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DIN EN 1992-2

ICS 91.010.30; 91.080.40; 93.040

Supersedes
DIN EN 1992-2:2007-02

Eurocode 2: Design of concrete structures – Part 2: Concrete bridges – Design and detailing rules (includes Corrigendum AC:2008) English translation of DIN EN 1992-2:2010-12

Eurocode 2: Bemessung und Konstruktion von Stahlbeton- und Spannbetontragwerken – Teil 2: Betonbrücken – Bemessungs- und Konstruktionsregeln (enthält Berichtigung AC:2008) Englische Übersetzung von DIN EN 1992-2:2010-12

Eurocode 2: Calcul des structures en béton – Partie 2: Ponts en béton – Calcul et dispositions constructives (Corrigendum AC:2008 inclus) Traduction anglaise de DIN EN 1992-2:2010-12

Document comprises 97 pages

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In case of doubt, the German-language original shall be considered authoritative.

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A comma is used as the decimal marker.

National foreword

This standard has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes” (Secretariat: BSI, United Kingdom).

The responsible German body involved in its preparation was the *Normenausschuss Bauwesen* (Building and Civil Engineering Standards Committee), Working Committee NA 005-07-20 AA *Betonbrücken (CEN/TC 250/SC 2/PT 2).*

EN 1992-2 was approved by CEN on 25 April 2005.

This European Standard is part of a series of standards dealing with structural design (Eurocodes) which are intended to be used as a ‘package’. In Guidance Paper L on the application and use of Eurocodes, issued by the EU Commission, reference is made to compulsory transitional periods for the introduction of the Eurocodes in the member states. The transitional periods are given in the Foreword of this standard.

In Germany, this standard is to be applied in conjunction with the National Annex.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. DIN [and/or DKE] shall not be held responsible for identifying any or all such patent rights.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ▌〈AC〉 〈AC〉▐.

Amendments

This standard differs from DIN V ENV 1992-2:1997-10 as follows:

a) the prestandard status has been changed to that of a full standard;

b) the comments received from the national standards bodies have been taken into account and the text of the standard has been completely revised;

c) in the German version of this standard, the terminology of DIN 1045-1 has been largely adopted.

Compared with DIN EN 1992-2:2007-02, the following corrections have been made:

a) this standard is the consolidated version of the previous 2005 edition with Corrigendum AC:2008;

b) the standard has been editorially revised.

Previous editions

DIN V ENV 1992-2: 1997-10
DIN EN 1992-2: 2007-02

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1992-2

October 2005

+ AC

July 2008

ICS 93.040; 91.010.30; 91.080.40

Supersedes ENV 1992-2:1996

English version

Eurocode 2: Design of concrete structures — Part 2: Concrete bridges — Design and detailing rules

Eurocode 2: Calcul des structures en béton — Partie 2: Ponts en béton — Calcul et dispositions constructives

Eurocode 2: Bemessung und Konstruktion von Stahlbeton- und Spannbetontragwerken — Teil 2: Betonbrücken — Bemessungs- und Konstruktionsregeln

EN 1992-2:2005 was approved by CEN on 2005-04-25 and Corrigendum AC:2008 on 2009-07-30.

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

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Ref. No. EN 1992-2:2005 + AC:2008 E

NOTE This contents list includes sections, clauses and annexes that have been introduced or modified in EN 1992-2.

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Foreword

This document (EN 1992-2:2005 + AC:2008) has been prepared by Technical Committee CEN/TC 250 “Structural Eurocodes”, the secretariat of which is held by BSI. CEN/TC 250 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 2006, and conflicting national standards shall be withdrawn at the latest by March 2010.

This document supersedes ENV 1992-2:1997.

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, Croatia, 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 to the Eurocode programme

See EN 1992-1-1.

Status and field of application of Eurocodes

See EN 1992-1-1.

National Standards implementing Eurocodes

See EN 1992-1-1.

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

See EN 1992-1-1.

Additional information specific to EN 1992-2 and link to EN 1992-1-1

EN 1992-2 describes the principles and requirements for safety, serviceability and durability of concrete structures, together with specific provisions for bridges. It is based on the limit state concept used in conjunction with a partial factor method.

— EN 1992-2 gives Principles and Application Rules for the design of bridges in addition to those stated in EN 1992-1-1. All relevant clauses of EN 1992-1-1 are applicable to the design of bridges unless specifically deleted or varied by EN 1992-2. It has been appropriate to introduce in EN 1992-2 some material, in the form of new clauses or amplifications of clauses in EN 1992-1-1, which is not bridge specific and which strictly belongs to EN 1992-1-1. These new clauses and amplifications are deemed valid interpretations of EN 1992-1-1 and designs complying with the requirements of EN 1992-2 are deemed to comply with the Principles of EN 1992-1-1.

— clauses in EN 1992-2 that modify those in EN 1992-1-1 are numbered by adding ‘100’ to the corresponding clause number in EN 1992-1-1.

— when additional clauses or sub-clauses are introduced in EN 1992-2, these are numbered by adding ‘101’ to the last relevant clause or sub-clause in EN 1992-1-1.

For the design of new structures, EN 1992-2 is intended to be used, for direct application, together with other parts of EN 1992, Eurocodes EN 1990, 1991, 1997 and 1998.

EN 1992-2 also serves as a reference document for other CEN/TCs concerning structural matters.

EN 1992-2 is intended for use by:

— committees drafting other standards for structural design and related product, testing and execution standards;

— clients (e.g. for the formulation of their specific requirements on reliability levels and durability);

— 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 of quality management applies. When EN 1992-2 is used as a base document by other CEN/TCs the same values need to be taken.

National Annex for EN 1992-2

This standard gives values with notes indicating where national choices may have to be made. Therefore the National Standard implementing EN 1992-2 should have a National Annex containing all Nationally Determined Parameters to be used for the design of bridges to be constructed in the relevant country.

National choice is allowed in EN 1992-2 through the following clauses:

3.1.2 (102)P	5.3.2.2 (104)	6.8.1 (102)	9.1 (103)
3.1.6 (101)P	5.5 (104)	6.8.7 (101)	9.2.2 (101)
3.1.6 (102)P	5.7 (105)	7.2 (102)	9.5.3 (101)
3.2.4 (101)P	6.1 (109)	7.3.1 (105)	9.7 (102)
4.2 (105)	6.1 (110)	7.3.3 (101)	9.8.1 (103)
4.2 (106)	6.2.2 (101)	7.3.4 (101)	11.9 (101)
4.4.1.2 (109)	6.2.3 (103)	8.9.1 (101)	113.2 (102)
5.1.3 (101)P	6.2.3 (107)	8.10.4 (105)	113.3.2 (103)
5.2 (105)	6.2.3 (109)	8.10.4 (107)	

Where references to National Authorities is made in this standard, the term should be defined in a Country's National Annex.

SECTION 1 General

The following clauses of EN 1992-1-1 apply.

1.1.1 (1)P	1.1.2 (3)P	1.2.2	1.5.2.1
1.1.1 (2)P	1.1.2 (4)P	1.3 (1)P	1.5.2.2
1.1.1 (3)P	1.2 (1)P	1.4 (1)P	1.5.2.3
1.1.1 (4)P	1.2.1	1.5.1 (1)P	1.5.2.4

1.1 Scope

1.1.2 Scope of Part 2 of Eurocode 2

(101)P Part 2 of Eurocode 2 gives a basis for the design of bridges and parts of bridges in plain, reinforced and prestressed concrete made with normal and light weight aggregates.

(102)P The following subjects are dealt with in Part 2.

Section 1: General
Section 2: Basis of design
Section 3: Materials
Section 4: Durability and cover to reinforcement
Section 5: Structural analysis
Section 6: Ultimate limit states
Section 7: Serviceability limit states
Section 8: Detailing of reinforcement and prestressing tendons — General
Section 9: Detailing of members and particular rules
Section 10: Additional rules for precast concrete elements and structures
Section 11: Lightweight aggregate concrete structures
Section 12: Plain and lightly reinforced concrete structures
Section 113: Design for the execution stages

1.106 Symbols

For the purpose of this standard, the following symbols apply.

NOTE The notation used is based on ISO 3898:1987. Symbols with unique meanings have been used as far as possible. However, in some instances a symbol may have more than one meaning depending on the context.

Latin upper case letters

A	Accidental action
A	Cross sectional area
A_c	Cross sectional area of concrete
A_{ct}	Area of concrete in tensile zone
A_p	Area of a prestressing tendon or tendons
A_s	Cross sectional area of reinforcement
$A_{s,min}$	minimum cross sectional area of reinforcement

A_{sw}	Cross sectional area of shear reinforcement
D	Diameter of mandrel
D_{Ed}	Fatigue damage factor
E	Effect of action
$E_{c,}$ $E_{c(28)}$	Tangent modulus of elasticity of normal weight concrete at a stress of σ_c = 0 and at 28 days
$E_{c,eff}$	Effective modulus of elasticity of concrete
E_{cd}	Design value of modulus of elasticity of concrete
E_{cm}	Secant modulus of elasticity of concrete
$E_c(t)$	Tangent modulus of elasticity of normal weight concrete at a stress of σ_c = 0 and at time t
E_p	Design value of modulus of elasticity of prestressing steel
E_s	Design value of modulus of elasticity of reinforcing steel
EI	Bending stiffness
EQU	Static equilibrium
F	Action
F_d	Design value of an action
F_k	Characteristic value of an action
G_k	Characteristic permanent action
I	Second moment of area of concrete section
J	Creep function
K_c	Factor for cracking and creep effects
K_s	Factor for reinforcement contribution
L	Length
M	Bending moment
M_{Ed}	Design value of the applied internal bending moment
M_{rep}	Cracking bending moment
N	Axial force or number of cyclic loads in fatigue
N_{Ed}	Design value of the applied axial force (tension or compression)
P	Prestressing force
P_0	Initial force at the active end of the tendon immediately after stressing
Q_k	Characteristic variable action
Q_{fat}	Characteristic fatigue load
R	Resistance or relaxation function
S	Internal forces and moments
S	First moment of area
SLS	Serviceability limit state
T	Torsional moment