

# *Geregistreeerde Belgische norm*

**NBN EN 1991-1-4**

1e uitg., oktober 2005

**Normklasse: B 03**

## **Eurocode 1: Belastingen op constructies - Deel 1-4: Algemene belastingen - Windbelasting (+ AC:2010)**

Eurocode 1: Actions sur les structures - Partie 1-4: Actions générales - Actions du vent (+ AC:2010)

Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions (+ AC:2010)

### **Toelating tot publicatie: 10 juni 2005**

Vervangt NBN ENV 1991-2-4 (2002), NBN B 03-002-1 (1988), NBN B 03-002-2 (1988).

Deze Europese norm NBN EN 1991-1-4:2005 heeft de status van een Belgische norm.

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

De Nederlandstalige versie is uitgegeven onder de verantwoordelijkheid van het NBN. Deze NBN EN 1991-1-4 is identiek aan de NBN EN 1991-1-4, 1e uitg., oktober 2005 en heeft dezelfde status als de officiële versies.

Hoewel de grootste zorg is besteed aan deze Nederlandstalige uitgave, kunnen fouten en onvolledigheden niet geheel worden uitgesloten. Het NBN kan dan ook niet aansprakelijk worden gesteld voor rechtstreekse en/of onrechtstreekse schade, ontstaan door of verband houdend met de toepassing van deze uitgave.

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

# *norme belge enregistrée*

## **NBN EN 1991-1-4**

1e éd., octobre 2005

**Indice de classement: B 03**

### **Eurocode 1: Actions sur les structures - Partie 1-4: Actions générales - Actions du vent (+ AC:2010)**

Eurocode 1: Belastingen op constructies - Deel 1-4: Algemene belastingen - Windbelasting (+ AC:2010)

Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions (+ AC:2010)

#### **Autorisation de publication: 10 juin 2005**

Remplace NBN ENV 1991-2-4 (2002), NBN B 03-002-1 (1988), NBN B 03-002-2 (1988).

La présente norme européenne EN 1991-1-4:2005 a le statut d'une norme belge.

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

La version en néerlandais est publiée sous la responsabilité du NBN. Cette norme NBN EN 1991-1-4 est identique à la NBN EN 1991-1-4, 1e éd., octobre 2005 et a le même statut que les versions officielles.

Bien que le plus grand soin ait été apporté à la réalisation de cette édition néerlandaise, des erreurs ou omissions ne peuvent être totalement exclues. Par conséquent, le NBN décline toute responsabilité pour les dommages directs et/ou indirects dus ou liés à l'application de la présente norme.

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 EN 1991-1-4:2005

1. De norm NBN EN 1991-1-4:2005 « Eurocode 1: Belastingen op constructies - Deel 1-4: Algemene belastingen - Windbelasting » (+AC:2010) omvat de nationale bijlage NBN EN 1991-1-4 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 1991-1-4 ANB:2010 de volgende normen:
  - NBN B 03-002-1:1988 «Windbelasting op bouwwerken – Algemeen, Winddruk op een wand en gezamenlijke windeffecten op bouwwerken (met 2 errata inbegrepen)»;
  - NBN B 03-002-2:1988 « Windbelasting op bouwwerken – Dynamische windeffecten op buigzame bouwwerken (met 2 errata)»;
  - NBN ENV 1991-2-4:2002 « Eurocode 1 – Grondslag voor ontwerp en belasting op draagsystemen - Deel 2-4: Belasting op draagsystemen – Windbelasting samen met Belgische toepassingsrichtlijn (gehomologeerde versie + NAD)»
  
2. 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 Eurocode: Basis of structural design	NBN EN 1990 Grondslagen van het constructief ontwerp
EN 1991-1-3 Eurocode 1: Actions on structures: Part 1-3: Snow loads	NBN EN 1991-1-3 Eurocode 1 : Belastingen op constructies - Deel 1-3: Algemene belastingen - Sneeuwbelasting (+ AC:2009)
EN 1991-1-6 Eurocode 1: Actions on structures: Part 1-6: Actions during execution	NBN EN 1991-1-6 Eurocode 1: Belastingen op constructies - Deel 1-6: Algemene belastingen - Belastingen tijdens uitvoering (+ AC:2008)
EN 1991-2 Eurocode 1: Actions on structures: Part 2: Traffic loads on bridges	NBN EN 1991-2 Eurocode 1: Belastingen op constructies - Deel 2: Verkeersbelasting op bruggen (+ AC:2010)
EN 1993-3-1 Eurocode 3: Design of steel structures : Part 3.1: Masts and towers	NBN EN 1993-3-1 Eurocode 3 - Ontwerp en berekening van staalconstructies - Deel 3-1: Torens, masten en schoorstenen - Torens en masten



English version

## Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Eurocode 1: - Actions sur les structures - Partie 1-4:  
Actions générales - Actions du vent

Eurocode 1: Einwirkungen auf Tragwerke - Teil 1-4:  
Allgemeine Einwirkungen - Windlasten

This European Standard was approved by CEN on 4 June 2004.

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.



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COMITÉ EUROPÉEN DE NORMALISATION  
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## Foreword

This document EN 1991-1-4:2005 has been prepared by Technical Committee CEN/TC250 "Structural Eurocode", 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 October 2005, and conflicting national standards shall be withdrawn at the latest by March 2010.

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 United Kingdom.

This European Standard supersedes ENV 1991-2-4: 1995.

CEN/TC 250 is responsible for all Structural Eurocodes.

## 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 agreement<sup>1</sup> 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 (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

<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 1991-1-4:2005 (E)

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.

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<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.

## 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. wind map,
- the procedure to be used where alternative procedures are given in the Eurocode.

It may also contain

- decisions on the use of informative annexes, and
- 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 for EN 1991-1-4

EN 1991-1-4 gives design guidance and actions for the structural design of buildings and civil engineering works for wind.

EN 1991-1-4 is intended for the use by clients, designers, contractors and relevant authorities.

EN 1991-1-4 is intended to be used with EN 1990, the other Parts of EN 1991 and EN 1992-1999 for the design of structures.

### National annex for EN 1991-1-4

This standard gives alternative procedures, values and recommendations for classes with notes indicating where National choice may be made. Therefore the National Standard implementing EN 1991-1-4 should have a National Annex containing Nationally Determined Parameters to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

National choice is allowed for EN 1991-1-4 through clauses:

- 1.1 (11) Note 1
- 1.5 (2)

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