

# *Geregistreeerde Belgische norm*

**NBN EN 1991-1-6**

1e uitg., oktober 2005

**Normklasse: B 03**

## **Eurocode 1: Belastingen op constructies - Deel 1-6: Algemene belastingen - Belastingen tijdens uitvoering (+ AC:2013)**

Eurocode 1 - Actions sur les structures - Partie 1-6: Actions générales - Actions en cours d'exécution (+ AC:2013)

Eurocode 1 - Actions on structures Part 1-6: General actions - Actions during execution (+ AC:2013)

### **Toelating tot publicatie: 28 juli 2005**

Vervangt NBN ENV 1991-2-6 (1997).

Deze Europese norm EN 1991-1-6:2005 heeft de status van een Belgische norm.

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



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Bank 000-3255621-10 IBAN BE41 0003 2556 2110 BIC BPOTBEB1 BTW BE0880857592

*norme belge  
enregistrée*

**NBN EN 1991-1-6**

1e éd., octobre 2005

**Indice de classement: B 03**

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**Eurocode 1 - Actions sur les structures - Partie 1-6: Actions générales -  
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Eurocode 1 - Actions on structures Part 1-6: General actions - Actions during execution (+ AC:2013)

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**Autorisation de publication: 28 juillet 2005**

Remplace NBN ENV 1991-2-6 (1997).

La présente norme européenne EN 1991-1-6:2005 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.



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## Nationaal voorwoord van NBN EN 1991-1-6:2005

1. De norm NBN EN 1991-1-6:2005 « Eurocode 1: Belastingen op constructies - Deel 1-6: Algemene belastingen - Belastingen tijdens uitvoering (+AC:2008)» omvat de nationale bijlage NBN EN 1991-1-6 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 1991-1-6 ANB:2010 de volgende norm:
  - NBN ENV 1991-2-6:1997 « Eurocode 1 - Grondslag voor ontwerp en belasting op draagsystemen - Deel 2-6 : Belasting op draagsystemen - Belasting gedurende de uitvoering »

Het corrigendum EN 1991-1-6:2005/AC:2008, zoals door CEN gepubliceerd, is na deze norm toegevoegd.

In de Nederlandstalige versie is dit corrigendum EN 1991-1-6:2005/AC:2008 verwerkt.

2. De Nederlandstalige versie van EN 1991-1-6 is tot stand gekomen op basis van een voorkeurterminologie die in samenwerking tussen het NBN en het NEN is opgesteld. Daarbij werd voor elk begrip een unieke woordkeuze gemaakt. Dit heeft als 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<br>(Engels) | Verplichte term<br>(Nederlands) | Synoniem<br>(B); (N)                                  |
|----------------------------------|---------------------------------|-------------------------------------------------------|
| accidental situation             | buitengewone situatie           | bijzondere situatie (N);<br>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)                                                  |
|------------------------------------------------------------------|-------------------------------------------------------------------------------|
| (in de Bibliografie)                                             |                                                                               |
| EN 1337 Structural bearings                                      | NBN EN 1337 Opleggingen voor het bouwwezen (11 delen)                         |
| EN 12811 Temporary works equipment                               | NBN EN 12811 Tijdelijke bouwplaatsuitrusting                                  |
| EN 12812 Falsework - Performance requirements and general design | NBN EN 12812 Ondersteuningsconstructies - Prestatie-eisen en algemeen ontwerp |
| ISO 12494 Atmospheric Icing of Structures                        | (verkrijgbaar bij het NBN)                                                    |

## NBN EN 1991-1-6-ANB:2010 (N)

3. Aanvullende opmerking van het NBN: de hieronder opgenomen verbetering behoort te worden aangebracht in de Nederlandstalige versie van de NBN EN 1991-1-6:2005 (die op basis van de Engelse tekst werd gemaakt). Deze verbetering is het uittreksel van het Corrigendum N392M goedgekeurd door CEN SC1.

### 1.1 Toepassingsgebied

(1) OPMERKING 2 *moet door de volgende tekst worden vervangen:*

Regels betreffende de veiligheid van mensen in en rond de werf onder invloeden die buiten het toepassingsgebied van deze Europese norm vallen kunnen voor het afzonderlijk project worden bepaald.

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 1991-1-6**

June 2005

ICS 91.010.30

Supersedes ENV 1991-2-6:1997

English version

## Eurocode 1 - Actions on structures Part 1-6: General actions - Actions during execution

Eurocode 1 - Actions sur les structures - Partie 1-6: Actions  
générales - Actions en cours d'exécution

Eurocode 1 - Einwirkungen auf Tragwerke - Teil 1-6 :  
Allgemeine Einwirkungen - Einwirkungen während der  
Ausführung

This European Standard was approved by CEN on 13 January 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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

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EN 1991-1-6:2005 (E)

## Foreword

This European document (EN 1991-1-6), 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 national standard, either by publication of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by March 2010.

CEN/TC250 is responsible for all Structural Eurocodes.

This document will supersede ENV 1991-2-6:1996.

Annexes A1 and A2 are normative and Annex B is informative. This standard includes a Bibliography.

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, 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 harmonisation of technical specifications.

Within this action programme, the Commission took the initiative to establish a set of harmonized 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                             |
| 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                               |

<sup>1</sup> 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).



|         |             |                                                |
|---------|-------------|------------------------------------------------|
| EN 1998 | Eurocode 8: | Design of structures for earthquake resistance |
| EN 1999 | Eurocode 9: | Design of aluminium structures                 |

Eurocode standards recognize the responsibility of regulatory authorities in each Member State and have safeguarded their right to determine values related to regulatory safety matters at the 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 recognize 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 harmonized 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 harmonized 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 a 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.

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, etc), 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.

<sup>2</sup> 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 hENs and ETAGs/ETAs.

<sup>3</sup> According to Article 12 of the CPD the interpretative documents shall :

- a) give concrete form to the essential requirements by harmonizing 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 harmonized 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 1991-1-6:2005 (E)

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

There is a need for consistency between the harmonized 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 shall clearly mention which Nationally Determined Parameters have been taken into account.

### **Additional information specific to EN 1991-1-6**

EN 1991-1-6 describes Principles and Application rules for the determination of actions to be considered during execution of buildings and civil engineering works, including the following aspects :

- actions on structural and non-structural members during handling;
- geotechnical actions ;
- actions due to prestressing effects ;
- pre-deformations ;
- temperature, shrinkage, hydration effects ;
- wind actions ;
- snow loads ;
- actions caused by water ;
- actions due to atmospheric icing ;
- construction loads ;
- accidental actions
- seismic actions;

EN 1991-1-6 is intended for use by:

- clients (e.g. for the formulation of their specific requirements),
- designers and constructors,
- relevant authorities.

EN 1991-1-6 is intended to be used with EN 1990, the other parts of EN 1991 and EN 1992 to EN 1999 for the design of structures.

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