

One or more corrigenda exist with corrections to this document.
These can be searched online and ordered free of charge at www.beuth.de

This page is intentionally blank.

DIN EN 1991-1-2



ICS 13.220.50; 91.010.30

Supersedes
DIN EN 1991-1-2:2003-09 and
DIN EN 1991-1-2
Corrigendum 1:2009-09

**Eurocode 1: Actions on structures –
Part 1-2: General actions –
Actions on structures exposed to fire
(includes Corrigendum AC:2009)
English translation of DIN EN 1991-1-2:2010-12**

Eurocode 1: Einwirkungen auf Tragwerke –
Teil 1-2: Allgemeine Einwirkungen –
Brandeinwirkungen auf Tragwerke
(enthält Berichtigung AC:2009)
Englische Übersetzung von DIN EN 1991-1-2:2010-12

Eurocode 1: Actions sur les structures –
Partie 1-2: Actions générales –
Actions sur les structures exposées au feu
(Corrigendum AC:2009 inclus)
Traduction anglaise de DIN EN 1991-1-2:2010-12

Document comprises 61 pages

Translation by DIN-Sprachendienst.

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



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), Subcommittee SC 1 “Eurocode 1: Actions on structures”.

The responsible German body involved in its preparation was the *Normenausschuss Bauwesen* (Building and Civil Engineering Standards Committee), Working Committee NA 005-52-22 AA *Konstruktiver baulicher Brandschutz*.

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 the Directive 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. It will be the responsibility of CEN and the EU Commission to agree the details of the introduction on a case-by-case basis.

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  .

Amendments

This standard differs from DIN V ENV 1991-2-2:1997-05 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.

Compared with DIN EN 1991-1-2:2003-09 and DIN EN 1991-1-2 Corrigendum 1:2009-09, the following corrections have been made:

- a) this standard is the consolidated version of the previous 2002 edition with Corrigendum AC:2009;
- b) the standard has been editorially revised.

Previous editions

DIN V ENV 1991-2-2: 1997-05

DIN EN 1991-1-2: 2003-09

DIN EN 1991-1-2 Corrigendum 1: 2009-09

ICS 13.220.50; 91.010.30

English version

Eurocode 1: Actions on structures — Part 1-2: General actions — Actions on structures exposed to fire

Eurocode 1: Actions sur les structures — Partie 1-2: Actions générales — Actions sur les structures exposées au feu

Eurocode 1: Einwirkungen auf Tragwerke — Teil 1-2: Allgemeine Einwirkungen — Brandeinwirkungen auf Tragwerke

EN 1991-1-2:2002 was approved by CEN on 2002-09-01 and Corrigendum AC:2009 on 2009-03-04.

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 Management Centre or to any CEN member.

The European Standards exist 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
Foreword to EN 1991-1-2:2002 + AC:2009.....	4
Section 1 General	10
1.1 Scope	10
1.2 Normative references	10
1.3 Assumptions	11
1.4 Distinction between Principles and Application Rules	11
1.5 Terms and definitions	11
1.5.1 Common terms used in Eurocode Fire parts	11
1.5.2 Special terms relating to design in general.....	13
1.5.3 Terms relating to thermal actions	13
1.5.4 Terms relating to heat transfer analysis	15
1.6 Symbols.....	15
Section 2 Structural Fire design procedure.....	21
2.1 General.....	21
2.2 Design fire scenario.....	21
2.3 Design fire	21
2.4 Temperature Analysis	21
2.5 Mechanical Analysis	22
Section 3 Thermal actions for temperature analysis	23
3.1 General rules	23
3.2 Nominal temperature-time curves	24
3.2.1 Standard temperature-time curve.....	24
3.2.2 External fire curve.....	24
3.2.3 Hydrocarbon curve	25
3.3 Natural fire models	25
3.3.1 Simplified fire models	25
3.3.1.1 General	25
3.3.1.2 Compartment fires	25
3.3.1.3 Localised fires	26
3.3.2 Advanced fire models	26
Section 4 Mechanical actions for structural analysis	27
4.1 General.....	27
4.2 Simultaneity of actions.....	27
4.2.1 Actions from normal temperature design	27
4.2.2 Additional actions.....	28
4.3 Combination rules for actions.....	28
4.3.1 General rule.....	28
4.3.2 Simplified rules	28
4.3.3 Load level	29
Annex A (informative) Parametric temperature-time curves.....	30
Annex B (informative) Thermal actions for external members - Simplified calculation method	33
B.1 Scope	33
B.2 Conditions of use.....	33

B.3	Effects of wind	34
B.3.1	Mode of ventilation.....	34
B.3.2	Flame deflection by wind	34
B.4	Characteristics of fire and flames.....	35
B.4.1	No forced draught.....	35
B.4.2	Forced draught	37
B.5	Overall configuration factors.....	39
Annex C (informative) Localised fires.....		41
Annex D (informative) Advanced fire models.....		44
D.1	One-zone models	44
D.2	Two-zone models	45
D.3	Computational fluid dynamic models.....	45
Annex E (informative) Fire load densities		46
E.1	General.....	46
E.2	Determination of fire load densities	47
E.2.1	General.....	47
E.2.2	Definitions	47
E.2.3	Protected fire loads.....	48
E.2.4	Net calorific values	48
E.2.5	Fire load classification of occupancies	50
E.2.6	Individual assessment of fire load densities	50
E.3	Combustion behaviour	50
E.4	Rate of heat release Q	51
Annex F (informative) Equivalent time of fire exposure		53
Annex G (informative) Configuration factor		55
G.1	General.....	55
G.2	Shadow effects.....	56
G.3	External members	56
Bibliography		59