

Geregistreeerde Belgische norm

NBN EN 1993-2

2e uitg., juni 2007

Normklasse: B 52

Eurocode 3 - Ontwerp en berekening van staalconstructies - Deel 2: Bruggen (+ AC:2009)

Eurocode 3 - Calcul des structures en acier - Partie 2: Ponts métalliques (+ AC:2009)

Eurocode 3 - Design of steel structures - Part 2: Steel Bridges (+ AC:2009)

Toelating tot publicatie: 19 december 2006

Vervangt NBN ENV 1993-2 (1998).

Deze Europese norm EN 1993-2:2006 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 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 1993-2

2e éd., juin 2007

Indice de classement: B 52

**Eurocode 3 - Calcul des structures en acier - Partie 2: Ponts métalliques
(+ AC:2009)**

Eurocode 3 - Ontwerp en berekening van staalconstructies - Deel 2: Bruggen (+ AC:2009)

Eurocode 3 - Design of steel structures - Part 2: Steel Bridges (+ AC:2009)

Autorisation de publication: 19 décembre 2006

Remplace NBN ENV 1993-2 (1998).

La présente norme européenne EN 1993-2:2006 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 1993-2:2007

1. De norm NBN EN 1993-2:2007 «Eurocode 3 – Ontwerp en berekening van staalconstructies – Deel 2: Bruggen» omvat de nationale bijlage NBN EN 1993-2 ANB:2011 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 1993-2 ANB:2011 de volgende norm:

NBN ENV 1993-2:1998 Eurocode 3 – Ontwerp van stalen draagsystemen - Deel 2:
Stalen bruggen

Het corrigendum EN 1993-2:2006/AC:2009, zoals door CEN gepubliceerd, is na deze norm toegevoegd.

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	Nederlandstalige titel (NBN)
EN 1090 Execution of steel structures and aluminium structures	NBN EN 1090 Uitvoering van staalconstructies en aluminiumconstructies
EN 1337 Structural bearings	NBN EN 1337 Opleggingen voor het bouwwezen
EN 10029:1991 Specification for tolerances on dimensions, shape and mass for hot rolled steel plates 3 mm thick or above	NBN EN 10029: 1991 Warmgewalste staalplaat van 3 mm of dikker - Toleranties op afmetingen, vorm en massa
EN 10164 Steel products with improved deformation properties perpendicular to the surface of the product – Technical delivery conditions.	NBN EN 10164 Producten van staal met verbeterde vervormingseigenschappen loodrecht op het productoppervlak - Technische leveringsvoorwaarden
EN ISO 5817 Arc-welded joints in steel – Guidance on quality levels for imperfections.	NBN EN ISO 5817 Lassen - Smeltlasverbindingen in staal, nikkel, titanium en hun legeringen (laserlassen en elektronenbundellassen uitgezonderd) - Kwaliteitsniveaus voor onvolkomenheden

<p>EN ISO 12944-3 Paints and varnishes – Corrosion protection of steel structures by protective paint systems</p> <p>Part 3: Design considerations.</p>	<p>NBN EN ISO 12944-3 Verven en vernissen - Corrosiebescherming van staalconstructies door beschermende verfsystemen</p> <p>Deel 3: Basisregels voor het ontwerp</p>
<p>EN ISO 9013:2002 Thermal cutting – Classification of thermal cuts – Geometrical product specification and quality tolerances.</p>	<p>NBN EN ISO 9013:2002 Thermisch snijden - Classificatie van thermische doorsnijdingen - Geometrische productspecificatie en kwaliteitstoleranties</p>
<p>EN ISO 15613 Specification and qualification of welding procedures for metallic materials – Qualification based on pre-production welding test</p>	<p>NBN EN ISO 15613 Beschrijven en goedkeuren van lasprocedures voor metalen - Goedkeuring op basis van een lasproef voor aanvang van de productie</p>
<p>EN ISO 15614-1 Specification and qualification of welding procedures for metallic materials – Welding procedure test</p> <p>Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys</p>	<p>NBN EN ISO 15614-1 Het beschrijven en goedkeuren van lasmethoden voor metalen – Lasmethodebeproeving</p> <p>Deel 1: Boog- en autogeenlassen van staal en booglassen van nikkel en nikkellegeringen</p>

AVANT-PROPOS NATIONAL À LA NBN EN 1993-2:2007

1. La norme NBN EN 1993-2:2007 "Eurocode 3 – Calcul des structures en acier - Partie 2 : Ponts métalliques" comprend l'annexe nationale NBN EN 1993-2 ANB:2011 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 1993-2 ANB:2011 la norme suivante:

NBN ENV 1993-2:1998 Eurocode 3 : Calcul des structures en acier - Partie 2 :
Ponts métalliques

Le corrigendum EN 1993-2:2006/AC:2009, tel que publié par le CEN, est joint à cette norme.

2. La version en langue française de l'EN 1993-2:2006 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 1993-2	Terme équivalent en Belgique
client	le maître de l'ouvrage assisté de ses bureaux d'architectes, d'ingénierie et de consultance
attache	assemblage

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1993-2

October 2006

ICS 91.010.30; 91.080.10; 93.040

Supersedes ENV 1993-2:1997

English Version

Eurocode 3 - Design of steel structures - Part 2: Steel Bridges

Eurocode 3 - Calcul des structures en acier - Partie 2:
Ponts métalliques

Eurocode 3 - Bemessung und konstruktion von Stahlbauten
- Teil 2: Stahlbrücken

This European Standard was approved by CEN on 9 January 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 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

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Foreword

This European Standard EN 1993-2, Eurocode 3: Design of steel structures Part 2: Steel bridges, has been prepared by Technical Committee CEN/TC250 « Structural Eurocodes », the Secretariat of which is held by BSI. CEN/TC250 is responsible for all Structural Eurocodes.

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 April 2007 and conflicting National Standards shall be withdrawn at latest by March 2010.

This Eurocode supersedes ENV 1993-2.

According to the CEN-CENELEC Internal Regulations, the National Standard 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 1980's.

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 (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 0: 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

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).

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 different nature from a harmonised product standard³. 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 (informative).

The National Annex (informative) 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 for partial factors and/or classes where alternatives are given in the Eurocode,
- values to be used where a symbol only is given in the Eurocode,
- geographical and climatic data specific to the Member State, e.g. snow map,
- the procedure to be used where alternative procedures are given in the Eurocode,
- references to non-contradictory complementary information to assist the user to apply the Eurocode.

² 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 hENs and ETAGs/ETAs.

³ 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.

Links between Eurocodes and product harmonised technical specifications (ENs and ETAs)

There is a need for consistency between the harmonised technical specifications for construction products and the technical rules for works⁴. 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 EN 1993-2

EN 1993-2 is the second part of six parts of EN 1993 – Design of Steel Structures – and describes the principles and application rules for the safety and serviceability and durability of steel structures for bridges.

EN 1993-2 gives design rules which are supplementary to the generic rules in EN 1993-1-1.

EN 1993-2 is intended to be used with Eurocodes EN 1990 – Basis of design, EN 1991 – Actions on structures and the parts 2 of EN 1992 to EN 1998 when steel structures or steel components for bridges are referred to.

Matters that are already covered in those documents are not repeated.

EN 1993-2 is intended for use by

- committees drafting design related product, testing and execution standards,
- clients (e.g. for the formulation of their specific requirements),
- designers and constructors,
- relevant authorities.

Numerical values for partial factors and other reliability parameters are recommended as basic values that provide an acceptable level of reliability. They have been selected assuming that an appropriate level of workmanship and quality management applies.

National annex for EN 1993-2

This standard gives alternative procedures, values and recommendations with notes indicating where national choices may have to be made. The National Standard implementing EN 1993-2 should have a National Annex containing all Nationally Determined Parameters to be used for the design of steel structures to be constructed in the relevant country.

National choice is allowed in EN 1993-2 through:

- 2.1.3.2(1)
- 2.1.3.3(5)
- 2.1.3.4(1)
- 2.1.3.4(2)
- 2.3.1(1)
- 3.2.3(2)
- 3.2.3(3)
- 3.2.4(1)
- 3.4(1)
- 3.5(1)
- 3.6(1)

⁴ 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.

- 3.6(2)
- 4(1)
- 4(4)
- 5.2.1(4)
- 5.4.1(1)
- 6.1(1)P
- 6.2.2.3(1)
- 6.2.2.4(1)
- 6.3.2.3(1)
- 6.3.4.2(1)
- 6.3.4.2(7)
- 7.1(3)
- 7.3(1)
- 7.4(1)
- 8.1.3.2.1(1)
- 8.1.6.3(1)
- 8.2.1.4(1)
- 8.2.1.5(1)
- 8.2.1.6(1)
- 8.2.10(1)
- 8.2.13(1)
- 8.2.14(1)
- 9.1.2(1)
- 9.1.3(1)
- 9.3(1)P
- 9.3(2)P
- 9.4.1(6)
- 9.5.2(2)
- 9.5.2(3)
- 9.5.2(5)
- 9.5.2(6)
- 9.5.2(7)
- 9.5.3(2) (two places)
- 9.6(1) (two places)
- 9.7(1)
- A.3.3(1)P
- A.3.6(2)
- A.4.2.1(2)
- A.4.2.1(3)
- A.4.2.1(4)
- A.4.2.4(2)
- C.1.1(2)

EN 1993-2: 2006 (E)

- C.1.2.2(1)
- C.1.2.2(2)
- E.2(1)

1 General

1.1 Scope

1.1.1 Scope of Eurocode 3

(1) See 1.1.1(1), (2), (3), (4), (5) and (6) of EN 1993-1-1.

1.1.2 Scope of Part 2 of Eurocode 3

(1) EN 1993-2 provides a general basis for the structural design of steel bridges and steel parts of composite bridges. It gives provisions that supplement, modify or supersede the equivalent provisions given in the various parts of EN 1993-1.

(2) The design criteria for composite bridges are covered in EN 1994-2.

(3) The design of high strength cables and related parts are included in EN 1993-1-11.

(4) This European Standard is concerned only with the resistance, serviceability and durability of bridge structures. Other aspects of design are not considered.

(5) For the execution of steel bridge structures, EN 1090 should be taken into account.

NOTE: As long as EN 1090 is not yet available a provisional guidance is given in Annex C.

(6) Execution 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 needed to comply with the assumptions of the design rules.

(7) Special requirements of seismic design are not covered. Reference should be made to the requirements given in EN 1998, which complements and modifies the rules of EN 1993-2 specifically for this purpose.

1.2 Normative references

(1) This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication applies (including amendments).

(2) In addition to the normative references given in EN 1990 and EN 1993-1 the following references should apply:

EN 1090	Execution of steel structures and aluminium structures
EN 1337	Structural bearings
EN 10029:1991	Specification for tolerances on dimensions, shape and mass for hot rolled steel plates 3 mm thick or above.
EN 10164	Steel products with improved deformation properties perpendicular to the surface of the product - Technical delivery conditions.
EN ISO 5817	Arc-welded joints in steel - Guidance on quality levels for imperfections.
EN ISO 12944-3	Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Design considerations.
EN ISO 9013:2002	Thermal cutting - Classification of thermal cuts - Geometrical product specification and quality tolerances.