



BSI Standards Publication

Eurocode 2 — Design of concrete structures

Part 1-2: Structural fire design

National foreword

This British Standard is the UK implementation of EN 1992-1-2:2023. It supersedes BS EN 1992-1-2:2004+A1:2019, which will be withdrawn on 30 March 2028.

The UK participation in its preparation was entrusted to Technical Committee B/525/2, Structural use of concrete.

A list of organizations represented on this committee can be obtained on request to its committee manager.

National choice is allowed in this standard where explicitly stated within notes. The National Annex to this standard contains the national choices to be used for buildings and civil engineering works constructed in the UK.

The first generation of EN Eurocodes was published between 2002 and 2007, with conflicting British Standards withdrawn in 2010. This document forms part of the second generation of EN Eurocodes.

The second generation of EN Eurocodes is expected to be published between 2023 and 2026. These documents are being published as soon as they are available. This is being done to enable users to prepare for the transition from the first generation to second generation of EN Eurocodes.

UK adoptions of the first generation of EN Eurocodes will be withdrawn by BSI on 30 March 2028. Until that date, the first generation documents should be considered as the applicable standards for buildings and civil engineering works constructed in the UK unless otherwise specified by the relevant authority or in the specification for a particular project.

This standard is intended to be used with its National Annex and other referenced documents, including other second generation Eurocodes, as an interdependent suite of documents.

While the use of provisions in this standard in conjunction with first generation Eurocodes is not precluded, it should be undertaken with care and should only be done when users are satisfied that it will not result in a lower level of reliability than the minimum level set in the first generation Eurocodes and associated UK National Annexes.

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European foreword

This document (EN 1992-1-2:2023) has been prepared by Technical Committee CEN/TC 250 “Structural Codes”, the secretariat of which is held by BSI. CEN/TC 250 is responsible for all Structural Eurocodes and has been assigned responsibility for structural and geotechnical design matters by CEN.

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 September 2027, and conflicting national standards shall be withdrawn at the latest by March 2028.

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

This document supersedes EN 1992-1-2:2004 and its amendments and corrigenda.

The first generation of EN Eurocodes was published between 2002 and 2007. This document forms part of the second generation of the Eurocodes, which have been prepared under Mandate M/515 issued to CEN by the European Commission and the European Free Trade Association.

The Eurocodes have been drafted to be used in conjunction with relevant execution, material, product and test standards, and to identify requirements for execution, materials, products and testing that are relied upon by the Eurocodes.

The Eurocodes recognize the responsibility of each Member State and have safeguarded their right to determine values related to regulatory safety matters at national level through the use of National Annexes.

The main changes compared to the previous edition are listed below:

- simplified design methods were improved and amended and provisions were updated in tabulated data to ensure consistency between tabulated design data, simplified and advanced design methods;
- simplified analytical formulae were added for the determination of temperature profiles in members;
- specific rules for spalling were integrated;
- informative annexes provide guidance for fire design of steel fibre reinforced concrete structures and of recycled aggregates concrete structures;
- the number of alternative design rules was reduced;
- the structure and table of contents was harmonized with other fire parts.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

0 Introduction

0.1 Introduction to the Eurocodes

The Structural Eurocodes comprise the following standards generally consisting of a number of Parts:

- EN 1990, *Eurocode: Basis of structural and geotechnical 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*
- EN 1999, *Eurocode 9: Design of aluminium structures*
- New Eurocodes under development, e.g. Eurocode for design of structural glass

The Eurocodes are intended for use by designers, clients, manufacturers, constructors, relevant authorities (in exercising their duties in accordance with national or international regulations), educators, software developers, and committees drafting standards for related product, testing and execution standards.

NOTE Some aspects of design are most appropriately specified by relevant authorities or, where not specified, can be agreed on a project-specific basis between relevant parties such as designers and clients. The Eurocodes identify such aspects making explicit reference to relevant authorities and relevant parties.

0.2 Introduction to EN 1992 (all parts)

(1) EN 1992 applies to the design of buildings, bridges and civil engineering structures in plain, reinforced and prestressed concrete. It complies with the principles and requirements for the safety and serviceability of structures, the basis of their design and verification that are given in EN 1990.

(2) EN 1992 is only concerned with the requirements for resistance, serviceability, durability and fire resistance of concrete structures. Other requirements, e.g. concerning thermal or sound insulation, are not considered.

(3) EN 1992 is subdivided into various parts:

- EN 1992-1-1, Design of concrete structures — Part 1-1: General rules and rules for buildings, bridges and civil engineering structures,
- EN 1992-1-2, Design of concrete structures — Part 1-2: Structural fire design,
- EN 1992-4, Design of concrete structures — Part 4: Design of fastenings for use in concrete.

0.3 Introduction to EN 1992-1-2

(1) EN 1992-1-2 describes the requirements and rules for the structural design of buildings and civil engineering works exposed to fire.

(2) EN 1992-1-2 is intended for clients (e.g. for the formulation of their specific requirements), designers, contractors and relevant authorities.

(3) The general objectives of fire protection are to limit risks with respect to the individual and society, neighbouring property, and where required, environment or directly exposed property, in the case of fire.

(4) The fire parts of the Structural Eurocodes deal with specific aspects of passive fire protection in terms of designing structures and parts thereof for adequate loadbearing resistance and for limiting fire spread as relevant.

(5) Required functions and levels of performance can be specified either in terms of nominal (standard) fire resistance rating, generally given in national fire regulations or by referring to fire safety engineering for assessing passive and active measures, see EN 1991-1-2:—¹.

(6) Supplementary requirements concerning, e.g.:

- the possible installation and maintenance of sprinkler systems;
- conditions on occupancy of building or fire compartment;
- the use of approved insulation and coating materials, including their maintenance;

are not given in this standard, because they are subject to specification by the competent authority.

0.4 Verbal forms used in the Eurocodes

The verb “shall” expresses a requirement strictly to be followed and from which no deviation is permitted in order to comply with the Eurocodes.

The verb “should” expresses a highly recommended choice or course of action. Subject to national regulation and/or any relevant contractual provisions, alternative approaches could be used/adopted where technically justified.

The verb “may” expresses a course of action permissible within the limits of the Eurocodes.

The verb “can” expresses possibility and capability; it is used for statements of fact and clarification of concepts.

0.5 National annex for EN 1992-1-2

National choice is allowed in this standard where explicitly stated within notes. National choice includes the selection of values for Nationally Determined Parameters (NDPs).

The national standard implementing EN 1992-1-2 can have a National Annex containing all national choices to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

When no national choice is given, the default choice given in this standard is to be used.

When no national choice is made and no default is given in this standard, the choice can be specified by a relevant authority or, where not specified, agreed for a specific project by appropriate parties.

National choice is allowed in EN 1992-1-2 through the following clauses:

4.5(1) 9.2(1) 10(10)

National choice is allowed in EN 1992-1-2 on the application of the following informative annexes:

Annex B Annex C Annex E

The National Annex can contain, directly or by reference, non-contradictory complementary information for ease of implementation, provided it does not alter any provisions of the Eurocodes.

1 Scope

1.1 Scope of EN 1992-1-2

- (1) This document deals with the design of concrete structures for the accidental situation of fire exposure and is intended to be used in conjunction with EN 1992-1-1 and EN 1991-1-2:—¹. This document identifies differences from, or supplements to, normal temperature design.
- (2) This document applies to concrete structures required to fulfil a loadbearing function, separating function, insulation function or all of them.
- (3) This document gives principles and application rules for the design of structures for specified requirements in respect of the aforementioned functions and the levels of performance.
- (4) This document applies to structures, or parts of structures, that are within the scope of EN 1992-1-1 and are designed accordingly.

1.2 Assumptions

- (1) In addition to the general assumptions of EN 1990 the following assumptions apply:
- the choice of the relevant design fire scenario is made by appropriate qualified and experienced personnel or is given by the relevant national regulation;
 - any fire protection measure taken into account in the design shall be adequately maintained for the duration of the intended use of the construction.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE See the Bibliography for a list of other documents cited that are not normative references, including those referenced as recommendations (i.e. in 'should' clauses), permissions ('may' clauses), possibilities ('can' clauses), and in notes.

EN 1363-2, *Fire resistance tests - Part 2: Alternative and additional procedures*

EN 1990, *Eurocode - Basis of structural design*

EN 1991-1-2:—¹, *Eurocode 1 — Actions on structures — Part 1-2: Actions on structures exposed to fire*

EN 1992-1-1:2023, *Eurocode 2 — Design of concrete structures — Part 1-1: General rules and rules for buildings, bridges and civil engineering structures*

EN 1991-1-7:—², *Eurocode 1 — Actions on structures — Part 1-7: Accidental actions*

¹ Under preparation. Stage at the time of publication: FprEN 1991-1-2:2023.

² Under preparation. Stage at the time of publication: prEN 1991-1-7:2023.