December 2010

DIN EN 1993-1-1

DIN

ICS 91.010.30; 91.080.10

Supersedes: see below

Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings (includes Corrigendum AC:2009) English translation of DIN EN 1993-1-1:2010-12

Eurocode 3: Bemessung und Konstruktion von Stahlbauten –
Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau
(enthält Berichtigung AC:2009)
Englische Übersetzung von DIN EN 1993-1-1:2010-12

Eurocode 3: Calcul des structures en acier –
Partie 1-1: Règles générales et règles pour les bâtiments
(Corrigendum AC:2009 inclus)
Traduction anglaise de DIN EN 1993-1-1:2010-12

Supersedes DIN EN 1993-1-1:2010-08;
together with DIN EN 1993-1-1/NA:2010-12, DIN EN 1993-1-3:2010-12, DIN EN 1993-1-3/NA:2010-12, DIN EN 1993-1-5:2010-12, DIN EN 1993-1-5/NA:2010-12, DIN EN 1993-1-8:2010-12, DIN EN 1993-1-8/NA:2010-12, DIN EN 1993-1-9:2010-12, DIN EN 1993-1-9/NA:2010-12, DIN EN 1993-1-10:2010-12, DIN EN 1993-1-10/NA:2010-12, DIN EN 1993-1-11:2010-12 and DIN EN 1993-1-11/NA:2010-12 supersedes DIN 18800-1:2008-11;
together with DIN EN 1993-1-1/NA:2010-12, DIN EN 1993-1-3:2010-12, DIN EN 1993-1-3/NA:2010-12, DIN EN 1993-1-5:2010-12 and DIN EN 1993-1-5/NA:2010-12 supersedes DIN 18800-2:2008-11;
together with DIN EN 1993-1-1/NA:2010-12, DIN EN 1993-1-8:2010-12, DIN EN 1993-1-8/NA:2010-12, DIN EN 1993-1-11:2010-12 and DIN EN 1993-1-11/NA:2010-12 supersedes DIN 18801:1983-09;
together with DIN EN 1993-1-1/NA:2010-12, DIN EN 1993-1-8:2010-12 and DIN EN 1993-1-8/NA:2010-12 supersedes DIN 18808:1984-10

Document comprises 95 pages

Translation by DIN-Sprachendienst.
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 005-08-16 AA *Tragwerksbemessung (Sp CEN/TC 250/SC 3).*

EN 1993-1-1 was approved by CEN on 16 April 2004.

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 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 or corrigendum is indicated in the text by tags ▌AC〉 〈AC▐.

Amendments

This standard differs from DIN V ENV 1993-1-1:1993-04, DIN V ENV 1993-1-1/A1:2002-05 and DIN V ENV 1993-1-1/A2:2002-05 as follows:

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

b) the standard has been divided up into Parts 1-1, 1-8, 1-9 and 1-10;

c) the comments received from the national member bodies of CEN have been taken into account and the standard has been completely revised.

Compared with DIN EN 1993-1-1:2005-07 and DIN EN 1993-1-1 Corrigendum 1:2006-05, the following corrections have been made:

a) the European Corrigendum EN 1993-1-1:2005/AC:2009 and Corrigendum 1:2006-05 have been incorporated.

Compared with DIN EN 1993-1-1:2010-08, DIN 18800-1:2008-11, DIN 18800-2:2008-11, DIN 18801:1983-09 and DIN 18808:1984-10, the following corrections have been made:

a) the standard has been based on European design rules;

b) superseding notes have been corrected;

c) this standard is the consolidated version of the previous 2005 edition with Corrigendum AC:2009;

d) the standard has been editorially revised.

Previous editions

DIN 1050: 1934-08, 1937xxxxx-07, 1946-10, 1957x-12, 1968-06
DIN 1073: 1928-04, 1931-09, 1941-01, 1974-07
DIN 1079: 1938-01, 1938-11, 1970-09
DIN 4100: 1931-05, 1933-07, 1934xxxx-08, 1956-12, 1968-12
DIN 4101: 1937xxx-07, 1974-07
Supplement to DIN 1073: 1974-07
DIN 18800-1: 1981-03, 1990-11, 2008-11
DIN 18800-1/A1: 1996-02
DIN 4114-1: 1952xx-07
DIN 4114-2: 1952-07, 1953-02
DIN 18800-2: 1990-11, 2008-11
DIN 18800-2/A1: 1996-02
DIN 18801: 1983-09
DIN 18808: 1984-10
DIN V ENV 1993-1-1: 1993-04
DIN V ENV 1993-1-1/A1: 2002-05
DIN V ENV 1993-1-1/A2: 2002-05
DIN EN 1993-1-1: 2005-07
DIN EN 1993-1-1 Corrigendum 1: 2006-05

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1993-1-1

May 2005

+ AC

April 2009

ICS 91.010.30; 91.080.10

Supersedes ENV 1993-1-1:1992

English version

Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings

Eurocode 3: Calcul des structures en acier — Partie 1-1: Règles générales et règles pour les bâtiments

Eurocode 3: Bemessung und Konstruktion von Stahlbauten — Teil 1-1: Allgemeine Bemessungsregeln und Regeln für den Hochbau

EN 1993-1-1:2005 was approved by CEN on 2004-04-16 and Corrigendum AC:2009 on 2009-04-15.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 1993-1-1:2005 + AC:2009 E

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Foreword

This document (EN 1993-1-1:2005 + AC:2009) 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 November 2005, and conflicting national standards shall be withdrawn at the latest by March 2010.

This document supersedes ENV 1993-1-1:1992.

According to the CEN-CENELEC Internal Regulations, the National Standard Organisations 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 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 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[1] 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

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

[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 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 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[2] referred to in Article 12 of the CPD, although they are of a different nature from harmonized product standard[3]. 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.

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[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 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.