en beproeving - Veldproeven - Deel 2: Slagsondering
EN ISO 22476-3 Geotechnical investigation and testing — Field testing — Part 3: Standard penetration test	NBN EN ISO 22476-3 Geotechnisch onderzoek en beproeving - Veldproeven - Deel 3: Standaard-penetratieproef
EN ISO 22476-4 Geotechnical investigation and testing — Field testing — Part 4: Ménard pressuremeter test	EN ISO 22476-4 Geotechnisch onderzoek en beproeving - Veldproeven - Deel 4: Ménard pressiometerproef
EN ISO 22476-5 Geotechnical investigation and testing — Field testing — Part 5: Flexible dilatometer test	EN ISO 22476-5 Geotechnisch onderzoek en beproeving - Veldproeven - Deel 5: Proef met een flexibele dilatometer
EN ISO 22476-6* Geotechnical investigation and testing — Field testing — Part 6: Self boring pressuremeter test	
EN ISO 22476-8* Geotechnical investigation and testing — Field testing — Part 8: Full displacement pressuremeter test	
EN ISO 22476-9* Geotechnical investigation and testing — Field testing — Part 9: Field vane test	
EN ISO 22476-12 Geotechnical investigation and testing — Field testing — Part 12: Mechanical CPT	NBN EN ISO 22476-12 Geotechnisch onderzoek en beproeving - Veldproeven - Deel 12: Mechanische sondering (CPTM)
EN ISO 22476-13* Geotechnical investigation and testing — Field testing — Part 13: Plate loading test	

\*nog niet gepubliceerd.



English Version

## Eurocode 7 - Geotechnical design - Part 2: Ground investigation and testing

Eurocode 7 - Calcul géotechnique - Partie 2:  
Reconnaissance des terrains et essais

Eurocode 7 - Entwurf, Berechnung und Bemessung in der  
Geotechnik - Teil 2: Erkundung und Untersuchung des  
Baugrunds

This European Standard was approved by CEN on 12 June 2006.

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 CEN Management Centre 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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**

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**EN 1997-2: 2007 (E)****Foreword**

This document (EN 1997-2: 2007) has been prepared by Technical Committee CEN/TC 250 "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 September 2007, and conflicting national standards shall be withdrawn at the latest by March 2010.

This document supersedes ENV 1997-2:1999 and ENV 1997-3:1999.

CEN/TC 250 is responsible for all Structural Eurocodes.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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 harmonization 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 agreement<sup>1</sup> between the Commission and CEN, to transfer the preparation and the publication of the Eurocodes to 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 (e.g. the Council Directive 89/106/EEC on construction products - CPD - and Council Directives 93/37/EEC, 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

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

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 Documents<sup>2</sup> referred to in Article 12 of the CPD, although they are of a different nature from harmonised product standards<sup>3</sup>. 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.

<sup>2</sup> According to Art. 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.

<sup>3</sup> According to Art. 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 the ER 1 and a part of ER 2.

**EN 1997-2: 2007 (E)****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.

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, i.e.:

- 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), *e.g.* snow map;
- the procedure to be used where alternative procedures are given in the Eurocode.

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.

**Links between Eurocodes and harmonised technical specifications (ENs and ETAs) for products**

There is a need for consistency between the harmonised technical specifications for construction products and the technical rules for works<sup>4</sup>. Furthermore, all the information accompanying the CE Marking of the construction products, which refer to Eurocodes, should clearly mention which Nationally Determined Parameters have been taken into account.

**Additional information specific to Eurocode 7**

EN 1997-2 gives guidance for the planning and interpretation of geotechnical laboratory and field tests that are used for the support of geotechnical design of buildings and civil engineering works.

EN 1997-2 is intended for clients, designers, geotechnical laboratories, field testing laboratories and public authorities.

EN 1997-2 is intended to be used with EN 1997-1.

When using EN 1997-2, particular regard should be paid to the underlying assumptions and conditions given in 1.3.

The six sections of EN 1997-2 are complemented by 24 informative annexes.

**National annex for EN 1997-2**

The national standard implementing EN 1997-2 should have a national annex containing all information concerning the application of EN 1997-2 in the relevant country.

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<sup>4</sup> See Art.3.3 and Art.12 of the CPD, as well as 4.2, 4.3.1, 4.3.2 and 5.2 of ID 1.

## Section 1 General

### 1.1 Scope

#### 1.1.1 Scope of Eurocode 7

- (1) EN 1997 is intended to be used in conjunction with EN 1990:2002, which establishes the principles and requirements for safety and serviceability, describes the basis of design and verification and gives guidelines for related aspects of structural reliability.
- (2) EN 1997 is intended to be applied to the geotechnical aspects of the design of buildings and civil engineering works. It is subdivided into various separate parts (see 1.1.2).
- (3) EN 1997 is concerned with the requirements for strength, stability, serviceability and durability of structures. Other requirements, e.g. concerning thermal or sound insulation, are not considered.
- (4) Numerical values of actions on buildings and civil engineering works to be taken into account in design are provided in EN 1991 for the various types of construction. Actions imposed by the ground, such as earth pressures, shall be calculated according to the rules of EN 1997.
- (5) Separate European Standards are intended to be used to treat matters of execution and workmanship. They are denoted in the relevant sections.
- (6) In EN 1997 execution is covered to the extent that is necessary to conform to the assumptions of the design rules.
- (7) EN 1997 does not cover the special requirements of seismic design. EN 1998 provides additional rules for geotechnical seismic design, which complete or adapt the rules of this standard.

#### 1.1.2 Scope of EN 1997-2

- (1) EN 1997-2 is intended to be used in conjunction with EN 1997-1 and provides rules supplementary to EN 1997-1 related to:
  - planning and reporting of ground investigations;
  - general requirements for a number of commonly used laboratory and field tests;
  - interpretation and evaluation of test results;
  - derivation of values of geotechnical parameters and coefficients.

In addition, examples of the application of field test results to design are given.

NOTE Establishment of characteristic values is covered in EN 1997-1.

- (2) This document gives no specific provisions for environmental ground investigations.
- (3) Only commonly used geotechnical laboratory and field tests are covered in this standard. These were selected on the basis of their importance in geotechnical practice, availability in