**Document: CEN/TC 250**

**N 600 Rev1**

Ref: 7232:CEN/TC 250
Date: 3 December 2004

**To the Members of CEN/TC 250**
**Structural Eurocodes**

# GUIDELINES FOR PREPARING EN EUROCODE PARTS FOR SUBMISSION TO CMC TO LAUNCH FOR FORMAL VOTE

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## Changes in N 600 Rev 1

The main change in this Revision 1 is a new section 7 is added on the "Finalization of drafts for publication after positive Formal Vote". The Revision also includes a note on the agreement made at the CEN/TC 250 meeting in Rome to permit single language drafts to be sent for Formal Vote in order to maintain the schedule.
All changes from the first edition of N 600 (January 04), are highlighted

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**CEN/TC250 N600 Rev1**
**November 2004**

# GUIDELINES FOR PREPARING EN EUROCODE PARTS FOR SUBMISSION TO CMC TO LAUNCH FOR FORMAL VOTE

## Foreword

This document gives guidance on the detailed matters that Editing Panels shall follow in order to submit to CMC a draft that will be valid for launching a Formal Vote. It complements the policy guidelines and procedures given in CEN/TC250 N250, as revised. It is based on experience gained in preparing the first EN Eurocode Parts that have been published and in detail complements or reiterates the guidance in CEN/BOSS.

The aim is to ensure that all EN Eurocode Parts are editorially consistent. The general guidance for N250 clause 7 has been repeated (updated) and particular attention is drawn to the essential responsibilities of Editing Panels.

The common Foreword (in three language versions) and Section 1 are given (from N250 Annex K), with necessary variations for EN Eurocode Parts for fire. A revised clause on normative references is highlighted.

More specific guidance is given on editorial style and form, based on and incorporating N250 Annex L, so that EN Eurocode Parts have the same appearance. Requirements additional to or different from those in Annex L are highlighted.

The translation procedure reflects agreements between BSI, AFNOR and DIN and CMC and replaces that in N250 Annex M. It aims to avoid any delays but relies on Editing Panels preparing a single, technically agreed, draft for translation.

The document itself conforms as far as possible to the guidance contained within it.

**Changes implemented in N 600 Rev 1, November 2004**

1. Note added to 6.2 (3) about exceptional use of fewer than three language versions for Formal Vote.

2. Section 7 added on finalisation of drafts for publication after positive Formal Vote, together with reference in 1. Scope.

3. Minor corrections and additions to common Foreword in sections 3 and 4.

NOTE Changes to the wording below are highlighted.

**Contents**

## 1. Scope

(1) This document covers detailed aspects of layout, editing and translation required to achieve an EN Eurocode Part suitable for the launching of a Formal Vote.

(2) This document provides the three language versions of the common Foreword and Section 1, with variations for EN Eurocode Parts for fire.

(3) The specifications for editorial style and form are obligatory.

(4) The procedure for achieving three language versions of an EN Eurocode Part before submission to CMC for launching a Formal Vote is obligatory.

(5) The finalisation procedure of drafts for publication after positive Formal Vote is given.

## 2. General guidance for project teams drafting EN Eurocode Parts.

### 2.1 The users

(1) It should be assumed that the principal users of EUROCODES will be design engineers who are appropriately qualified and experienced in the particular field of work. However, other users may include; regulatory personnel, producers of structural components and materials, contract specifiers, building and civil engineering constructors/contractors, educators and trainers, drafters of related standards as well as authors of guides handbooks and computer programmers.

### 2.2 Level of technology

(1) The EUROCODES shall be based on well accepted and of proven/established current practice ("State of the Art"). Input from expert bodies (for example FIB, ECCS) may make an important contribution. Research/testing or trial calculations may be helpful (and sometimes necessary) to harmonization different current practices. Only in exceptional circumstances, e.g. where significant safety issues are concerned, shall recent non-applied research results be taken into account. Novel/unproven methods shall not be included, and therefore no content shall be dependent on newly commissioned or future basic research.

### 2.3 Design economy

(1) EUROCODES are to give the basis for the design of safe structures at acceptable cost. In order to achieve realistic and effective acceptance of the EUROCODES, structures designed using them should not cost significantly more, over their design life, than those designed to national standards, unless an important principle of acceptable safety has been identified and agreed e.g. a change in the level of reliability.

### 2.4 User-friendliness

(1) Every EUROCODE part should be organized and drafted to make it understandable and logically applicable by the anticipated user (see 7.1) in everyday use. In this regard, the views of the National Technical Contacts (NTCs - see 6.2d and Annex G para. 5.4), and the national responses from the trial use of the ENV documents must be respected, and only set aside when other extremely strong reasons are accepted by the SC.

### 2.5 Comprehensiveness of scope and text

(1) The Scope Clause of each EUROCODE part shall be precisely detailed and make specific reference to any exclusions and limitations.

(2) Each EUROCODE part is to be comprehensive in its coverage of the PRINCIPLES in its particular subject area. The APPLICATION RULES should embrace at least 90% of construction in its field. Exotic, novel, or extremely unusual forms of construction or design conditions will not be covered, or will be stated to require additional consideration by the designer. Although the documents may be lengthy (for example, when treatment of alternative forms of members, with alternative design methods, are included), it should be appreciated that design aids, in the form of manuals/handbooks/ computer programs, etc. will be produced, often by others, and will be an important part of the application of the EUROCODES. Background material, worked examples, very specialized applications and non-essential informative narrative material **should be removed** and possibly included in such support items.

(3) The user should be assisted to use the EUROCODES effectively. Therefore any helpful guidance should be provided where possible as to which parts of the text will be relevant to various forms of construction, types of structure, or level of precision in the calculations.

### 2.6 Organization of EUROCODE parts

(1) All the **material-related structural EUROCODES** (Eurocodes 2, 3, 4, 5, 6 and 9) are organized on the following basis:

- Part 1 deals with **General Rules**, including structural fire design rules, which apply to all structures unless specifically omitted or amended in supplementary parts for specific structures
- Parts 2, 3, 4, etc. are supplementary to Part 1 and contain additional and varied **rules for specific applications**, e.g. particular types of structure (e.g. buildings, bridges, silos.)

NOTE in some EUROCODES Part 1 also deals with rules for buildings.

(2) EUROCODE: **Basis of Structural Design** (pr EN 1990) covers the general design philosophy, basis of design, common non material-related aspects and common terminology and symbols.

(3) EUROCODE 1: **Actions on structures** covers general actions (loading) applicable to all structures in Part 1 and additional loadings for specific structures (bridges, silos and tanks and loads from machinery) in further Parts.

(4) EUROCODE 7: Geotechnical design deals in Part 1 with general rules Geotechnical design for structures and in Parts 2 and 3 with geotechnical field tests and laboratory tests to assist design.

(5) EUROCODE 8: **Design for earthquake resistance**, is organized on a similar basis to the material-related EUROCODES.

### 2.7 Consistency and interdependency

(1) All EUROCODE Parts have interdependency with other Parts and are not intended to be self-sufficient. Each EUROCODE Part must be fully consistent with other parts of the same EUROCODE and with related parts of other EUROCODES, as well as with EN 1990 "Eurocode: Basis of Structural Design" in terms of technology, terminology and symbols.

(2) Repetition of clauses must be avoided; instead use precise unambiguous cross-references quoting the full clause/sub-clause number.

(3) To facilitate consistency between Parts, liaison between Project Teams will be essential when clauses dealing with similar or related subjects are being considered, e.g. serviceability criteria.

### 2.8 Principles and application rules

(1) The PRINCIPLES given in a EUROCODE Part shall only comprise:

- general statements and definitions for which there is no alternative throughout the scope of the Part
- as well as requirements and analytical models for which no alternative is permitted unless specifically stated.

They should therefore be brief statements of all-embracing fundamentals.

The PRINCIPLES are to be identified in EUROCODES by use of '(P)' after the paragraph number.

(2) The APPLICATION RULES given in a EUROCODE Part are generally recognized rules, which are recommended methods of achieving the PRINCIPLES and satisfy their requirements for the whole or a specific field within the scope of the Part. In the case of a specific field the limitations shall be clearly given.

(3) It is permissible to use alternative design rules different from the APPLICATION RULES given in the EUROCODE Part, provided that it is shown that the alternative rules accord with the relevant PRINCIPLES and are at least equivalent with regard to the structural safety, serviceability and durability which would be expected when using the EUROCODE.

NOTE 1 If an alternative design rule is substituted for an application rule, the resulting design cannot be claimed to be wholly in accordance with the Eurocode, although the design will remain in accordance with its Principles. When the Eurocode is used in respect of a property listed in an Annex Z of a product standard or an ETAG, the use of an alternative design may not be acceptable for CE

marking.

NOTE 2 The Coordination Group has a continuing role in reviewing consistency of implementation of this arrangement particularly in conversions from ENV to EN.

## 2.9 Innovative and alternative design

(1) It is particularly important to ensure that the European construction industry maintains or improves its share of the European and worldwide market in design services and structural products and materials. The objective of the EUROCODES is to provide common structural design rules for everyday use for whole structures and for design of component products.

(2) Manufacturers have expressed the importance of encouraging the design of innovative products and of ensuring that the EUROCODES do not inhibit such development. Project Teams should therefore ensure that the design of innovative products is covered and facilitated in the EUROCODES, which should allow alternative designs rules (see 7.8).

## 2.10 Format of text - standard sequence of sections

(1) CEN/TC250 has agreed that the EUROCODE Parts will adopt the following standard sequence of sections unless it is agreed that this will not be appropriate:

| | | |
|---|---|---|
| | Foreword (Informative) | |
| | Section 1 | General |
| | Section 2 | Basis of Design (material specific) |
| | Section 3 | Materials |
| | Section 4 | Durability |
| | Section 5 | Basis of Structural Analysis |
| | Section 6 | Ultimate Limit States |
| | Section 7 | Serviceability Limit States |
| * | Section ? | Details/Connections |
| * | Section ? | Special Considerations |
| * | Section ? | Execution |
| * | Section ? | Design Assisted by Testing |
| * | Annexes (Normative) | |
| * | Annexes (Informative) | |

NOTE Sub-committees are required to advise TC250 or CG when these Sections are used, giving number, title and brief scope. H G Fire will determine sequence of sections for Fire Parts.

## 2.11 Format of text - foreword, standard clauses

(1) CEN/TC 250 has agreed the standard clauses, which should form the beginning

of the Foreword to all Parts of all EUROCODES. These are set out in Annex K together with background notes and extracts from the rules. Any additional informative, helpful clauses specific to the particular Part should be inserted before the final standard paragraph which should be followed by an invitation to submit constructive comments to the NSB.

**2.12 Format of text - harmonized editorial style**

(1) CEN/250 has agreed a harmonized editorial style, which is based on the CEN PNE rules (with agreed derogation), and on the experience of drafting and coordinating the ENV documents. This is to be adopted in every EUROCODE Part, unless TC250 agrees otherwise for exceptional circumstances. (See Annex L)

**2.13 Editing Panels**

(1) For the duration of the conversion to EN stages each SC should establish an Editing Panel, which should be chaired by the SC chairman. It should comprise a member of the SC Secretariat and 3 technical representatives whose mother tongues are English, French and German respectively. The Editing Panel will monitor draft texts to ensure compliance with PNE rules as modified by ISO Regulations, TC250 derogation, agreed TC250 format and Harmonized Editorial Style. They should also check drafts for technical equivalence of the 3 language versions

**2.14 Translations from the working language**

(1) The working language of CEN/TC250 is English, however, translations into French and German will be required before the final version is submitted for Formal Vote as an EN (See Annex M). Translation into any other European language is a matter for the Country concerned and shall be prepared from the definitive texts as circulated by CEN/CS following the Formal Vote.

**2.15 Relationship with National Regulations**

(1) The role of national regulations has not changed. The method of specifying the standard(s) which may (or must) be used for particular situations differs between Member States. In some (for instance UK) there is a very 'permissive' regime, which gives flexibility of choice of design method but also identifies certain standard(s) that are ‘deemed to satisfy’ the regulations - these have usually been established national codes or standards, and will become progressively the EUROCODES (even at ENV stage in one or two cases).

(2) At the other extreme, some Member States (for example Italy and Spain) have the relevant standard enshrined in the law, so that the introduction of the EUROCODES will need a change in the national law. The steps to be taken to adopt or recognize the EUROCODES will vary according to the national situation because the harmonization of national regulations is not in prospect and is outside the scope of the National and European Standards bodies. It is expected that, in accordance with CEN rules and agreements, the EUROCODE texts approved by CEN will be published by the NSBs, without variation from one Member State to another. This is the objective of 'harmonization', and this is the means of achieving the removal of barriers to trade (in

services or products.)

### 2.16 Removal of "boxed values"

(1) The "boxed values" in the ENVs were adopted as an interim expedient with a view to total removal prior to publication of ENs. Total removal and replacement by common agreed values to be used in all Member States is not fully achievable until there is a harmonization of national safety regulations. The European Commission has published Guidance Paper L on "Application and Use of Eurocodes". It provides for the use of a Nationally Determined Parameter (NDP) where a national choice is left open in a EN-Eurocode about values (where symbols are given in the EN-Eurocodes), a set of classes or alternative procedures permitted within the EN-Eurocodes. CEN/TC 250 has agreed that Project Teams will take the following action to remove all "boxed values":-

- "Boxed values" which do not relate to safety levels and differences should, in the EN-Eurocodes, be replaced by fixed values or methods.

- "Boxed values" which relate to safety levels and differences should be replaced, in the EN-Eurocodes, by symbols, sets of classes or sets of alternative methods (i.e. Nationally Determined Parameters). Where relevant, the range of possible national choice should be given for information. "Boxed values" which have an influence on the level of serviceability or durability should be handled in the same way.

(2) The types of information that may be included in a National Annex are given in the common Foreword for EN-Eurocodes, see EN 1990. Examples of the use of NDPs and the National Annex are given in Annex P. The wording to be used to refer, in Notes, to National Annexes is given in Annex L.

### 2.17 Safety classification/reliability differentiation

(1) It is clear that these issues are important to the design process in some Countries as the National requirement for safety on construction works is based on such practices. This is reflected in some National Application Documents to ENVs. As no generally accepted approach has been developed for the first phase of conversion to EN, such concepts may be adopted by individual Member States under the arrangements set out in 2.15.

### 2.18 Quality Assurance, control and management

(1) The achievement of predicable and adequate levels of quality in construction is an objective, which is receiving increasing attention in Europe. As there is no generally accepted framework at present it is difficult to produce sensibly detailed content. It is not the role of CEN/TC250 (or EUROCODES) to define such levels, nevertheless, where relevant, simple statements of assumptions made in this context must be included.

(2) EUROCODE Parts are permitted to refer to QA policies in the construction process as a whole bearing in mind that they could become part of a general QA/Quality Management System. EUROCODES are directly concerned with the design phase of construction, so at this stage they should not venture into detailed treatment of the subject. Statements of the level of workmanship and supervision assumed for the purposes of design must, of course, be included.

## 2.19 Liaison/compatibility with other standards

(1) CEN/TC250 has the responsibility to ensure that adequate and effective liaisons are maintained with other CEN Technical Committees, and these liaisons are normally carried out by the relevant SC. The objective is to mutually achieve compatibility with other relevant and related standards and to obtain essential information for EUROCODES.

(2) The Structural EUROCODES provide a consistent set of design rules for all forms of building and civil engineering works using the full range of materials in common use. They deal with the design of whole structures comprising interconnected elements of structure thus providing consistency of resistance, reliability and integrity throughout. EUROCODES are equally appropriate for design of single products (structural elements) which are manufactured to be permanently incorporated into building and civil engineering works and for individual load-bearing products.

(3) CEN/TC250 and its sub-committees are required to establish active liaison (or 'Modes of Cooperation') with other TCs responsible for performance standards for products under the CPD (harmonized standards) and with those dealing with material specifications and characteristics. Liaison is also necessary with others (not necessarily within scope of CPD) where verification of reliability is required by calculation. Monitoring and reporting liaison activities are essential activities of all sub-committees and the TC itself.

(4) In summary, product and material TCs relate to Structural EUROCODES:

- as a means of verifying compliance of individual products (elements of structure),

- to achieve consistency of reliability etc, of inter-related products to be used in a single structure,

- to mutually agree consistent material property descriptions, characteristics and values,

- to demonstrate consistency of reliability to procurers and regulators under safety and durability requirements,

- to improve functioning of the single markets and remove barriers inherent in having a variety of different national design codes.

## 3. Common Sections for EN Eurocode Parts, in three languages

### Contents

**A Foreword – all parts of all Eurocodes (in English, French and German)**

**B Section 1 - all parts of EN 199X, and sub-parts if necessary**

**C Section 2 - all parts of EN 1992-1 to EN 1996-1 and EN 1999-1 (**except Fire parts**)**

NOTE B and C comprise a list of the recommended contents followed, where appropriate, by model clauses and examples, and three language versions where applicable to all EN Eurocode Parts.

### A. Common foreword

(1) All Eurocode Parts should adopt the text of EN 1990: 2002, with the exception of the last three clauses, which are specific to each Eurocode. This last clause may be preceded in the fire parts by the clauses in 4.

(2) The contents of the Foreword, after preliminary statements about the status of the document, are:

Background of the Eurocode programme

Status and field of application of Eurocodes

National Standards implementing Eurocodes

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

Additional information specific to EN 199X-X-X

[*To be drafted by the specific Project Team to give further advice/information to users which is not dealt with elsewhere]*

National annex for EN 199X-X-X

This standard gives alternative procedures, values and recommendations for classes with notes indicating where national choices may have to be made. Therefore the National Standard implementing EN 199X-X-X should have a National annex containing all Nationally Determined Parameters to be used for the design of buildings and civil engineering works to be constructed in the relevant country.

National choice is allowed in EN 199X-X-X through clauses:

*[Clause numbers to be inserted by the specific Project Team]*

NOTE The above last three sections are specific to EN Eurocode Parts and the three language versions of EN 1990 have not been included below.

(3) The English reference model from EN 1990:2002 is:

## Foreword

This document (EN 1990:2002) 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 October 2002, and conflicting national standards shall be withdrawn at the latest by March 2010.

This document supersedes ENV 1991-1:1994.

CEN/TC 250 is responsible for all Structural Eurocodes.

According to the CEN/CENELEC Internal Regulations, the national standards 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, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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

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).

and the publication of the Eurocodes to 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 |
| 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 Documents[2] referred to in Article 12 of the CPD, although they are of a different nature from harmonised product standards[3].

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 harmonised ENs and ETAGs/ETAs.

3 According to Art. 12 of the CPD the interpretative documents shall :

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.

The National annex 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 and/or classes where alternatives are given in the Eurocode,
– values to be used where a symbol only is given in the Eurocode,
– country specific data (geographical, climatic, etc.), *e.g.* snow map,
– the procedure to be used where alternative procedures are given in the Eurocode~~,~~.
It may also contain
– decisions on the application of informative annexes,
– references to non-contradictory complementary information to assist the user to apply the Eurocode.

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

There is a need for consistency between the harmonised technical specifications for construction products and the technical rules for works[4]. Furthermore, all the information accompanying the CE Marking of the construction products which refer to Eurocodes shall clearly mention which Nationally Determined Parameters have been taken into account.

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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.

4 see Art.3.3 and Art.12 of the CPD, as well as 4.2**,** 4.3.1, 4.3.2 and 5.2 of ID 1**.**

(4) The model German translation of EN 1990:2002 is:

## Vorwort

Dieses Dokument (EN 1990:2002) wurde vom CEN /TC 250 "Structural Eurocodes" erarbeitet, dessen Sekretariat von BSI geführt wird.
Diese Europäische Norm muss den Status einer nationalen Norm erhalten, entweder durch Veröffentlichung des identischen Textes oder durch amtliche Bekanntmachung bis spätestens Oktober 2002 und entgegenstehende nationale Normen müssen bis spätestens Mai 2010 zurückgezogen werden.

Dieses Dokument ersetzt ENV 1991–1:1994.

CEN/TC 250 ist für alle Eurocodes des konstruktiven Ingenieurbaus zuständig.

Entsprechend der CEN/CENELEC-Geschäftsordnung sind die nationalen Normungsinstitute der folgenden Länder gehalten, diese Europäische Norm zu übernehmen: Belgien, Dänemark, Deutschland, Estland, Finnland, Frankreich, Griechenland, Irland, Island, Italien, Lettland, Litauen, Luxemburg, Malta, Niederlande, Norwegen, Österreich, Polen, Portugal, Schweden, Schweiz, Slowakei, Slowenien, Spanien, Tschechische Republik, Ungarn, Vereinigtes Königreich und Zypern.

## Hintergrund des Eurocode-Programms

Im Jahre 1975 beschloss die Kommission der Europäischen Gemeinschaften, für das Bauwesen ein Programm auf der Grundlage des Artikels 95 der Römischen Verträge durchzuführen. Das Ziel des Programms war die Beseitigung technischer Handelshemmnisse und die Harmonisierung technischer Normen.
Im Rahmen dieses Programms leitete die Kommission die Bearbeitung von harmonisierten technischen Regelwerken für die Tragwerksplanung von Bauwerken ein, die im ersten Schritt als Alternative zu den in den Mitgliedsländern geltenden Regeln dienen und schließlich diese ersetzen sollten.
15 Jahre lang leitete die Kommission mit Hilfe eines Steuerkomitees mit Repräsentanten der Mitgliedsländer die Entwicklung des Eurocode-Programms, das zu der ersten Eurocode-Generation in den 80er Jahren führte.
Im Jahre 1989 entschieden sich die Kommission und die Mitgliedsländer der Europäischen Union und der EFTA, die Entwicklung und Veröffentlichung der Eurocodes über eine Reihe von Mandaten an CEN zu übertragen, damit diese den Status von Europäischen Normen (EN) erhielten. Grundlage war eine Vereinbarung5) zwischen der Kommission und CEN. Dieser Schritt verknüpft die Eurocodes de facto mit den Regelungen der Ratsrichtlinien und Kommissionsentscheidungen, die die Europäischen Normen behandeln (z. B. die Ratsrichtlinie 89/106/EWG zu Bauprodukten, die Bauproduktenrichtlinie, die Ratsrichtlinien 93/37/EWG, 92/50/EWG und 89/440/EWG zur Vergabe öffentlicher Aufträge und Dienstleistungen und die entsprechenden EFTA-Richtlinien, die zur Einrichtung des Binnenmarktes eingeleitet wurden).

5) Vereinbarung zwischen der Kommission der Europäischen Gemeinschaft und dem Europäischen Komitee für Normung (CEN) zur Bearbeitung der Eurocodes für die Tragwerksplanung von Hochbauten und Ingenieurbauwerken.

Das Eurocode-Programm umfasst die folgenden Normen, die in der Regel aus mehreren Teilen bestehen:

EN 1990 Eurocode, *Grundlagen der Tragwerksplanung.*

EN 1991 Eurocode 1, *Einwirkung auf Tragwerke.*

EN 1992 Eurocode 2, Entwurf, *Berechnung und Bemessung von Stahlbetonbauten.*

EN 1993 Eurocode 3, Entwurf, *Berechnung und Bemessung von Stahlbauten.*

EN 1994 Eurocode 4, Entwurf, *Berechnung und Bemessung von Stahl-Beton-Verbundbauten.*

EN 1995 Eurocode 5, Entwurf, *Berechnung und Bemessung von Holzbauten.*

EN 1996 Eurocode 6, Entwurf, *Berechnung und Bemessung von Mauerwerksbauten.*

EN 1997 Eurocode 7, Entwurf, *Berechnung und Bemessung in der Geotechnik.*

EN 1998 Eurocode 8, *Auslegung von Bauwerken gegen Erdbeben.*

EN 1999 Eurocode 9, Entwurf, *Berechnung und Bemessung von Aluminiumkonstruktionen*.

Die Europäischen Normen berücksichtigen die Zustimmigkeit der Bauaufsichtsorgane der jeweiligen Mitgliedsländer bei der nationalen Festlegung sicherheitsbezogener Werte, so dass diese Werte von Land zu Land unterschiedlich sein können.

## Status und Gültigkeitsbereich der Eurocodes

Die Mitgliedsländer der EU und EFTA betrachten die Eurocodes als Bezugsdokumente für folgende Zwecke:

— als Mittel zum Nachweis der Übereinstimmung der Hoch- und Ingenieurbauten mit den wesentlichen Anforderungen der Richtlinie 89/106/EWG, besonders mit der wesentlichen Anforderung Nr 1: Mechanischer Widerstand und Stabilität und der wesentlichen Anforderung Nr 2: Brandschutz;

— als Grundlage für die Spezifizierung von Verträgen für die Ausführung von Bauwerken und dazu erforderlichen Ingenieurleistungen;

— als Rahmenbedingung für die Herstellung harmonisierter, technischer Spezifikationen für Bauprodukte (ENs und ETAs)

Die Eurocodes haben, da sie sich auf Bauwerke beziehen, eine direkte Verbindung zu den Grundlagendokumenten6), auf die in Artikel 12 der Bauproduktenrichtlinie hingewiesen wird, wenn sie auch anderer Art sind als die harmonisierten Produktnormen7).

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6) Entsprechend Artikel 3.3 der Bauproduktenrichtlinie sind die wesentlichen Angaben in Grundlagendokumenten zu konkretisieren, um damit die notwendigen Verbindungen zwischen den wesentlichen Anforderungen und den Mandaten für die Erstellung harmonisierter Europäischer Normen und Richtlinien für die europäische Zulassung selbst zu schaffen.

7) Nach Artikel 12 der Bauproduktenrichtlinie hat das Grundlagendokument

a) die wesentliche Anforderung zu konkretisieren, in dem die Begriffe und, soweit erforderlich, die technische Grundlage für Klassen und Anforderungshöhen vereinheitlicht werden,

b) Methode zur Verbindung dieser Klasse oder Anforderungshöhen mit technischen Spezifikationen anzugeben, z. B. rechnerische oder Testverfahren, Entwurfsregeln,

Daher sind technische Gesichtspunkte, die sich aus den Eurocodes ergeben, von den Technischen Komitees des CEN und den Arbeitsgruppen von EOTA, die an Produktnormen arbeiten, zu beachten, damit diese Produktnormen mit den Eurocodes kompatibel sind.
Die Eurocodes liefern Einzelbauteile, allgemeine Regelungen für den Entwurf, die Berechnung und Bemessung von vollständigen Tragwerken und Einzelbauteilen, die sich für die übliche Anwendung eignen. Sie treffen auf bewährte Bauweisen und Aspekte neuartiger Anwendungen, enthalten aber keine Regelungen für ungewöhnliche Konstruktionen oder Sonderlösungen, wofür es erforderlich ist Experten zu Rate zu ziehen.

## Nationale Fassungen der Eurocodes

Die Nationale Fassung eines Eurocodes enthält den vollständigen Text des Eurocodes (einschließlich aller Anhänge), so wie von CEN veröffentlicht, mit möglicherweise einer nationalen Titelseite und einem nationalen Vorwort sowie einem Nationalen Anhang.
Der Nationale Anhang darf nur Hinweise zu den Parametern geben, die im Eurocode für nationale Entscheidungen offen gelassen wurden. Diese national festzulegenden Parameter (NDP) gelten für die Tragwerksplanung von Hochbauten und Ingenieurbauten in dem Land, in dem sie erstellt werden. Sie umfassen:

— Zahlenwerte für Teilsicherheitsbeiwerte und/oder Klassen, wo die Eurocodes Alternativen eröffnen,

— Zahlenwerte, wo die Eurocodes nur Symbole angeben,

— Landesspezifische, geographische und klimatische Daten, die nur für ein Mitgliedsland gelten, z. B. Schneekarten;

— Vorgehensweisen, wenn die Eurocodes mehrere zur Wahl anbieten;

— Vorschriften zur Verwendung der informativen Anhänge,

— Verweise zur Anwendung des Eurocodes, soweit diese ergänzen und nicht widersprechen.

## Verbindung zwischen den Eurocodes und den harmonisierten Technischen Spezifikationen für Bauprodukte (ENs und ETAs)

Es besteht die Notwendigkeit, dass die harmonisierten Technischen Spezifikationen für Bauprodukte und die technischen Regelungen für die Tragwerksplanung8) konsistent sind. Insbesondere sollten die Hinweise, die mit den CE-Zeichen an den Bauprodukten verbunden sind, die die Eurocodes in Bezug nehmen, klar erkennen lassen, welche national festzulegenden Parameter zugrunde liegen.

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c) als Bezugsdokument für die Erstellung harmonisierter Normen oder Richtlinien für Europäische Technische Zulassungen zu dienen.
Die Eurocodes spielen de facto eine ähnliche Rolle für die wesentliche Anforderung Nr 1 und einen Teil der wesentlichen Anforderung Nr 2.

8) siehe Artikel 3.3 und Art. 12 der Bauproduktenrichtlinie ebenso wie die Abschnitte 4.2, 4.3.1, 4.3.2 und 5.2 des Grundlagendokumentes Nr. 1

(5) The model French translation of EN 1990:2002 is:

## Avant-propos

Le présent document (EN 1990:2002) a été élaboré par le Comité Technique CEN/TC 250 “Eurocodes structuraux”, dont le secrétariat est tenu par BSI.

Cette Norme européenne devra recevoir le statut de norme nationale, soit par publication d'un texte identique, soit par entérinement, au plus tard en octobre 2002, et toutes les normes nationales en contradiction devront être retirées au plus tard en mars 2010.

Le présent document remplace l’ENV 1991-1:1994.

Le CEN/TC 250 est responsable de tous les Eurocodes Structuraux.

Selon le Règlement Intérieur du CEN/CENELEC, les instituts de normalisation nationaux des pays suivants sont tenus de mettre cette Norme européenne en application : Allemagne, Autriche, Belgique, Chypre, Danemark, Espagne, Estonie, Finlande, France, Grèce, Hongrie, Irlande, Islande, Italie, Lettonie, Lituanie, Luxembourg, Malte, Norvège, Pays-Bas, Pologne, Portugal, République tchèque, Royaume-Uni, Slovaquie, Slovénie, Suède et Suisse.

## Origine du programme des Eurocodes

En 1975 la Commission des Communautés Européennes arrêta un programme d’actions dans le domaine de la construction, sur la base de l’article 95 du Traité. L’objectif du programme était l’élimination d’obstacles aux échanges et l’harmonisation des spécifications techniques.
Dans le cadre de ce programme d’actions, la Commission prit l’initiative d’établir un ensemble de règles techniques harmonisées pour le dimensionnement des ouvrages ; ces règles, en un premier stade, serviraient d’alternative aux règles nationales en vigueur dans les Etats Membres et, finalement, les remplaceraient.
Pendant quinze ans la Commission, avec l’aide d’un Comité Directeur comportant des représentants des Etats Membres, pilota le développement du programme des Eurocodes, ce qui conduisit au cours des années 80 à la première génération de codes européens.
En 1989 la Commission et les Etats Membres de l’Union Européenne et de l’AELE décidèrent, sur la base d’un accord9) entre la Commission et le CEN, de transférer au CEN par une série de Mandats la préparation et la publication des Eurocodes, afin de leur donner par la suite un statut de normes européennes (EN). Ceci établit *de facto* un lien entre les Eurocodes et les dispositions de toutes les Directives du Conseil et/ou Décisions de la Commission traitant de normes européennes (par exemple la Directive du Conseil 89/106 CEE sur les produits de la construction – DPC – et les Directives du Conseil 93/37/CEE, 92/50/CEE et 89/440/CEE sur les travaux et services publics

9) Accord entre la Commission des Communautés Européennes et le Comité Européen pour la Normalisation (CEN) concernant le travail sur les EUROCODES pour le dimensionnement des ouvrages de bâtiment et de génie civil (BC/CEN/03/89).

ainsi que les Directives équivalentes de l'AELE destinées à la mise en place du marché intérieur).
Le programme des Eurocodes Structuraux comprend les normes suivantes, chacune étant en général constituée d'un certain nombre de Parties :

| | | |
|---|---|---|
| EN 1990 | Eurocode : | Bases de calcul des structures |
| EN 1991 | Eurocode 1 : | Actions sur les structures |
| EN 1992 | Eurocode 2 : | Calcul des structures en béton |
| EN 1993 | Eurocode 3 : | Calcul des structures en acier |
| EN 1994 | Eurocode 4 : | Calcul des structures mixtes acier-béton |
| EN 1995 | Eurocode 5 : | Calcul des structures en bois |
| EN 1996 | Eurocode 6 : | Calcul des structures en maçonnerie |
| EN 1997 | Eurocode 7 : | Calcul géotechnique |
| EN 1998 | Eurocode 8 : | Calcul des structures pour leur résistance aux séismes |
| EN 1999 | Eurocode 9 : | Calcul des structures en aluminium |

Les normes Eurocodes reconnaissent la responsabilité des autorités réglementaires dans chaque État Membre et ont sauvegardé le droit de celles-ci de déterminer, au niveau national, des valeurs relatives aux questions réglementaires de sécurité, là où ces valeurs continuent à différer d'un État à l'autre.

## Statut et domaine d'application des Eurocodes

Les États Membres de l'UE et de l'AELE reconnaissent que les Eurocodes servent de documents de référence pour les usages suivants :

— comme moyen de prouver la conformité des bâtiments et des ouvrages de génie civil aux exigences essentielles de la Directive du Conseil 89/106/CEE, en particulier à l'Exigence Essentielle No. 1 - Stabilité et résistance mécanique – et à l'Exigence Essentielle No. 2 – Sécurité en cas d'incendie ;

— comme base de spécification des contrats pour les travaux de construction et les services techniques associés ;

— comme cadre d'établissement de spécifications techniques harmonisées pour les produits de construction (EN et ATE).

Les Eurocodes, dans la mesure où les ouvrages eux-mêmes sont concernés par eux, ont une relation directe avec les Documents Interprétatifs10) visés à l'article 12 de la DPC, quoiqu'ils soient d'une nature différente de celle des normes harmonisées de produits11). En conséquence, les aspects techniques résultant des travaux effectués

10) Selon l'article 3.3 de la DPC, les exigences essentielles (E.E.) doivent recevoir une forme concrète dans des Documents Interprétatifs (DI) pour assurer les liens nécessaires entre les exigences essentielles et les mandats pour normes européennes (EN) harmonisées et guides pour les agréments techniques européens (ATE), et ces agréments eux-mêmes.

11) Selon l'article 12 de la DPC, les documents interprétatifs doivent :

a) donner une forme concrète aux exigences essentielles en harmonisant la terminologie et les bases techniques et en indiquant, lorsque c'est nécessaire, des classes ou niveaux pour chaque exigence ;

b) indiquer des méthodes pour relier ces classes ou niveaux d'exigences avec les spécifications techniques, par exemple méthodes de calcul et d'essai, règles techniques pour la conception, etc. ;

c) servir de référence pour l'établissement de normes harmonisées et de guides pour agréments techniques européens.

Les Eurocodes, de facto, jouent un rôle similaire pour l'E.E.1 et une partie de l'E.E.2.

pour les Eurocodes nécessitent d'être pris en considération de façon adéquate par les Comités Techniques du CEN et/ou les groupes de travail de l'EOTA travaillant sur les normes de produits en vue de parvenir à une complète compatibilité de ces spécifications techniques avec les Eurocodes.
Les normes Eurocodes fournissent des règles de conception structurale communes d'usage quotidien pour le calcul des structures entières et des produits composants de nature traditionnelle ou innovatrice. Les formes de construction ou les conceptions inhabituelles ne sont pas spécifiquement couvertes, et il appartiendra en ces cas au concepteur de se procurer des bases spécialisées supplémentaires.

**Normes nationales transposant les Eurocodes**

Les normes nationales transposant les Eurocodes comprendront la totalité du texte des Eurocodes (toutes annexes incluses), tel que publié par le CEN ; ce texte peut être précédé d'une page nationale de titres et par un Avant-Propos National, et peut être suivi d'une Annexe Nationale.
L'Annexe Nationale peut seulement contenir des informations sur les paramètres laissés en attente dans l'Eurocode pour choix national, sous la désignation de Paramètres Déterminés au niveau National, à utiliser pour les projets de bâtiments et ouvrages de génie civil à construire dans le pays concerné ; il s'agit :

— de valeurs et/ou des classes là où des alternatives figurent dans l'Eurocode ;

— de valeurs à utiliser là où seul un symbole est donné dans l'Eurocode ;

— de données propres à un pays (géographiques, climatiques, etc.), par exemple carte de neige ;

— de la procédure à utiliser là où des procédures alternatives sont données dans l'Eurocode ;

Il peut aussi contenir :

— des décisions sur l'usage des Annexes informatives ;

— des références à des informations complémentaires non contradictoires pour aider l'utilisateur à appliquer l'Eurocode.

## Liens entre les Eurocodes et les spécifications techniques harmonisées (EN et ATE) pour les produits

La cohérence est nécessaire entre les spécifications techniques harmonisées pour les produits de construction et les règles techniques pour les ouvrages12). En outre, toute information accompagnant la Marque CE des produits de construction, se référant aux Eurocodes, doit clairement faire apparaître quels Paramètres Déterminés au niveau National ont été pris en compte.

12) Voir le paragraphe et l'article 12 de la DPC, ainsi que les clauses 4.2, 4.3.1, 4.3.2 et 5.2 du DI 1.

## B. Common Section 1

### B1 Recommended contents for Section 1

Titles for the Section
and the clauses — Comments on the content of the clauses

NOTE Divide clauses into sub-clauses and paragraphs as appropriate

| Section 1: General | |
|---|---|
| **1.1 Scope** | - be precise about the scope: give statements on what is included (e.g. types of construction, types of prestress), and what is excluded (e.g. execution, fire design, seismic design, insulation design, some materials, some types of analysis).<br>- give references to other EN-Eurocodes or signposts to other parts of this Eurocode which supplement this Part. |
| **1.2 Normative references** | - *insert the following sentences*: "The following normative documents contain provisions which, through reference in this text, constitute provisions of this European Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this European Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies."<br>- list the standards (only those normative documents which are really cited in the Part). |
| **1.3 Assumptions** | - refer to EN 1990:2002, clause 1.3<br>- with specific additions if needed (in a separate sub-clause) |

| | |
|---|---|
| **1.4 Distinction between Principles and Application Rules** | - refer to EN 1990:2002, clause 1.4 |
| **1.5 Terms and Definitions** | - refer to EN 1990:2002, clause1.5 (in a general way), and<br>- give additional specific definitions (if any) for those terms which are not in EN1990:2002, clause 1.5 and which are used in the Part. |
| **1.6 Symbols** | - refer to EN 1990:2002, clause 1.6, while giving those symbols used in the Part (note: sometimes there will be justified differences) and<br>- give additional specific symbols (if any) (in a separate sub-clause) |

## B.2 Model clauses for Section 1

NOTE for drafters Boxes to be completed with the relevant Eurocode part number, with title where relevant, or appropriate description

NOTE for drafters The three language versions of these model clauses are available to be downloaded from ??? for compliling stage 49 drafts of all Eurocode Parts.

# 1 General

## 1.1 Scope

### 1.1.1 Scope of Eurocode ...

(1)P Eurocode ... applies to the design of buildings and civil engineering works in ... ..

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

(3)P *Eurocode* ... is intended to be used in conjunction with:

- EN 1990 "Basis of structural design"
- EN 1991 "Actions on structures"
- *hEN's for construction products relevant for* ...
- *EN ...* *"Requirements for the execution of* ... "
- *EN 1998 "Design of structures for earthquake resistance", when* ... *structures are built in seismic regions*

(4)P *Eurocode* ... is subdivided in various parts:

...

...

### 1.1.2 Scope of Part ... of Eurocode ...

(1)P *The Part* ... *of Eurocode* ... *gives basic design rules for* ...

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

Section 1: General

Section 2: Basis of design

NOTE Sections 1 and 2 provide additional clauses to those given in EN 1990 "Basis of structural design".

Section 3: Materials

Section 4: Durability

Section 5: Structural analysis

Section 6: Ultimate limit states

NOTE for drafters: the following paragraphs (3) to (6) are optional. If you choose to write them, try to give useful information (i.e. not only repeat the title).

(3)P Section 3 …

(4)P Section 4 …

(5)P Section 5 …

(6)P Section 6 …

(7)P This Part [...] does not cover:

- …
- ...

## 1.2 Normative references

### 1.2.1 Use

(1)P 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 referred to applies (including amendments).

### 1.2.2 General reference standards

NOTE for drafters: this term applies to standards that apply to all structures or embrace the present standard.

[...]

[...]

### 1.2.3 Other reference standards

[...]

[...]

## 1.3 Assumptions

(1)P In addition to the general assumptions of EN 1990 the following assumptions apply:

– [...]

– …

## 1.4 Distinction between principles and application rules

(1)P The rules in EN 1990:2002, clause 1.4 apply.

## 1.5 Terms and Definitions

### 1.5.1 General

(1)P The terms and definitions given in EN 1990:2002, clause 1.5 apply

### 1.5.2 Additional terms and definitions used in the present standard

**1.5.2.1** …
**1.5.2.2** …
*etc*

## 1.6 Symbols

**(1)P For the purpose of this standard the following symbols apply.**

…

…

**B.3 Example of common Section 1** (from EN 1994-1-1, in italics)

**Section 1 General**

**1.1 Scope**

**1.1.1 Scope of *Eurocode 4***

(1)P *Eurocode 4 applies to the design of composite structures and members* for buildings and civil engineering works. 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 – Basis of structural design.

(2)P *Eurocode 4* is only concerned with requirements for resistance, serviceability, durability and fire resistance of composite structures. Other requirements, e.g concerning thermal or sound insulation, are not considered.

(3)P Eurocode 4 is intended to be used in conjunction with:
- EN 1990 Basis of structural design
- EN 1991 Actions on structures

*- EN's for construction products relevant for composite structures*
*- EN xxx13 Requirements for the execution of steel structures*
*- EN 13670 Execution of concrete structures*
*- EN 1998 Design of structures for earthquake resistance, when composite structures are built in seismic regions.*

(4) *Eurocode 4* is subdivided in various parts :
Part 1.1 : General rules and rules for buildings
Part 1.2 : Structural fire design
Part 2 : Bridges.

**1.1.2 *Scope of Part 1.1 of Eurocode 4***

*(1)P The Part 1.1 of Eurocode 4 gives a general basis for the design of composite structures together with specific provisions for buildings.*

(2) The following subjects are dealt with in Part 1.1:
Section 1 : General
Section 2 : Basis of design
Section 3 : Materials
Section 4 : Durability
Section 5 : Structural analysis
Section 6 : Ultimate limit states
Section 7 : Serviceability limit states

13 EN xxx is the conversion of ENV 1090

Section 8 : Composite joints in frames for buildings
Section 9 : Composite slabs with profiled steel sheeting for buildings
Section 10 : Execution

## 1.2 Normative references

### 1.2.1 Use

(1)P 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 referred to applies (including amendments).

### 1.2.2 General reference standards

| | |
|---|---|
| EN 1990:200x | Basis of structural design |
| EN 1991-1-5:200x | Actions on structures: Thermal actions |
| EN 1991-1-6:200x | Actions on structures: Actions during execution |

### 1.2.3 Other reference standards

| | |
|---|---|
| *EN 1992-1:200x* | *Design of concrete structures: General rules and rules for buildings* |
| *EN 1993-1-1:200x* | *Design of steel structures: General structural rules* |
| *EN 1993-1-3:200x* | *Design of steel structures: Cold-formed thin gauge members and sheeting* |
| *EN 1993-1-5:200x* | *Design of steel structures: Plated structural elements* |
| *EN 1993-1-8:200x* | *Design of steel structures: Design of joints* |
| *EN 1993-1-9:200x* | *Design of steel structures: Fatigue strength of steel structures* |
| *EN 1993-3:200x* | *Design of steel structures: Buildings* |
| *EN xxx* | *Requirements for the execution of steel structures* |
| *EN 10025:1993* | *Hot-rolled products of non-alloy structural steels: technical delivery conditions* |
| *EN 10147:2000* | *Continuously hot-dip zinc coated structural steels strip and sheet: Technical delivery conditions* |
| *EN 10149-2:1996* | *Hot-rolled flat products made of high yield strength steels for cold-forming: Delivery conditions for thermomechanically rolled steels* |
| *EN 10149-3:1995* | *Hot-rolled flat products made of high yield strength steels for cold-forming: Delivery conditions for normalised or normalised rolled steels* |

*EN 13670:200x* *Requirements for the execution of concrete structures*

*EN 13918:1998* *Welding – Studs and ceramic ferrules for arc stud welding*

*EN 14555:1998* *Welding – Arc stud welding of metallic materials*

### 1.3 Assumptions

*(1)P* In addition to the general assumptions of EN 1990 the following assumptions apply: - *those given in clauses 1.3 of EN1992-1: 200x and EN1993-1-1:200x.*

### 1.4 Distinction between principles and application rules

(1) The rules in EN 1990, 1.4 apply.

### 1.5 Terms and Definitions

#### 1.5.1 General

(1)P The terms and definitions given in EN 1990: 2001, 1.5 apply.

#### 1.5.2 Additional terms and definitions used in the present standard

***1.5.2.1***
***composite member***
*a structural member with components of concrete and of structural or cold-formed steel, interconnected by shear connection so as to limit the longitudinal slip between concrete and steel and the separation of one component from the other*.

***1.5.2.2***
***shear connection***
*an interconnection between the concrete and steel components of a composite member that has sufficient strength and stiffness to enable the two components to be designed as parts of a single structural member etc.*

### 1.6 Symbols

(1)P For the purpose of this standard the following symbols apply.

## C1 Recommended contents for Section 2

Titles for the Section and the clauses — Comments on the content of the clauses

NOTE Divide clauses into sub-clauses and paragraphs as appropriate

| | |
|---|---|
| **Section 2: Basis of Design** | Note: The titles of the clauses correspond to the titles of the Sections of Basis of Design (EN 1990)[(1)]: so each clause will give, when needed because of the specific scope or type of construction, additional information to that given in the relevant Section of EN 1990, except for "Structural Analysis", for which the corresponding information should be given in "Section 5" of the Parts. |
| **2.1 Requirements** | - refer to EN 1990<br>- with specific additions if needed (in separate sub-clauses) |
| **2.2 Principles of limit state design** | - give relevant information for use in verification e.g. types of limit states to consider. |
| **2.3 Basic variables** | - about the actions, refer to relevant parts of EN 1991,<br>- supplement them as necessary (e.g. on shrinkage, materials, prestress), |
| **2.4 Verification by the partial factor method** | - give relevant information for use in verification e.g. recommended values of the partial factors (these values shall be given in the same manner as in Annex A1 to EN 1990 i.e. in Notes)<br>- and refer to EN 1990 for combinations of actions |
| **2.5 Other matters specific to the Eurocode Part** | Note: optional, e.g. design by testing. |

## C2 Model clauses for Section 2

## 2 Basis of design

### 2.1 Requirements

#### 2.1.1 Basic requirements

(1)P The design of [ ... ] structures shall be in accordance with EN 1990.

(2)P The supplementary provisions for [ ... ] structures given in this section shall also be applied.

(3) The basic requirements of EN 1990 section 2 are deemed be satisfied for [ ... ] structures when limit state design in conjunction with the partial factor method using EN 1990 and EN 1991 for actions and their combinations and [EN ... ] for resistances, rules for serviceability and durability are applied.

#### 2.1.2 Reliability management

(1) [...]

#### 2.1.3 Design working life and durability

(1) [...]

### 2.2 Principles of limit states design

(1)P [...]

### 2.3 Basic variables

#### 2.3.1 Actions and environmental influences

(1)P [...]

#### 2.3.2 Material and product properties

(1)P [...]

### 2.4 Verification by the partial factor method

#### 2.4.1 Design values of actions

(1)P [...]

#### 2.4.2 Design values of material or product properties

(1)P ...

### 2.4.3 Design values of geometrical data

(1)P ...

### 2.4.4 Design resistances

(1)P ...

### 2.4.5 Verification of static equilibrium (EQU)

(1) The reliability format for the verification of static equilibrium in Table 1.2 (A) in Annex A of EN 1990:2002 also applies to design situations equivalent to (EQU), e.g. for the design of hold down anchors or the verification of uplift of bearings of continuous beams.

## 2.5 Design assisted by testing

(1) Resistances $R_K$ in this standard have been determined using Annex D of EN 1990:2002.

(2) When resistances $R_K$ for new products are to be determined from tests, the procedure specified in this standard should be considered.

## C3 Example of common Section 2 (from EN 1994-1-1, in italics)

### Section 2 Basis of design

### 2.1 Requirements

(1)P The design of composite structures shall be in accordance with EN 1990.

(2)P The supplementary provisions for composite structures given in this section shall also be applied.

(3) The basic requirements of EN 1990 Section 2 are deemed be satisfied for composite structures when the following are applied together:
- limit state design in conjunction with the partial factor method in accordance with EN 1990,
- actions in accordance with EN 1991,
- combination of actions in accordance with EN 1990 and
- resistances, durability and serviceability in accordance with this Standard.

### 2.2 Principles of limit states design

(1)P For composite structures, relevant stages in the sequence of construction shall be considered.

### 2.3 Basic variables

#### 2.3.1 Actions and environmental influences

(1) Actions for use in design may be obtained from the relevant parts of EN 1991:

EN 1991-1.1 Densities, self-weight and imposed loads
EN 1991-1.2 Fire Actions
EN 1991-1.3 Snow loads
EN 1991-1.4 Wind loads
EN 1991-1.5 Thermal actions
EN 1991-1.6 Actions during execution
EN 1991-1.7 Accidental actions due to impact and explosions
EN 1991-2 Traffic loads on bridges
EN 1991-3 Actions induced by cranes and other machinery
EN 1991-4 Actions in silos and tanks

(2) Actions from earth and water pressure may be obtained from EN 1997.

(3)P In calculations for a steel deck as shuttering, account shall be taken of the ponding effect (increased depth of concrete due to the deflection of the sheeting).

#### 2.3.2 Material and product properties

(1) Actions caused by time-dependent behaviour of concrete are obtained from EN 1992-1.

2.3.3 Classification of actions

(1)P The effects of shrinkage of concrete and non-uniform changes of temperature result in internal forces in cross sections, and curvatures and longitudinal strains in members; the effects that occur in statically determinate structures, and in statically indeterminate structures when compatibility of the deformations is not considered, shall be classified as primary effects.

(2)P In statically indeterminate structures the primary effects of shrinkage and temperature are associated with additional action effects, such that the total effects are compatible; these shall be classified as secondary effects and shall be considered as indirect actions.

## 2.4 Verification by the partial factor method

### 2.4.1 Design values

#### 2.4.1.1 Design values of actions

*(1) For prestress by controlled imposed deformations, e.g. by jacking at supports, the partial safety factor $\gamma_P$ should be specified for ultimate limit states.*

NOTE The value to be ascribed to the symbol $\gamma_P$ for use in a country may be found in its National Annex. The recommended value is 1,0.

(2) *For serviceability limit states, imposed deformations should be introduced as nominal values.*

*NOTE It is recommended that best estimate (mean) values are used but the values may be set by the National Annex.*

#### 2.4.1.2 Design values of material or product properties

(1)P Unless an upper estimate of strength is required, partial factors shall be applied to lower characteristic or nominal strengths.

(*2)P For concrete and steel reinforcement, partial factors $\gamma_M$ will be applied.*

NOTE The values to be ascribed to the symbol γm for use in a country may be found in its National Annex. The recommended values are in EN 1992-1-1: 200x, clause 2.4.1.

(3)*P For structural steel, steel sheeting and steel connecting devices, partial factors $\gamma_M$ will be applied.*

NOTE The values to be ascribed to the symbol γm for use in a country may be found in its National Annex. The recommended values are in EN 1993.

*(4)P For shear connection, a partial factor $\gamma_V$ will be applied.*

NOTE The value to be ascribed to the symbol $\gamma_V$ for use in a country may be found in its National Annex. The recommended value is in 6.6.

*(5)P For longitudinal shear in composite slabs, a partial factor $\gamma_M$ will be applied.*

NOTE The values to be ascribed the symbol γm for use in a country may be found in its National Annex. The recommended value is in 9.

### 2.4.1.3 Design values of geometrical data

(1) Geometrical data for cross sections and systems may be taken as nominal values from product standards hEN or drawings for the execution.

### 2.4.1.4 Design resistances

*(1)P For composite structures, design resistances shall be determined in accordance with EN 1990 expression (6.6a) or expression 6.6(c).*

### 2.4.2 Combination of actions

(1) The general formats for combinations of actions are given in EN 1990, Section 6.

### 2.4.3 Verification of static equilibrium (EQU)

(1) The reliability format for the verification of static equilibrium for buildings, as described in EN 1990: 2001, Table A1.2 (A), should also apply to design situations equivalent to (EQU), *e.g. for the design of hold down anchors or the verification of uplift of bearings of continuous beams.*

## 4. Fire parts - Foreword and Sections 1, 2, 3 & 4.3 (advanced calculation models)

### D.0 Common foreword

NOTE FOR DRAFTERS The three language versions of these model clauses are available to be downloaded from ??? for compiling stage 49 drafts of all Eurocode Parts.

The following clauses should be included in the Foreword to fire parts, in addition to the clauses in the Foreword to EN 1990 (see 3 above):

**Safety requirements**

EN 199x-1-2 is intended for clients (e.g. for the formulation of their specific requirements), designers, contractors and relevant authorities.

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.

Construction Products Directive 89/106/EEC gives the following essential requirement for the limitation of fire risks:

"The construction works must be designed and build in such a way, that in the event of an outbreak of fire

the load bearing resistance of the construction can be assumed for a specified period of time
- the generation and spread of fire and smoke within the works are limited
- the spread of fire to neighbouring construction works is limited
- the occupants can leave the works or can be rescued by other means
- the safety of rescue teams is taken into consideration".

According to the Interpretative Document N° 2 "Safety in case of fire[5]" the essential requirement may be observed by following various possibilities for fire safety strategies prevailing in the Member States like conventional fire scenarios (nominal fires) or "natural" (parametric) fire scenarios, including passive and/or active fire protection measures.

The fire parts of Structural Eurocodes deal with specific aspects of passive fire protection in terms of designing structures and parts thereof for adequate load bearing resistance and for limiting fire spread as relevant.

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, where allowed by national fire regulations, by referring to fire safety engineering for assessing passive and active measures.

Supplementary requirements concerning, for example

- 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 document, because they are subject to specification by the competent authority.

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

**Design procedures**

A full analytical procedure for structural fire design would take into account the behaviour of the structural system at elevated temperatures, the potential heat exposure and the beneficial effects of active and passive fire protection systems, together with the uncertainties associated with these three features and the importance of the structure (consequences of failure).

At the present time it is possible to undertake a procedure for determining adequate performance which incorporates some, if not all, of these parameters and to demonstrate that the structure, or its components, will give adequate performance in a real building fire. However, where the procedure is based on a nominal (standard) fire the classification system, which calls for specific periods of fire resistance, takes into account (though not explicitly), the features and uncertainties described above.

Application of this Part 1-2 is illustrated in Figure 1. The prescriptive approach and the performance-based approach are identified. The prescriptive approach uses nominal fires to generate thermal actions. The performance-based approach, using fire safety engineering, refers to thermal actions based on physical and chemical parameters.

For design according to this part, EN 1991-1-2 is required for the determination of thermal and mechanical actions to the structure. *(only for EN 1992 to 1999)*

**Design aids**

Where simple calculation models are not available, the Eurocode fire parts give design solutions in terms of tabulated data (based on tests or advanced calculation models), which may be used within the specified limits of validity. *(only for EN 1992 to 1999)*

It is expected, that design aids based on the calculation models given in EN 199x-1-2, will be prepared by interested external organizations.

The main text of EN 199x-1-2 together with normative Annexes A1, A2, .... includes most of the principal concepts and rules necessary for structural fire design of *aaa* structures.

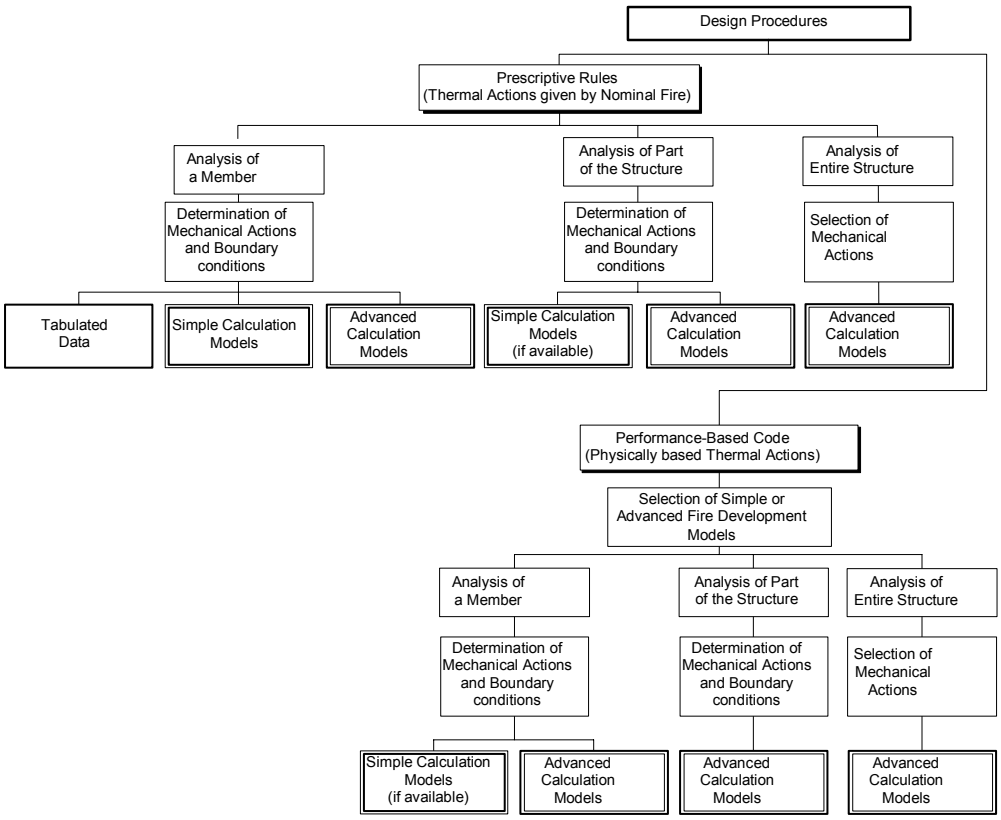



**Figure 1: Alternative design procedures**

## D.1 Model Section 1 for fire parts

NOTE for drafters The three language versions of these model clauses are available to be downloaded from ??? for compiling stage 49 drafts of all Eurocode Parts.

# 1 General

## 1.1 Scope

### 1.1.1 Scope of Eurocode ...

(1)P Eurocode ... applies to the design of buildings and civil engineering works in ... . 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 – Basis of structural design.

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

(3)P Eurocode ... is intended to be used in conjunction with:

- EN 1990 “Basis of structural design”
- EN 1991 “Actions on structures”
- hEN´s for construction products relevant for ..

EN ... “Requirements for the execution of ...”

- EN 1998 “Design of structures for earthquake resistance”, when ... structures are built in seismic regions

(4)P Eurocode ... is subdivided in various parts:

...

..

### 1.1.2 Scope of Part 1.2 of Eurocode ...

(1) This Part 1-2 of EN 199x deals with the design of ... structures for the accidental situation
of fire exposure and is intended to be used in conjunction with EN 199x-1-1, … and EN 1991-1-2.
This part 1-2 only identifies differences from, or supplements to, normal temperature design.

(2) This Part 1-2 of EN 199x deals only with passive methods of fire protection. Active methods
are not covered.

(3) This Part 1-2 of EN 199x applies to [ ... ] structures that are required to fulfil certain functions when exposed to fire, in terms of:
- avoiding premature collapse of the structure (load bearing function)
- limiting fire spread (flame, hot gases, excessive heat) beyond designated areas (separating function)

(4) This Part 1-2 of EN 199x gives principles and application rules (see EN 1991-1-2) for designing structures for specified requirements in respect of the aforementioned functions and the levels of performance.

(5) This Part 1-2 of EN 199x applies to structures, or parts of structures, that are within the scope of EN 199x-1-1 *(and ...)* and are designed accordingly. *(However, it does not cover ....)*

(6) The methods given in this Part 1-2 of EN 199x are applicable to *[aaa grades]*

**1.2 Normative references**

(1)P 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 referred to applies (including amendments).

EN …

EN 1363-1 *Fire resistance: General requirements*;

prENV 13381 *Fire tests on elements of building construction:*

- Part 1 *Test method for determining the contribution to the fire resistance of structural members: by horizontal protective membranes*;
- Part 2 *Test method for determining the contribution to the fire resistance of structural members: by vertical protective membranes*;
- Part z: *Test method for determining the contribution to the fire resistance of structural members: by applied protection to aaa structural elements*;

prEN 13501-2 *Fire classification of construction products and building elements*

- Part 2 Classification using data from fire resistance tests**,** excluding ventilation services

EN 1991 *Eurocode 1. Basis of design and actions on structures:*

Part 1-2: *Actions on structures exposed to fire*;

EN 199x *Eurocode x. Design of aaa structures:*

Part 1.1: *General rules : General rules and rules for buildings*;
Part 1.y: *General rules : Supplementary rules for …*;

### 1.3 Assumptions

(1)P In addition to the general assumptions of EN 1990 the following assumption applies:

- Any (active and– *within EN 1991-1.2-*) passive fire protection systems taken into account in the design will be adequately maintained.

- The choice of the relevant design fire scenario is made by appropriate qualified and experienced personnel.

NOTE The choice to be used in a country may be found in the National Annex (only within EN 1991-1-2)

### 1.4 Distinction between Principles and Application Rules

(1) The rules given in EN 1990 clause 1.4 apply.

### 1.5 Definitions

NOTE FOR DRAFTERS The general definitions have to be put only in EN 1991-1-2. Only specific definitions are put in material Eurocodes (identified by their sub-committee number). Each definition needs to have a reference number – if only few definitions remain, it could be possible to not use sub-clauses.

#### 1.5.1 General

(1)P The rules in EN 1990 clause 1.5 apply

(2)P The following terms are used in Part 1.2 of Eurocode 199x with the following meanings:

#### 1.5.2 Common terms used in Eurocode Fire parts *(sub-chapter only for EN 1991-1.2)*

**1.5.2.1**.
**equivalent time of fire exposure**
time of exposure to the standard temperature-time curve supposed to have the same heating effect as a real fire in the compartment.

**1.5.2.2**
**external member**
structural member located outside the building that may be exposed to fire through openings in the building enclosure.

**1.5.2.3**

**fire compartment**
a space within a building, extending over one or several floors, which is enclosed by separating elements such that fire spread beyond the compartment is prevented during the relevant fire exposure.

**1.5.2.4**
**fire resistance**
the ability of a structure, a part of a structure or a member to fulfil its required functions (load
bearing function and/or separating function) for a specified fire exposure and for a specified period of time.

**1.5.2.5**
**fully developed fire**
the state of full involvement of all combustible surfaces in a fire within a specified space.

**1.5.2.6**
**global structural analysis** *(for fire)*
a structural analysis of the entire structure, when either the entire structure, or only parts of it, are exposed to fire. Indirect fire actions are considered throughout the structure.

**1.5.2.7**
**indirect fire actions**
internal forces and moments caused by thermal expansion.

**1.5.2.8**
**integrity (E)**
the ability of a separating element of building construction, when exposed to fire on one side, to prevent the passage through it of flames and hot gases and to prevent the occurrence of flames on the unexposed side.

**1.5.2.9**
**insulation (I)**
the ability of a separating element of building construction when exposed to fire on one side, to restrict the temperature rise of the unexposed face to below specified levels.

**1.5.2.10**
**load bearing function (R)**
the ability of a structure or a member to sustain specified actions during the relevant fire, according to defined criteria.

**1.5.2.11**
**member**
a basic part of a structure (such as beam, column, but also assembly such as stud wall, truss, ...) considered as isolated with appropriate boundary and support conditions.

**1.5.2.12**
**member analysis** *(for fire)*
the thermal and mechanical analysis of a structural member exposed to fire in which the member is assumed as isolated, with appropriate support and boundary conditions. Indirect fire actions are not considered, except those resulting from thermal gradients.

**1.5.2.13**
**normal temperature design**
ultimate limit state design for ambient temperatures according to Part 1-1 of EN 1992 to 1996 or ENV 1999

**1.5.2.14**
**separating function**
the ability of a separating element to prevent fire spread (e.g. by passage of flames or hot gases - cf integrity) or ignition beyond the exposed surface (cf insulation) during the relevant fire.

**1.5.2.15**
**separating element:** Load bearing or non-load bearing element (e.g. wall or floor) forming part of the enclosure of a fire compartment.

**1.5.2.16**
**standard fire resistance**
the ability of a structure or part of it (usually only members) to fulfil required functions (load-bearing function and/or separating function), for the exposure to heating according to the standard temperature-time curve for a stated period of time.

**1.5.2.17**
**structural members**
the load-bearing members of a structure including bracings.

**1.5.2.18**
**temperature analysis**
the procedure of determining the temperature development in members on the basis of the thermal actions (net heat flux) and the thermal material properties of the members and of protective surfaces, where relevant.

**1.5.2.19**
**thermal actions**
actions on the structure described by the net heat flux to the members.

**1.5.3 Special terms relating to design in general** *(only for Fire Parts other than EN 1991-1.2)*

**1.5.3.1**
**advanced fire model**

design fire based on mass conservation and energy conservation aspects

**1.5.3.2**
**computational fluid dynamic model**
a fire model able to solve numerically the partial differential equations giving, in all points of the compartment, the thermo-dynamical and aero-dynamical variables.

**1.5.3.3**
**fire wall**
a separating element that is a wall separating two spaces (generally two buildings) that is designed for fire resistance and structural stability, and may include resistance to horizontal loading such that, in case of fire and failure of the structure on one side of the wall, fire spread beyond the wall is avoided. *(EC2)*

**1.5.3.4**
**one-Zone model**
a fire model where homogeneous temperatures of the gas are assumed in the compartment.

**1.5.3.5**
**simple fire model**
design fire based on a limited application field of specific physical parameters.

**1.5.3.6**
**two-zone model**
a fire model where different zones are defined in a compartment: the upper layer, the lower layer, the fire and its plume, the external gas and walls. In the upper layer, uniform temperature of the gas is assumed.

**1.5.3.7**
**part of structure**
isolated part of an entire structure with appropriate support and boundary conditions.*(EC2, EC3, EC4, EC5, EC6, EC9)*

**1.5.3.8**
**protected members**
members for which measures are taken to reduce the temperature rise in the member due to fire.*(EC2, EC3, EC4, EC5)*

**1.5.4 Terms relating to thermal actions** *(mainly for EN 1991-1-2)*

**1.5.4.1**
**combustion factor**
the combustion factor represents the efficiency of combustion, varying between 1 for complete combustion to 0 for combustion fully inhibited.

**1.5.4.2**
**design fire**
a specified fire development assumed for design purposes.

**1.5.4.3**
**design fire load density**

the fire load density considered for determining thermal actions in fire design; its value makes allowance for uncertainties.

**1.5.4.4**
**design fire scenario**

a specific fire scenario on which an analysis will be conducted.

**1.5.4.5**
**external fire curve**

a nominal temperature-time curve intended for the outside of separating external walls which can be exposed to fire from different parts of the facade, i.e. directly from the inside of the respective fire compartment of from a compartment situated below or adjacent to the respective external wall.

**1.5.4.6**
**fire activation risk**

a parameter taking into account the probability of ignition function of the compartment area and the occupancy.

**1.5.4.7**
**fire load density**

the fire load per unit area related to the floor area $q_f$, or related to the surface area of the total enclosure, including openings, $q_t$.

**1.5.4.8**
**fire load**

the sum of thermal energies which are released by combustion of all combustible materials in a space (building contents and construction elements).

**1.5.4.9**
**fire scenario**

a qualitative description of the course of a fire with time identifying key events that characterise the fire and differentiate it from other possible fires. It typically defines the ignition and fire growth process, the fully developed stage, decay stage together with the building environment and systems that will impact on the course of the fire.

**1.5.4.10**

**flash-over:**

simultaneous ignition of all the fire load in a compartment.

**1.5.4.11**

**heat release rate**

heat (energy) released by a combustible product as a function of time.

**1.5.4.12**

**hydrocarbon fire curve**

a nominal temperature-time curve for representing loads hydrocarbon type fire.

**1.5.4.13**

**localised fire**

a fire involving only a limited area of the fire load in the compartment.

**1.5.4.14**

**opening factor**

factor representing the amount of ventilation depending on the area of openings in the compartment walls, on the height of these openings and on total area of the enclosure surfaces.

**1.5.4.15**

**rate of heat release**

heat (energy) released by a combustible product as a function of time.

**1.5.4.16**

**standard temperature-time curve**

a nominal curve, defined in EN 13501-2 for representing a model of a fully developed fire in a compartment.

**1.5.4.17**

**temperature-time curves:**

gas temperature in the environment of member surfaces as a function of time. They may be:

- **nominal**: Conventional curves, adopted for classification or verification of fire resistance, e.g. the standard temperature-time curve, external fire curve, hydrocarbon fire curve;
- **parametric**: Determined on the basis of fire models and the specific physical parameters defining the conditions in the fire compartment.

**1.5.5 Terms relating to material and products properties** *(for Fire Parts other than EN 1991-1.2)*

**1.5.5.1**

**char-line**

border line between the char-layer and the residual cross section.*(EC5)*

**1.5.5.2**

**failure time of protection**

duration of protection against direct fire exposure; that is the time when the fire protective claddings or other protection fall off the timber member, or other structural members aligned with the member fail due to collapse, or the alignment with other structural members is terminated due to excessive deformation *(EC5)*

**1.5.5.3**
**fire protection material**
any material or combination of materials applied to a structural member for the purpose of increasing its fire resistance *(EC2, EC3, EC4, EC5, EC6, EC9)*.

**1.5.5.4**
**protection time of protection**
the time of delay of charring by means of fire protection material or cladding; *(EC5)*

**1.5.6 Terms relating to heat transfer analysis**

**1.5.6.1**
**configuration factor**
the configuration factor for radiative heat transfer from surface A to surface B is defined as the fraction of diffusely radiated energy leaving surface A that is incident on surface B.

**1.5.6.2**
**convective heat transfer coefficient**
convective heat flux to the member related to the difference between the bulk temperature of gas bordering the relevant surface of the member and the temperature of that surface.

**1.5.6.3**
**emissivity**
equal to absorptivity of a surface, i.e. the ratio between the radiative heat absorbed by a given surface, and that of a black body surface.

**1.5.6.4**
**net heat flux**
energy per unit time and surface area definitely absorbed by members.

**1.5.6.5**
**resulting emissivity**
the ratio between the actual radiative heat flux to the member and the net heat flux that would occur if the member and its radiative environment were considered as black bodies.

**1.5.6.6**
**section factor**

for a steel member, the ratio between the exposed surface area and the volume of steel; for an enclosed member, the ratio between the internal surface area of the exposed encasement and the volume of steel.*(EC3, EC4)*

### 1.5.7 Terms relating to mechanical behaviour analysis

**1.5.7.1**
**critical temperature of structural steel**

for a given load level, the temperature at which failure is expected to occur in a structural steel element for a uniform temperature distribution. *(EC3)*

**1.5.7.2**
**critical temperature of reinforcement**

the steel temperature at which the ultimate limit state is expected to occur at a given load level *(EC2,EC4?)*

**1.5.7.3**
**effective cross section**

cross section of the member in structure fire design used in the effective cross section method. It is obtained from the residual cross section by removing parts of the cross section with assumed zero strength and stiffness.*(EC2)*

**1.5.7.4**
**maximum stress level**

for a given temperature, the stress level at which the stress-strain relationship of steel is truncated to provide a yield plateau.*(EC2, EC3, EC4)*

**1.5.7.5**
**residual cross section**

cross section of the original member reduced with the charring depth.*(EC5)*

### 1.6 Symbols

(1)P For the purpose of this Part 1-2, the following symbols apply.

*Latin upper case letters*

| | |
|---|---|
| $A_m$ | the surface area of a member per unit length; |
| $A_p$ | the area of the inner surface of the fire protection material per unit length of the member; |
| $E_a$ | the modulus of elasticity of steel for normal temperature design; |
| $E_{a,\theta}$ | the slope of the linear elastic range for steel at elevated temperature $\theta_a$ ; |
| $E_{d,fi}$ | the design effect of actions in the fire situation; |

*Latin lower case letters*

| | |
|---|---|
| $c$ | the specific heat; |

$d_p$ the thickness of fire protection material;
$f_{p,\theta}$ the proportional limit for steel at elevated temperature $\theta_a$ ;
$f_{y,\theta}$ the effective yield strength of steel at elevated temperature $\theta_a$ ;
$\dot{h}_{net,d}$ the design value of the net heat flux per unit area;
$k_\theta$ the relative value of a strength or deformation property of steel at elevated temperature $\theta_a$;
$l$ the length at 20 $^oC$ ;
$t$ the time in fire exposure;

*Greek upper case letters*

$\Delta t$ the time interval;

*Greek lower case letters*

$\eta_{fi}$ the reduction factor for design load level in the fire situation;
$\theta$ the temperature;
$\kappa$ the adaptation factor;
$\lambda$ the thermal conductivity;
$\mu_0$ the degree of utilisation at time $t = 0$.

## D.2 Model Section 2 for fire parts

### Section 2. Basis of design

### 2.1 Requirements

#### 2.1.1 Basic requirements

(1)P Where mechanical resistance in the case of fire is required, structures shall be designed and constructed in such a way that they maintain their load bearing function during the relevant fire exposure.

(2)P Where compartmentation is required, the elements forming the boundaries of the fire compartment, including joints, shall be designed and constructed in such a way that they maintain their separating function during the relevant fire exposure. This shall include, when relevant:

- integrity failure does not occur,
- insulation failure does not occur,
- thermal radiation from the unexposed side is limited.

NOTE 1: see EN 1991-1.2 for definitions
NOTE 2: In case of concrete (or composite) elements dealt within this Part 1-2, the thermal radiation criteria is not relevant

(3)P Deformation criteria shall be applied where the means of protection, or the design criteria for separating elements, require consideration of the deformation of the load bearing structure.

(4) Consideration of the deformation of the load bearing structure is not necessary in the following cases, as relevant:

- the efficiency of the means of protection has been evaluated according to 3.3.3,
- the separating elements have to fulfil requirements according to a nominal fire exposure.

#### 2.1.2 Nominal fire exposure

(1)P For the standard fire exposure, members shall comply with criteria R, E and I as follows:

- separating only: integrity (criterion E) and, when requested, insulation (criterion I)
- load bearing only: mechanical resistance (criterion R)
- separating and load bearing: criteria R, E and, when requested, I

(2) Criterion R is assumed to be satisfied where the load bearing function is maintained during the required time of fire exposure.

(3) Criterion I may be assumed to be satisfied where the average temperature rise over the whole of the non-exposed surface is limited to 140 K, and the maximum temperature rise at any point of that surface does not exceed 180 K

NOTE FOR DRAFTERS don't forget to mention in the calculation part (generally chapter 4) that the ambient temperature is assumed to be at 20°C

(Annex K D2)

NOTE FOR DRAFTERS: since it is not possible to deal easily with criterion E by calculation, the only way to give rules for fulfilling this criterion is by construction detailing. Consequently, for the Eurocodes dealing with separating elements, don't forget to give rule(s) showing that this aspect of fire resistance behaviour is taken into account.

(4) With the external fire exposure curve the same criteria should apply, however the reference to this specific curve should be identified by the letters "ef".

(5) With the hydrocarbon fire exposure curve the same criteria should apply, however the reference to this specific curve should be identified by the letters "HC"

(6) Where a vertical separating element with or without load-bearing function have to comply with impact resistance requirement (criterion M), the element should resist a horizontal concentrated load as specified in EN 1363 Part 2.

NOTE Rule to be incorporated only in EC2 and EC6.

### 2.1.3 Parametric fire exposure

(1) The load-bearing function is ensured when collapse is prevented during the complete duration of the fire including the decay phase or during a required period of time.

(2) For the verification of the separating function the following applies, assuming that the normal temperature is 20°C:

- the average temperature rise of the unexposed side of the element is limited to 140 K and the maximum temperature rise of the unexposed side does not exceed 180 K, during the heating phase until the maximum gas temperature in the fire compartment is reached;
- the average temperature rise of the unexposed side of the element should be limited to $\Delta\Theta_1$ and the maximum temperature rise of the unexposed side should not exceed $\Delta\Theta_2$ during the decay phase of the fire or up to a required period of time.

NOTE The values to be ascribed to the symbols $\Delta\Theta_1$ and $\Delta\Theta_2$ for use in a Country may be found in its National Annex. The recommended value for $\Delta\Theta_1$ is 200 K and for $\Delta\Theta_2$ is240 K.

### 2.2 Actions

(1)P The thermal and mechanical actions shall be taken from EN 1991-1-2.

(2) In addition to EN 1991-1-2, the emissivity related to the *aaa* surface should be taken as 0.x

### 2.3 Design values of material properties

(1)P Design values of mechanical (strength and deformation) material properties $X_{d,fi}$ are defined as follows:

(Annex K D2)

$$X_{d,fi} = k_\theta X_k / \gamma_{\gamma M,fi} \quad (2.1)$$

where:

$X_k$ is the characteristic value of a strength or deformation property *(generally $f_k$ or $E_k$)* for normal temperature design to EN 199x-1-1;

$k_\square$ is the reduction factor for a strength or deformation property $(X_{k,\square} / X_k)$, dependent on the material temperature, see 3.2.1;

$\gamma_{M,fi}$ is the partial safety factor for the relevant material property, for the fire situation.

NOTE For mechanical properties of aaa, the recommended value of partial safety factor for the fire situation is:

$\gamma_{M,fi} = 1,0$

(2)P Design values of thermal material properties $X_{d,fi}$ are defined as follows:

- if an increase of the property is favourable for safety:

$$X_{d,fi} = X_{k,\theta} / \gamma_{M,fi} \quad (2.2a)$$

- if an increase of the property is unfavourable for safety:

$$X_{d,fi} = \square_{M,fi} X_{k,\theta} \quad (2.2b)$$

where:

$X_{k,\square}$ is the value of a material property in fire design, generally dependent on the material temperature, see section 3;

$\gamma_{M,fi}$ is the partial safety factor for the relevant material property, for the fire situation.

NOTE For thermal properties of aaa, the recommended value of partial safety factor for the fire situation is $\gamma_M$ =1,0

## 2.4 Verification methods

### 2.4.1 General

**2.4 Verification methods**

**2.4.1 General**

(1)P The model of the structural system adopted for design to this Part 1.2 of EN 199x shall reflect the expected performance of the structure in fire.

(2)P It shall be verified for the relevant duration of fire exposure *t*:

$$E_{d,fi} \leq R_{d,t,fi} \quad (2.3)$$

where

$E_{d,fi}$ is the design effect of actions for the fire situation, determined in accordance with EN 1991-1-2, including effects of thermal expansions and deformations;

$R_{d,t,fi}$ is the corresponding design resistance in fire situation.

(3) The structural analysis for the fire situation should be carried out according to EN 1990 5.1.4 (2).

NOTE For verifying standard fire resistance requirements, a member analysis is sufficient

(4) Where application rules given in this Part 1-2 are valid only for the standard temperature-time curve, this is identified in the relevant clauses.

(5) Tabulated data given in 4.2 are based on the standard temperature-time curve.

(6)P As an alternative to design by calculation, fire design may be based on the results of fire tests, or on fire tests in combination with calculations, see EN 1990 clause 5.2

### 2.4.2 Member analysis

(1) The effect of actions should be determined for time $t$=0 using combination factors $\Psi_{1,1}$ or $\Psi_{2,1}$ according to EN 1991-1-2 clause 4.3.1.

(2) As a simplification to (1), the effect of actions $E_{d,fi}$ may be obtained from a structural analysis for normal temperature design as:

$$E_{d,fi} = \acute{\eta}_{fi} E_d \quad (2.4)$$

where:

$E_d$ is the design value of the corresponding force or moment for normal temperature design, for a fundamental combination of actions (see EN 1990);

$\acute{\eta}_{fi}$ is the reduction factor for the design load level for the fire situation.

(3) The reduction factor $\eta_{fi}$ for load combination (6.10) in EN 1990 should be taken as:

$$\eta_{fi} = \frac{G_k + \psi_{fi} Q_{k,1}}{\gamma_G G_k + \gamma_{Q,1} Q_{k,1}} 1 \quad (2.5)$$

or for load combination (6.10)a and (6.10b) in EN 1990 as the smaller value given by the two following expressions:

$$\eta_{fi} = \frac{G_k + \psi_{fi} Q_{k,1}}{\gamma_G G_k + \gamma_{Q,1} Q_{k,1}} \quad (2.5a)$$

$$\eta_{fi} = \frac{G_k + \psi_{fi} Q_{k,1}}{\xi\gamma_G G_k + \gamma_{Q,1} Q_{k,1}} \quad (2.5b)$$

where:

$Q_{k,1}$ is the principal variable load;
Gk is the characteristic value of a permanent action;
$\gamma_G$ is the partial factor for permanent actions;

$\gamma_{Q,1}$ is the partial factor for variable action 1;
$\Psi_{fi}$ is the combination factor for frequent values, given either by $\Psi_{1,1}$ or $\Psi_{2,1}$ see EN 1991-1.2;
$\xi$ is a reduction factor for unfavourable permanent actions *G*.

NOTE 1: An example of the variation of the reduction factor $\eta_{fi}$ versus the load ratio $Q_{k,1}/G_k$ for different values of the combination factor $\psi_{fi} = \psi_{1,1}$ according to expression (2.5), is shown in figure 2.1 with the following assumptions: $\gamma_{GA} = 1,0$, $\gamma_G = 1,35$ and $\gamma_Q = 1,5$. Partial factors are specified in the relevant National annexes of EN 1990. Equations (2.5a) and (2.5b) give slightly higher values.

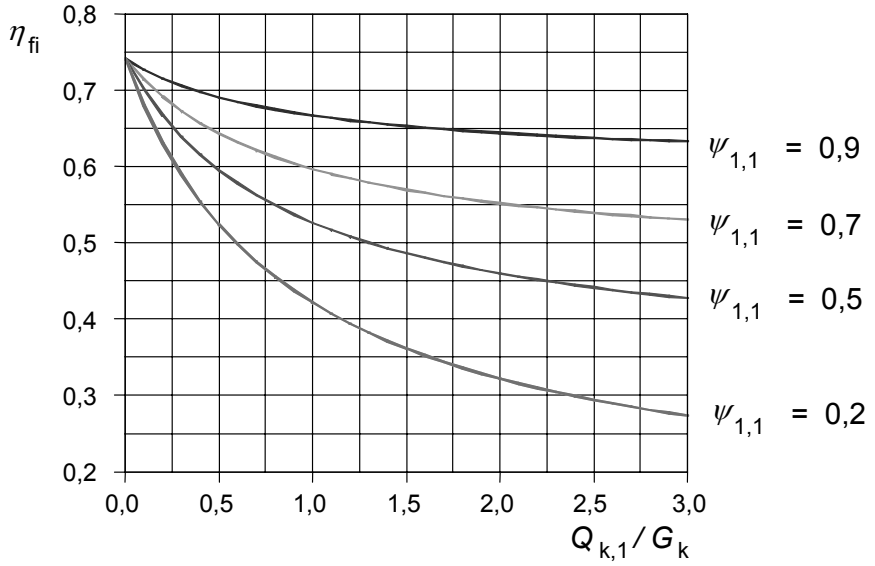



**Figure 2.1 : Examples of variation of the reduction factor $\eta_{fi}$ with the load ratio $Q_{k,1} / G_k$**

NOTE 2: As a simplification the recommended value of □ fi = 0,65 may be used, except for imposed load according to load category E as given in EN 1991-2.1 (areas susceptible to accumulation of goods, including access areas) where the recommended value is 0,7.

(4) Only the effects of thermal deformations resulting from thermal gradients across the cross-section need be considered. The effects of axial or in-plane thermal expansions may be neglected.

(5) The boundary conditions at supports and ends of member may be assumed to remain unchanged throughout the fire exposure.

(6) Tabulated data, simplified or advanced calculation methods given in clauses 4.2, 4.3 and 4.4 respectively are suitable for verifying members under fire conditions.

### 2.4.3 Analysis of part of the structure

(1) 2.4.2 (1) applies.

(2) As an alternative to carrying out a structural analysis for the fire situation at time $t = 0$, the reactions at supports and internal forces and moments at boundaries of part of the structure may be obtained from a structural analysis for normal temperature as given in clause 2.4.2

(3) The part of the structure to be analysed should be specified on the basis of the potential thermal expansions and deformations such, that their interaction with other parts of the structure can be approximated by time-independent support and boundary conditions during fire exposure.

(4)P Within the part of the structure to be analysed, the relevant failure mode in fire exposure, the temperature-dependent material properties and member stiffnesses, effects of thermal expansions and deformations (indirect fire actions) shall be taken into account

(5) The boundary conditions at supports and forces and moments at boundaries of part of the structure may be assumed to remain unchanged throughout the fire exposure

### 2.4.4 Global structural analysis

(1)P When global structural analysis for the fire situation is carried out, the relevant failure mode in fire exposure, the temperature-dependent material properties and member stiffnesses, effects of thermal expansions and deformations (indirect fire actions) shall be taken into account.

## D. 3 Model Section 3 for fire parts

### Section 3. : Material properties

### 3.1 General

(1)P Unless given as design values, the values of material properties given in this section shall be treated as characteristic values

(2)P The mechanical properties of *aaa* at 20 °C shall be taken as those given in EN 199x-1-1 for normal temperature design.

### 3.2 Mechanical properties of *AAA*

#### 3.1.1 Strength and deformation properties

(1) For heating rates between 2 and 50 K/min, the strength and deformation properties of *aaa* at elevated temperatures shall be obtained from the stress-strain relationship given in figure ....

#### 3.1.2 Unit mass

(1) The unit mass of *aaa* $\rho_a$ may be considered to be independent of the *aaa* temperature. The following value may be taken:

$\rho_{aaa}$ = xxx kg/m$^3$

### 3.3 Thermal properties

#### 3.3.1 Aaa

#### 3.3.1.1 Thermal elongation

(1) The thermal elongation of *aaa* $\Delta l / l$ should be determined from the following:....

(1) The variation of the thermal elongation with temperature is illustrated in figure ...

(3) In simple calculation models the relationship between thermal elongation and *aaa* temperature may be considered to be constant. In this case the elongation may be determined from:

…

#### 3.3.1.2 Specific heat capacity

(1) The specific heat of *aaa* $c_a$ should be determined from the following:....

(2) The variation of the specific heat with temperature is illustrated in figure ....

### 3.3.1.3 Thermal conductivity

(1) The thermal conductivity of *aaą* $\square_a$ should be determined from the following: ...

(2) The variation of the thermal conductivity with temperature is illustrated in figure.....

### 3.3.2 Charring depth

### 3.3.3 Fire protection materials

(1) The properties and performance of fire protection materials used in design should have been assessed using the test procedures given in ENV 13381-1, EN 13381-2 or EN 13381-y as appropriate.

### 3.3.4 Adhesives

## D.4 Model Section 4.3 for fire parts

### Section 4. Design Procedures

### 4.1 General

(1)P The following design methods are permitted in order to satisfy 2.4.1 (2)P:

- detailing according to recognised design solutions (tabulated data or testing)
- simplified calculation methods for specific types of members
- advanced calculation methods for simulating the behaviour of structural members, parts of the structure or the entire structure

NOTE FOR DRAFTERS Not all methods need to be included in a Eurocode Part . Where the text for Method 2 or Method 3 is given in an Informative Annex, it should be referred to by a NOTE, as described in 5.

NOTE The decision on use of advanced calculation methods in a Country may be found in its National Annex.

### 4.3 Advanced calculation models

#### 4.3.1 General

(1)P Advanced calculation methods shall provide a realistic analysis of structures exposed to fire. They shall be based on fundamental physical behaviour in such a way as to lead to a reliable approximation of the expected behaviour of the relevant structural component under fire conditions.

(2)P Any potential failure modes not covered by the advanced calculation method (including local buckling and failure in shear) shall be eliminated by appropriate means.

(3) Advanced calculation methods should include calculation models for the determination of:

- the development and distribution of the temperature within structural members (thermal response model);
- the mechanical behaviour of the structure or of any part of it (mechanical response model).

(4)P Advanced calculation methods may be used in association with any heating curve, provided that the material properties are known for the relevant temperature range.

(5) Advanced calculation methods may be used with any type of cross-section.

### 4.3.2 Thermal response

(1)P Advanced calculation methods for thermal response shall be based on the acknowledged principles and assumptions of the theory of heat transfer.

(2)P The thermal response model shall consider:

- the relevant thermal actions specified in EN 1991-1-2;
- the variation of the thermal properties of the material with the temperature, see 3.3.

(3) The effects of non-uniform thermal exposure and of heat transfer to adjacent building components may be included where appropriate.

(4) The influence of any moisture content and of any migration of the moisture within the fire protection material may conservatively be neglected.

NOTE This does not apply to EN 1995

### 4.3.3 Mechanical response

(1)P Advanced calculation methods for mechanical response shall be based on the acknowledged principles and assumptions of the theory of structural mechanics, taking into account the changes of mechanical properties with temperature.

(2)P The effects of thermally induced strains and stresses both due to temperature rise and due to temperature differentials, shall be considered, (*not for EC5*)

(3)P The mechanical response of the model shall also take account of:

- the combined effects of mechanical actions, geometrical imperfections and thermal actions;
- the temperature dependent mechanical properties of the material, see 3.2;
- geometrical non-linear effects;
- the effects of non-linear material properties, including the beneficial effects of loading and unloading on the structural stiffness.

(4) Provided that the stress-strain relationships given in 3.2 are used, the effects of transient thermal creep need not be given explicit consideration.

(5)P The deformations at ultimate limit state implied by the calculation method shall be limited to ensure that compatibility is maintained between all parts of the structure.

(6) The design should take into account the ultimate limit state beyond which the calculated deformations of the structure would cause failure due to the loss of adequate support to one of the members.

(7) For the analysis of isolated vertical members a sinusoidal initial imperfection with a maximum value of h/1000 at mid-height should be used, when not specified by relevant product standards.

### 4.3.4 Validation of advanced calculation models

(1)P A verification of the accuracy of the calculation models shall be made on basis of relevant test results.

(2) Calculation results may refer to temperatures, deformations and fire resistance times.

(3)P The critical parameters shall be checked to ensure that the model complies with sound engineering principles, by means of a sensitivity analysis.

(4) Critical parameters may refer, for example to the buckling length, the size of the elements, the load level.

## 5. Editorial style and form for EN Eurocode Parts

NOTE 1 Examples are indented

NOTE 2 The presentation of each EN Eurocode Part shall respect the following rules (following the CEN PNE Rules, with the special derogation accepted by the CEN – Resolution BTS1 38/1994, see end of section).

### 5.1 Organizing the Eurocode Part EN

#### 5.1.1 General

(1) Each EN Eurocode Part has a title page, a contents list and a Foreword and is divided in Sections and clauses (with sub-clauses as necessary).

(2) Each of these divisions has a title (in bold letters), except for secondary sub-clauses, which need not have.

(3) Each division is numbered. For the numbering of sub-clauses, use a maximum 4-part number only (in very exceptional circumstances 5 part may be possible).

(4) Each clause (or sub-clause) has one or several paragraphs. All paragraphs are to be numbered sequentially in the clause (or sub-clause), with the numbers enclosed in brackets, for example:

**1.3.2 Slenderness ratio**
(1) The slenderness ratio is etc.
(2) etc.

#### 5.1.2 Title page

(1) The CEN Central Secretariat will add the official title page for the EN Eurocode Part after the document has been approved. Meanwhile PTs should use an interim title page with the full title of the part concerned, for example:

**Part 1 : General rules and rules for buildings**

(2) The document number should appear at the top right-hand cover of the title page. For the above example this will be "prEN 1992-1.

#### 5.1.3 Contents list

(1) 'Contents' should be listed in numerical order starting on page 2 (inside of front cover/title page). Only Sections, clauses and sub-clauses up to and including 3 part numbers shall be listed (e.g. 2.5.3) together with Annexes, annex clauses and sub-clauses (e.g. B.2.4).

(2) Tables and figures will not be included in the content list.

#### 5.1.4 Foreword

(1) The Foreword is informative and is not numbered. Clauses and paragraphs in the Foreword are not numbered. Sub-headings may be used. Immediately after the Foreword appears the first Section.

NOTE The word 'introduction' should not be used.

### 5.1.5 The Sections

#### 5.1.5.1 Different types of paragraphs: Principles, Application Rules, and Assumptions

(1) A paragraph in a clause (or in a sub-clause) of a Section expresses

- a "Principle", identified by the letter P following the bracketed paragraph number e.g. (3)P.

NOTE 1 Do not use change of typeface to distinguish. Leave a single space after P then commence text.

NOTE 2 Project teams should be very careful to stick closely to the definition of a principle, in this precise domain of the Eurocodes, a requirement for which no alternative is permitted, unless specifically stated.

NOTE 3 It can also be a simple or introductory statement e.g. "a structure is made of structural elements or components"; the letter P is also used in this case.

- an "Application Rule" (a design rule that follows one or several of the "principles" and satisfies their requirements).

- an Assumption (or a set of assumptions): it is particularly important to ensure that any limits or conditions of applicability (of a method, a formula, and even a requirement) are clearly identified. Giving a formula as if it were of general application, when in fact it applies only in common cases, is a particular hazard to be eliminated. Some paragraphs shall then be devoted, when needed, to the assumptions attached to principles or to application rules. They should always be clearly identifiable, and take the form of a list of necessary conditions to be satisfied, or criteria to be met, about a principle or before a given method or formula is valid.

#### 5.1.5.2 Notes

(1) They will commence with "NOTE" (left justified).

### 5.1.6 The Section "1. General"

#### 5.1.6.1 General

(1) Section "1. General" contains the following clauses: the scope of the Part, the normative references, definitions and symbols used in the Part, and (if needed) terminology.

### 5.1.6.2 The “normative references” clause

(1) The “normative references” clause shall give the complete list of the normative EN Eurocodes Parts - and other Standards - to which reference is made in the text. The dated Parts referred to shall be accompanied by the year of publication, or by a dash with a footnote “to be published” if they are not yet published. EN Eurocode drafts should make normative reference to other EN parts (as relevant) not ENV Eurocode parts.

(2) The following model wording shall be used:

“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).

NOTE The Eurocodes were published as European Prestandards. The following European Standards which are published or in preparation are cited in normative clauses:

- 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**”.**

### 5.1.6.3 The “definitions” clause

(1) Definitions are given in so far as they are necessary for the understanding of the terms used in the Part and should all be given in this clause. Repetitions from standards referred to shall be avoided and only those elements/terms specific to the Part shall be listed.

(2) ISO 8930 shall be referred to, together with the terms and definitions in EN 1990.

(3) Each specific definition, considered as a sub-clause, is numbered; the defined element/term is emboldened and without capital letter, for example:

**1.5.3.7**
**geotechnical action**

action transmitted to the structure by the ground, fill or groundwater.

(4) Definitions are not required to be in alphabetical order but should preferably be in order of hierarchy of the concepts and may be listed under generic sub-headings. (See PNE Rules Annex G).

**5.1.6.4 A "Terminology" clause** (if needed)

(1) It can be very helpful to add a "terminology" clause that brings all the special terminology together. Unlike definitions, terminology can be illustrated by figures. Such a clause gives a good opportunity to clarify the specific terminology covered in the document and explain its purpose to the non-specialist or less experienced user. With such a clause available, any temptation to try to write "text-book" type explanations into the subsequent normative provisions can more readily be avoided.

**5.1.7 The "Section 2 Basis of design"**

(1) The Section "2 Basis of design" should generally deal with material related and supplementary Basis of Design matters.

NOTE Model Sections 1 and 2 are given in Annex K of this document, together with an example.

**5.1.8 Annexes**

(1) All Annexes are part of the EN and, with the main text, constitute the EN itself. They are lettered sequentially, A, B, C etc. and clearly identified as 'normative' or 'informative', for example:

**Annex B (informative)**

(2) Informative annexes cannot contain Principles.

**5.1.9 Footnotes**

(1) Use normal typeface and identify by Arabic numerals e.g. "3". Separate from main text by short thin horizontal line on the left of the page.

**5.2 Editing the Eurocode Parts EN**

**5.2.1 Dates and version(s)**

(1) Dates shall not be given to identify the current document, either in header or in a footer. The version or a working group reference (as e.g. the version, expert comments) can be added on the first page, which anyway will be replaced by one automatically generated by CMC.

**5.2.2 Page numbering**

(1) There shall be no blank pages.

(2) The numbering will commence with page 2 as *verso* of front cover/title page (i.e. page 2 is the first page of the contents list),

(3) The draft for Formal Vote is identified in the header in Arial Bold 10
- Left corner for even pages
- Right corner for odd pages

NOTE Date identification shall be given by the year, for example

**prEN 1993-1-1:2003 (E)**

(4) The page number shall be placed in the footer in Arial Bold 10
- Left corner for even pages
- Right corner for odd pages

### 5.2.3 Typeface

(1) Use 'Times New Roman' (except for headers and footers as above), unless problems occur with mathematical symbols or other alphabets.

(2) The point sizes to be used are:

- Main text (and tables in main text): 12

- NOTES (and tables in NOTES): 10

(3) Italic script shall be used only for symbols, and for expressions in which they are used.

### 5.2.4 Lists

(1) The precise meaning of a list for requirements must be understood. As PNE Rules do not permit the use of "*or*" or "*and*" in listing, add before the list a clear indication such as one of the following sentences, depending on the case:

- provided that all the following conditions are satisfied

- by any of the following conditions

(2) Lists shall be indented two spaces from the lead-in paragraph and commence with a dash then a single space before the text.

(3) Listed items shall not be preceded by identifying letters, unless it is essential for identification e.g. cross-referenced elsewhere in the document. In these cases use lowercase letter instead of the dash.

### 5.2.5 Indents

(1) Indents will only be used for lists within paragraphs (see 2.3 above: 2 spaces from the margin).

(2) Otherwise all text will commence at extreme alignment at left end.

### 5.2.6 Numerical values

(1) The decimal sign shall be a comma on the line.

(2) For values less than 1 in decimal form, the decimal sign shall be preceded by zero, for example:

0,037

(3) Numbers comprising more than three digits before or after the decimal sign shall be separated by a space from preceding or following digits, except for years, for example:

3 237,17 and 4,251 63 (but 1994).

(4) 'x' shall be used as the multiplication sign.

### 5.2.7 Units

(1) When units are referred to as such in text, tables or figures they shall be written in full. When units are attached to numbers they shall be abbreviated.

(2) Do not use units in keys to expressions (e.g. equations), unless it is dimensionally necessary.

### 5.2.8 Mathematical expressions

(1) All mathematical expressions given in a Section – equations, conditions, or pure formulae - should be numbered in a single series within each Section, the numbering being placed on the right side, for example:

$$\sum_{j\geq 1} G_{k,j} \text{ "+" } P \text{ "+" } \sum_{i\geq 1} \psi_{2,i} Q_{k,i} \qquad (6.17b)$$

(2) Where equations, conditions or pure formulae need to be referred to, it avoids misunderstandings to call them all "expressions", for example:

NOTE Guidance on which expression to use - (6.14a) or (6.17b) - is given in 6.5.3.

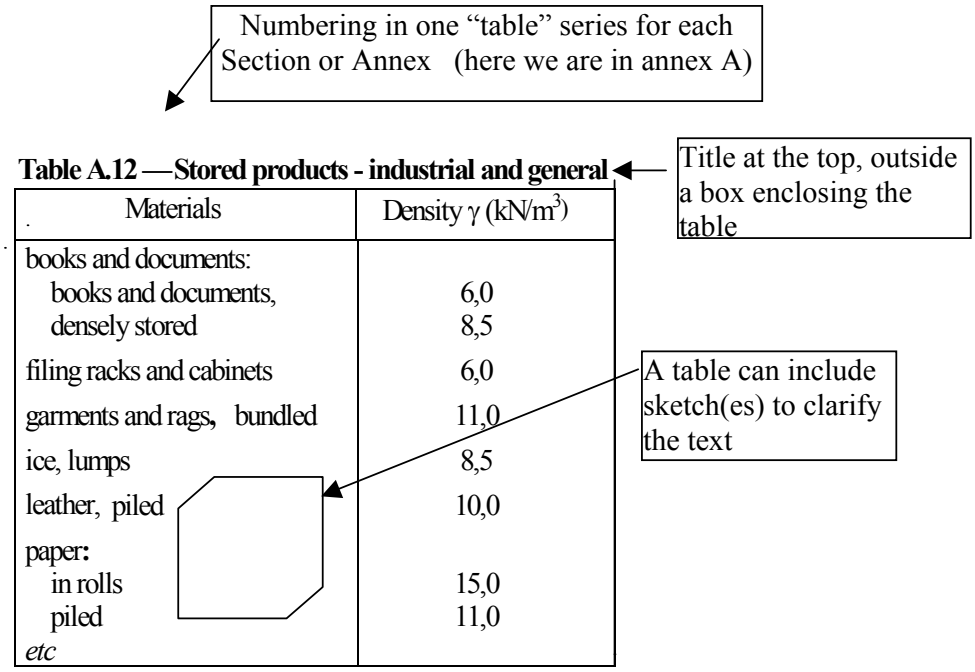
### 5.2.9 Tables and figures

#### 5.2.9.1 General

(1) Examples of the presentations that shall be adopted are given below.

#### 5.2.9.2 Tables

(1) Example from EN1991-1-1




(2) Table to be centred

(3) Title to be centered above the table.

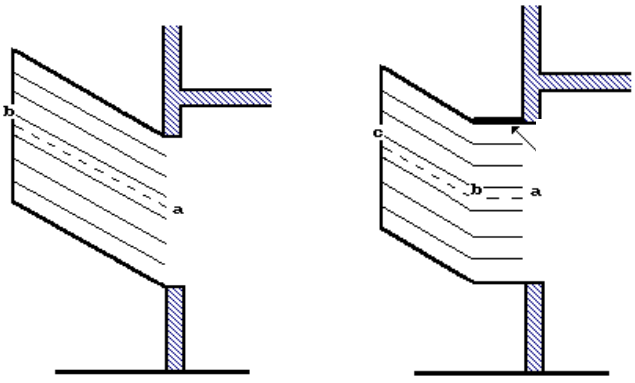
(4) Tables to be located as near as possible after the first reference in the text.

(5) Columns and rows should not be numbered.

(6) If supplementary or optional provisions are needed, to clarify or modify the contents of a table, this can be done in paragraphs subsequent to the first paragraph that refers to the table.

### 5.2.9.3 Figures

(1) Example from EN1991-1-2




Figures should not include text beyond sub-titles or what is needed to label the sketches.
Note: if a note seems essential in a Figure, it can be attached to the text that refers to the figure.

Sub-titles should come below the sub-divisions

Numbering in a Figure series for each Section or Annex (here we are in annex B)

**Figure B.5 - Deflection of flame by awning**

The title shall be centered below the figure

(2) Figures to be centered

(3) Figures to be located as near as possible after the first reference in the text.

(4) Figures should not be boxed.

(5) The properties of figures shall be selected to be "in line with text" so that, following any document or text modification, the relative position remains unchanged and avoids overlapping between figures or between figures and text.

(6) When multiple figures are to be displayed together it is suggested that a table should be used to fix the positions.

### 5.2.10 Table and figure numbering

(1) This will be done by sequential numbering (in order of first reference) within each Section and preceded by the Section number, e.g. Table 3.5 will be the fifth table in Section 3, Figure 2.7 will be the seventh figure in Section 2.

(2) In Annexes numbering will be as: Table B.3 (in Annex B), Figure C.5 (in Annex C).

NOTE figures, formulae and tables each start with 1 even when present together in the same chapter, for example

in same chapter there could be figure 2.1, tables 2.1 and 2.2 and formulae 2.1, 2.2 and 2.3

### 5.2.11 Subscripts

(1) A comma shall be used as a separator in multiple subscripts, for example:

$M_{p1,Rd}$

### 5.3 Style for the Eurocodes EN

#### 5.3.1 General

(1) Eurocodes shall be drafted in strictly neutral terms. They should state what has to be done, but not who has to do it. Responsibility is a matter for legal provisions and commercial contracts. Consequently one should avoid the use of expressions like "the designer".

#### 5.3.2 Verbal forms, use of modal auxiliary verbs

(1) In Eurocodes all four verbal forms set out in Annex C of PNE Rules may be applied.

(2) In the case of "Principles", i.e. requirements that must be adhered to with no permitted alternatives: "shall" shall be used**.**

(3) For "application rules", i.e. recommended as suitable to comply with the principles but for which alternatives would be permitted under certain conditions, "should" shall be used.

(4) For permissive statements/clauses, "may" shall be used.

(5) For possibilities, "can" shall be used.

(6) Examples of such cases are given in the following table:

| verbal form | to be used | examples from prEN1990 (Basis of structural design) |
|---|---|---|
| *is*<br>*can*<br><br>(and more generally any verb in the present indicative tense) | - for a general or definitive statement<br>or<br>- for an "assumption" paragraph | Depending on the character of the individual clauses, distinction is made in EN 1990 between Principles and Application Rules (in 1.4 (1)).<br><br>The general assumptions of EN 1990 are :<br>- The choice of the structural system and the design of the structure is made by appropriately qualified and experienced personnel.<br>- Execution is carried out by personnel having the appropriate skill and experience – etc (in 1.3 (2)). |
| *shall* | a requirement for which no alternative is permitted, unless specifically stated (i.e. a "principle") | A distinction shall be made between ultimate limit states and serviceability limit states (in 3.1 (1) P). |
| *should* | a design rule meeting requirement(s) (i.e. an "application rule") | The requirements of 3.5 (1)P should be achieved by the partial factor method, described in section 6 (in 3.5 (2)). |

| | | |
|---|---|---|
| *may* | - an alternative requirement<br>or<br>- an alternative design rule meeting requirement(s) (i.e. an alternative "application rule") | Verification of one of the two categories of limit states may be omitted provided that sufficient information is available to prove that it is satisfied by the other (in 3.1 (2))<br>Where insufficient statistical data are available to establish the characteristic values of a material or product property, nominal values may be taken as the characteristic values, or design values of the property may be established directly (in 4.2 (5)). |

### 5.3.3 How to use 'if', 'where', and 'when'

| word | recommended use | example |
|---|---|---|
| where | a "location" condition is implied | EN 1990 is applicable for the design of structures where other materials or other actions outside the scope of EN 1991 to EN 1999 are involved (in 1.1 (3). |
| when | a "time" condition is implied | Serviceability limit states where some consequences of exceeding the specified service requirements will remain when the actions are removed (in 1.5.2.14.1). |
| if | unless time and/or location conditions are involved | The characteristic value of a permanent action shall be assessed as follows **:**<br>- if the variability of G can be considered as small, one single value $G_k$ may be used ;<br>- if the variability of G cannot be considered as small, etc. (in 4.1.2 (2)P |

### 5.3.4 Some ambiguities to avoid

| about | it would be preferable to use | examples |
|---|---|---|
| only if, only when | unless | Where a partial factor for materials or product is needed, a conservative value shall be used, unless suitable statistical information exists to assess the reliability of the value chosen ( in 4.2 (10) P). |
| (if, when) possible | practicable | For test types (a), (b), (c), (d), the design values to be used should wherever practicable be derived from the test results by applying accepted statistical techniques (in D.3 (2)). |
| to consider | to take account of, to take into account | The relevant design situations shall be selected taking into account the circumstances under which the structure is required to fulfill its function (in 3.2 (1)P). |
| in case of | if (i.e. in the event of)<br>or for (i.e. in case of) | - if it rains, do this<br>- for a heavy rain, do that |
| provided | provided that | It is permissible to use alternative design rules different from the Application Rules given in |

| | | |
|---|---|---|
| | | EN 1990 for works, provided that it is shown (in 1.4 (5)). |
| possibly, sometimes | where appropriate | NOTE Suitable account may be taken where appropriate of the unfamiliarity of the application or materials/products used (in 4.2 (10)). |
| safe-sided, cautious, on the side of safety | conservative | Where a partial factor for materials or product is needed, a conservative value shall be used, unless suitable statistical information exists to assess the reliability of the value chosen (in 4.2 (10) P). |
| often | generally, normally, in most cases<br>note: a subsequent sentence (or paragraph) should cover the alternative case(s) | Generally a nominal value. Where relevant, values of geometrical quantities may correspond to some prescribed fractile of the statistical distribution (in 1.5.5.2). |
| eventually<br>when wrongly used in the sense of : - possibly (i.e. should the occasion arise )<br>-if necessary | - possibly<br>or<br>- if necessary | The derivation from tests of the design values for a material property, a model parameter or a resistance should be carried out in one of the following ways (in D.5 (1)<br>- "by assessing a characteristic value, which is then divided by a partial factor and possibly multiplied if necessary by an explicit conversion factor.<br>- etc. |

### 5.3.5 How to make references in the normative text

NOTE Drawn from the "Internal regulations" CEN-CENELEC Part 3: Rules for the structure and drafting of European Standards (PNE Rules: 1999-09).

(1) References to informative Annexes should be made only in a NOTE to normative text.

(2) Drafting an EN Eurocode Part generally entails referring in some place of the text to another clause (or several clauses) in the same Part, or to clause(s) in another Part of the same Eurocode or in a Part of another Eurocode.

NOTE As a general rule, references to particular pieces of text shall be used instead of repetition of the original source material, since such repetition involves the risk of error or inconsistency and increases the length of the document. However, if it is considered necessary to repeat such material, its source shall be identified precisely (which means that the reference shall be made in this case too).

(3) Reference to specific divisions, subdivisions, tables, figures, mathematical expressions of another Part (or another Eurocode) shall always be dated. If the referred Eurocode Part is published, give the year of publication; in case of a final draft EN not yet published, use a dash (-) and a footnote "to be published";

(4) A reference will be given undated only in the two following cases:

- if it is accepted that it will be possible to use all future changes of the Part referred to for the purpose of the referring Part;

- for informative references. An undated reference shall thus be understood to include all subsequent amendments and revisions of the quoted Part.

(5) References to non-normative documents (e.g. textbooks, published research papers) should be avoided. Consequently bibliographies should not be necessary.

### 5.4. How to deal with the "Nationally Determined Parameters" in the text (normative and informative) of a Part (NDP) *(see also **Annex P** of N250)*

#### 5.4.1 General

(1) The National Annex may give a Country's choice of Classes, Symbols and alternative Methods only if such choice is given in the relevant clause of the main text or Annex (normative or informative).

(2) When a choice of some sort is given by the EN Eurocode Part, a NOTE shall be inserted after the relevant clause in one of the following forms, as appropriate to the situation:

NOTE The selection of the class(es) to be used in a Country may be found in its National Annex. The recommended class is '…', or

NOTE The value(s) to be ascribed to the symbol '…' for use in a Country may be found in its National Annex. The recommended value is '...', or

NOTE The selection of the method(s) to be used in a Country may be found in its National Annex. The recommended method is '…'.

(3) It is not permitted to use a NOTE like "The National Annex may vary the above clause".

NOTE The value may be a single value or a range, ideally with a recommended value in the range.

### 5.5. About National Annexes and National provisions

#### 5.5.1 Content of National Annexes

(1) 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.

(2) The National Annex 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 and/or classes where alternatives are given in the Eurocode,
- values to be used where a symbol only is given in the Eurocode,
- country specific data (geographical, climatic, etc.), *e.g.* snow map,
- the procedure to be used where alternative procedures are given in the Eurocode, and it may contain
- decisions on the application of informative annexes,
- references to non-contradictory complementary information to assist the user to apply the Eurocode.

#### 5.5.2 Decision on the application of informative annexes:

(1) The National Annex may give the decision of the Country about the application of an informative annex (of the EN Eurocode Part). To do that, the National Annex will state, depending on the case:

- The informative annex 'X' shall be normative (if so determined in national provisions)

- The informative annex 'X' shall not be used at the national level.

(2) If the National Annex is silent on the use of an informative annex it remains part of the standard. If some guidance on the same subject as that contained in the annex is required, then a document can be published, separately from the National Annex, and be referenced in the National Annex, as a complementary non-conflicting reference. So, in that case, the National Annex would add:

- The subject is covered in reference 'Y' (name of publication and source).

### 5.5.3 The Guidance Paper L must be followed in respect of:

(1) No Alternative Application Rules may be given in the National Annex. Alternative Application Rules can be suggested in a Country, outside the relevant Eurocode, that can, at the discretion of the National Authority, be accepted for use in that Country.

(2) National Provisions may vary Eurocodes but such variation is against the recommendation of the Guidance Paper.

## 5.6. Attention SC Secretariats

### 5.6.1 About the PNE Rules

(1) The Secretariat of the Technical Committee or appropriate Sub-committee has the responsibility for ensuring that the CEN Internal Regulations are followed. This responsibility includes compliance with procedures, editing and format as contained in PNE Rules (Part 3 of Internal Regulations). In this respect the TC/SC Secretariat and the TC/SC Editing committee jointly hold the responsibility for the correct formulation of the text. In practice, in TC 250, the Editing committee for each EN Eurocode Part will be the members of the respective Project Teams who are expected to liaise/consult with the SC Secretariat.

(2) They should all have access to a copy of PNE Rules and should receive a copy of these notes via their Secretariat and Convener.

### 5.6.2 Translations

(1) The procedure is described in 6.

### 5.6.3 Publication

(1) The SC Secretariat should send a clean top quality copy of the approved document to CMC who will add the title page and number the pages before CEN registration and distribution to Members.

### 5.6.4 Typesetting – discs

(1) Final drafts and approved documents shall be stored on discs compatible with Word and the Secretariat of the appropriate SC will maintain a master disc updated to take account of technical amendments and the editing process. A copy disc should be passed to CMC with the finally agreed hard copy for publication.

**ANNEX: BTS1 DEROGATION FOR EUROCODES**

**RESOLUTION BTS1 38/1994**

**Subject:** Derogation from PNE Rules for EUROCODES

BTS1 approves for EUROCODE ENVs and ENs the following derogation from the PNE Rules:

1) The term "Section" is allowed for the first level of subdivision (e.g. Section 1). The need for "Sections", depending on the size and the structure of each standard, shall be decided upon case by case by CEN/TC250.

2) Within clauses/sub-clauses, the numbering of paragraphs is to be done with a single sequential number between brackets [e.g. (2) is the second paragraph in a clause or sub-clause].

3) As requested by the CEC/CEN agreement on Eurocodes, the paragraphs are to be identified as either "Principles" or "Application Rules". This distinction is only to be made in the Normative Parts of the Standards. "Principles" shall be identified by a 'P' after the paragraph number [e.g. (4)P]. No further identification is then needed for the "Application Rules". The distinction and the identification shall be explained at the beginning of each Eurocode standard.

4) For cross-referencing to paragraphs, the full number of (Section.clause subclause.paragraph) has to be used, including the 'P' when present [e.g. 4.3.2 (3)P].

5) In documents divided in Sections, Equations/Tables/Figures shall have a sequential numbering including the Section number (e.g. Table 3.3).

## 6. Translations (for EN Eurocode Parts)

NOTE For more detail refer to BOSS: http://www.cenorm.be/boss)

### 6.1 Reference language

(1) Through resolution CEN BT 20/2000, the TC/SC Secretariat is responsible for supplying CEN Management Centre (CMC) with prENs in the reference language to enable the formal vote to be launched.

NOTE In this section, action by TC/SC implies action by the TC or SC, whichever has responsibility for an EN Eurocode Part.

(2) The reference language for Eurocodes is English.

### 6.2 Responsibility

(1) Responsibility for the translations of the English version into French and German is transferred direct to AFNOR and DIN, as approved by Resolution CEN/BT C66/2003, following CEN TC 250 Resolution 164 (Stockholm, 2002). The responsibilities for handling documents have been revised as below.

NOTE The requirements for an Editing Panel are set out in 2.13

(2) The sequence of actions for preparing a published EN, starting from a published ENV, is shown in a Flow chart in Figure 6.1, to which the following text relates.

(3) Once the TC/SC has approved a draft to go Formal Vote and has convened an Editing Panel, the TC/SC Chairman submits a clean English draft to the TC Secretariat (BSI). The TC Secretariat (BSI) sends the draft to the BSI Editor, AFNOR (translation@email.afnor.fr) and DIN (translation@din.de).

NOTE In order to meet contractual deadlines it may nevertheless be essential to launch a Formal Vote using only the English version, together with possibly only one of the other language versions. CEN TC 250 Resolution 200 (Rome, 2004) applies to some items under the Order Voucher for 1999.

(4) AFNOR and DIN are requested to have translators in readiness, on the basis of the programme in N455, so that translation can start as soon as the English version has been received.

NOTE 1 Only one translation will be made so the TC/SC should not attempt to improve the draft further.

(5) When the Editing Panel is satisfied of the equivalence of the three language versions the SC Chairman will send the three versions to the TC 250 Secretariat in the specified format.

NOTE 1 AFNOR will transmit French drafts to the Editing Panel through the chairmen of SCs for which it holds the Secretariat.

(6) The TC 250 Secretariat will make the agreed versions available to CMC after approval by the TC Chairman. The TC Secretariat transmits the three language versions to CMC on E-Trans and advises a nominated person in CMC that the pr EN Eurocode Part is ready for CMC to launch the Formal Vote. The TC Secretariat advises the nominated persons that "Translations are not required".

NOTE 1 Details of the format and layout are given below and elsewhere in this document

NOTE 2 Use of the CEN template is not required. For clarity, when submitting to CMC, it will be noted that: "As agreed, this prEN is not formatted in the CEN template".

(7) The TC 250 Secretariat will advise nominated persons in AFNOR and DIN that the three versions are at CMC so that preparations for national enquiry can be started.

### 6.2 Format of document files

(1) Project Teams and the TC/SC Secretariat should also be aware of the format required by CMC for the document files they have to deliver.

(2) Each version shall be produced in two formats, a revisable format (Microsoft Word) and a non-revisable format (.pdf).

NOTE 1 The two formats are needed for production management of the final texts, even though editorial changes by CMC will be confined to the introduction and not made to the technically agreed texts.

NOTE 2 Delivery to the CEN Members occurs in Word and is used by several of them to start the translation procedure (in languages other than English, German and French).

NOTE 3 After creation, the pdf version should be proof-read against the original Word version, particularly concerning figures and mathematical symbols and signs.

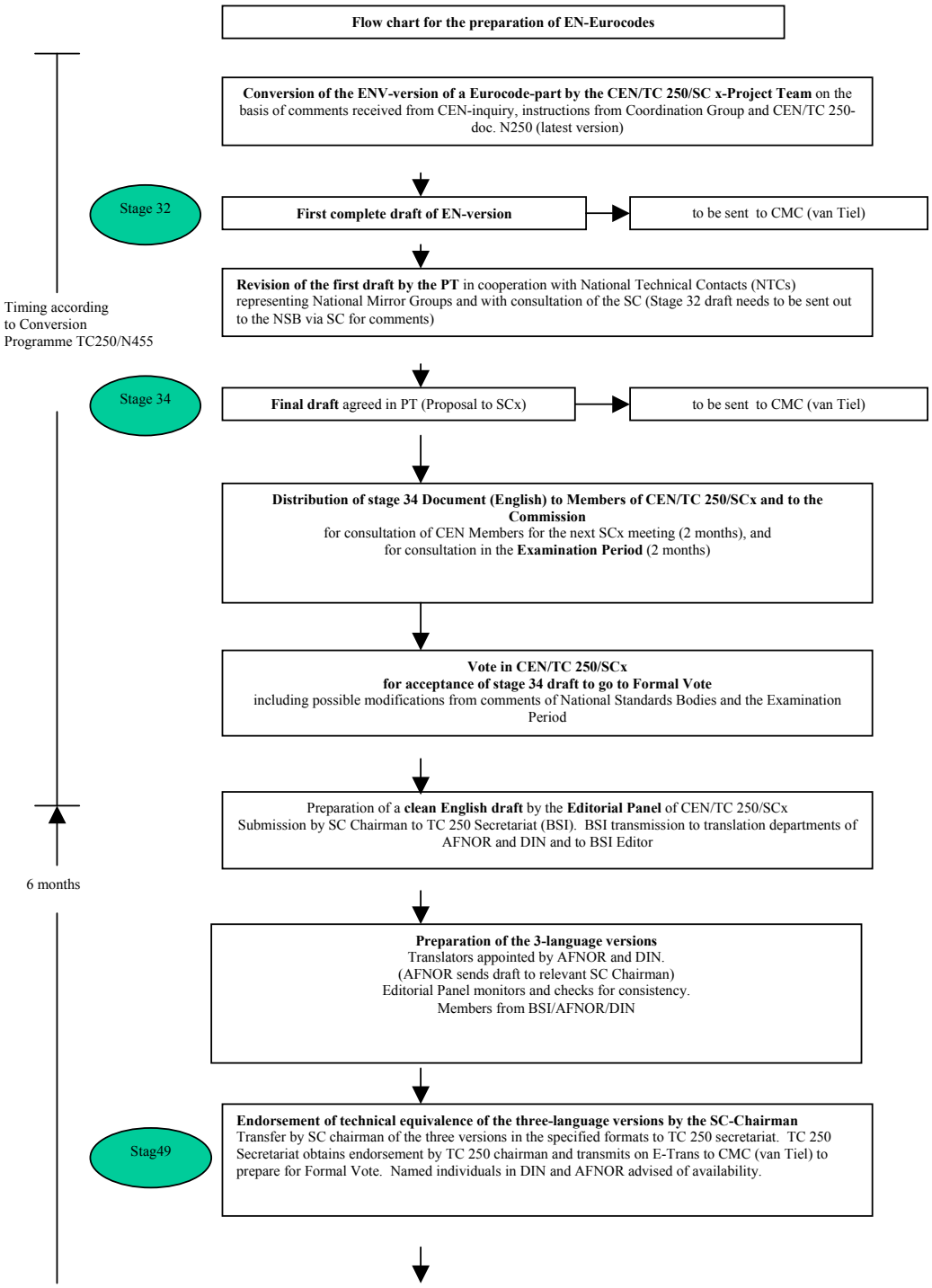
(3) Figures shall be sent as separate electronic files (in .tif format). Figures and graphics shall not be saved with the Word file. The files of the figures and other graphics shall be kept as separate tif-files (or, exceptionally .eps format) and be addressed as relative links in the Word file.

NOTE The information on relative links, and also legends, is given on BOSS.

### 6.3 Quality of language versions

(1) The TC/SC Secretariat, through its Project Teams for conversion work, is responsible for ensuring that the English language draft submitted for Formal Vote has been drafted in accordance with the PNE-Rules and has been validated by a native English speaker to ensure that it is of good linguistic quality.

(2) Project Teams for conversion work should pay particular attention to the translatability of the English language version into French and German to ensure inter-linguistic consistency and technical equivalence of terminology. They are also required to advise AFNOR and DIN, when requested, on technical aspects whilst translations are in preparation for Formal Voting.


Flow chart for the preparation of EN-Eurocodes
Conversion of the ENV-version of a Eurocode-part by the CEN/TC 250/SC x-Project Team on the basis of comments received from CEN-inquiry, instructions from Coordination Group and CEN/TC 250-doc. N250 (latest version)
Stage 32
First complete draft of EN-version
to be sent to CMC (van Tiel)
Revision of the first draft by the PT in cooperation with National Technical Contacts (NTCs) representing National Mirror Groups and with consultation of the SC (Stage 32 draft needs to be sent out to the NSB via SC for comments)
Timing according to Conversion Programme TC250/N455
Stage 34
Final draft agreed in PT (Proposal to SCx)
to be sent to CMC (van Tiel)
Distribution of stage 34 Document (English) to Members of CEN/TC 250/SCx and to the Commission
for consultation of CEN Members for the next SCx meeting (2 months), and
for consultation in the Examination Period (2 months)
Vote in CEN/TC 250/SCx
for acceptance of stage 34 draft to go to Formal Vote
including possible modifications from comments of National Standards Bodies and the Examination Period
Preparation of a clean English draft by the Editorial Panel of CEN/TC 250/SCx
Submission by SC Chairman to TC 250 Secretariat (BSI). BSI transmission to translation departments of AFNOR and DIN and to BSI Editor
6 months
Preparation of the 3-language versions
Translators appointed by AFNOR and DIN.
(AFNOR sends draft to relevant SC Chairman)
Editorial Panel monitors and checks for consistency.
Members from BSI/AFNOR/DIN
Stag49
Endorsement of technical equivalence of the three-language versions by the SC-Chairman
Transfer by SC chairman of the three versions in the specified formats to TC 250 secretariat. TC 250 Secretariat obtains endorsement by TC 250 chairman and transmits on E-Trans to CMC (van Tiel) to prepare for Formal Vote. Named individuals in DIN and AFNOR advised of availability.

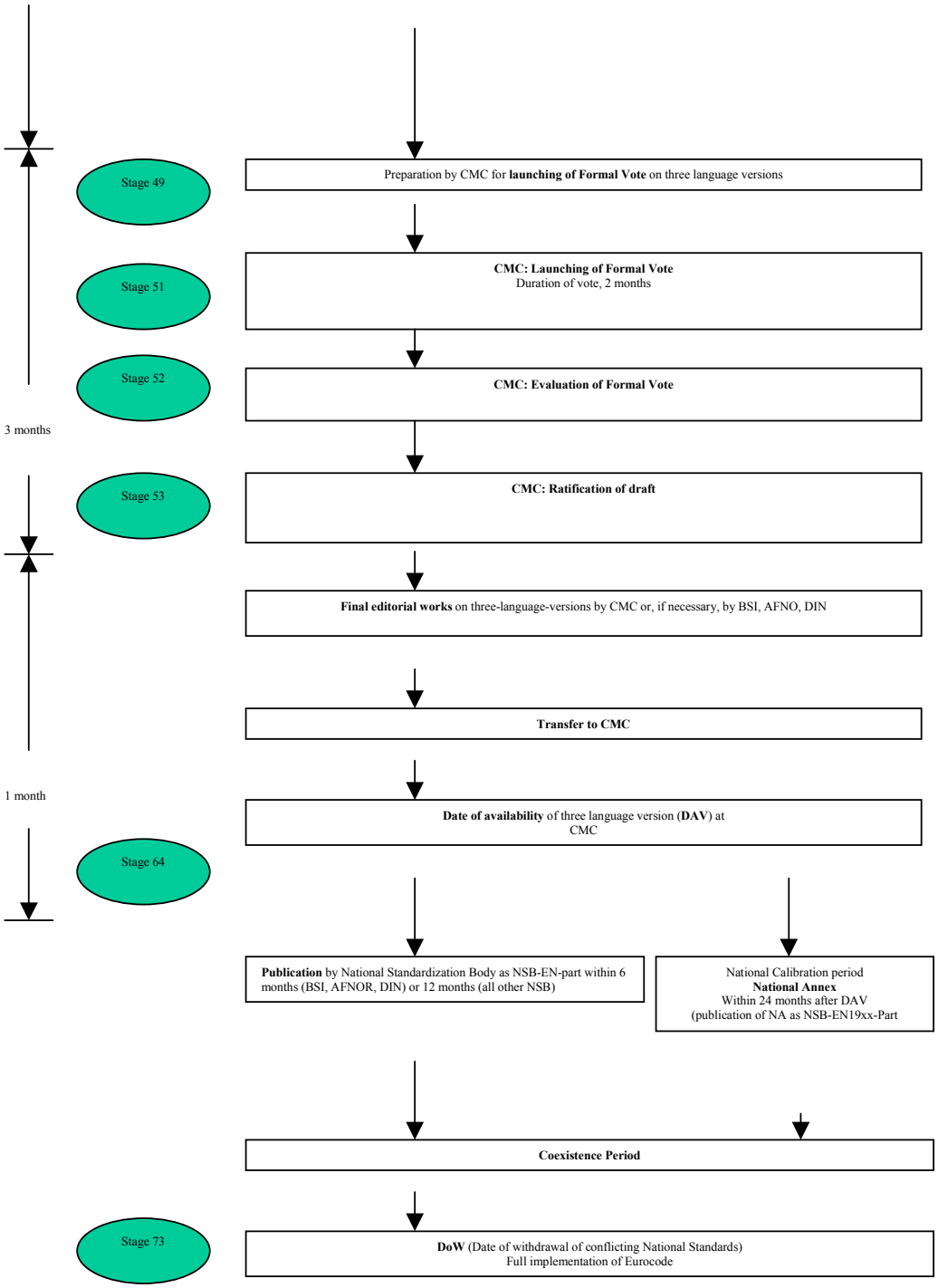



**Figure 6.1 Flowchart for the preparation of EN Eurocode Parts**

## 7. Finalisation of drafts for publication after positive Formal Vote

### 7.1 Responsibility

(1) The Chairman of the relevant sub-committee is responsible for making any changes as a result of comments received with the voting at Formal Vote. The Chairman shall work normally through a small editorial group.

(2) BSI is responsible for the English language version and AFNOR and DIN are responsible for the translations of the agreed changes.

(3) CMC will add only the appropriate cover pages before publication.

### 7.2 Criteria for accepting comments

(1) Any errors that have come to light shall be corrected.

(2) No changes of a technical nature shall be introduced.

NOTE 1 A positive vote cannot be conditional on acceptance by the SC of accompanying national comments.

NOTE 2 An amendment procedure will be necessary to correct errors such as technical mistakes, alternative interpretation of rules during the finalisation of translations and inconsistencies with other Eurocode Parts.

(3) Editorial changes should be accommodated when requested by a majority or to clearly enhance the document.

NOTE 1 The editorial group shall decide on the distinction between editorial and technical comments if it is not clear in the accompanying national comments.

NOTE 2 A positive vote cannot be conditional on acceptance by the SC of accompanying national comments.

NOTE 3 Problems highlighted by the translation process may justify editorial changes.

(4) Clause numbers shall not be changed, as it would affect cross-references in other codes.

NOTE In the event of deletion of a clause renumbering may exceptionally be necessary.

(5) The SC Chairman shall submit a comment-handling document to TC 250.

NOTE The CEN electronic balloting commenting template should ideally be used for this purpose.

(6) Any technical changes requested in the national comments shall be passed by the SC Secretariat to the relevant maintenance group, when it is set up, for their consideration along, with other comments that may be received in the future.

### 7.3 Translation

(1) The SC Chairman will submit the agreed English language version to the TC 250 Secretariat, to be forwarded to CMC.

(2) CMC will transmit the English language version to DIN and AFNOR and at the same time to the National Standards Bodies. This transmission will constitute DAV. DIN and AFNOR will carry out any amendments needed to align their language versions with the agreed English language version.