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**Construction**

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## **GUIDANCE PAPER L**

*(concerning the Construction Products Directive - 89/106/EEC)*

### **APPLICATION AND USE OF EUROCODES**

*(issued following consultation of the Standing Committee on Construction at the 53rd meeting on 19 December 2001 and written procedure ended on 25 January 2002, as document CONSTRUCT 01/483 Rev.1)*

#### **Preface**

*EN Eurocodes can be used to determine the performance of structural components and kits, which are construction products. In that context, EN Eurocodes relate to the Construction Product Directive (89/106/EC)*

*Furthermore, the Commission considers that the use of EN Eurocodes as the design method for buildings and civil engineering works is the recommended means of giving a presumption of conformity with the essential requirements N°1 and aspects of N°2, in the sense of article 2.1 of the Construction Products Directive*

*The Member States represented in the Standing Committee on Construction have expressed their opinion and their support by endorsement of this Guidance Paper, which becomes one of the series of Guidance Papers dealing with specific matters related to the implementation of the Directive.*

***These papers are not legal interpretations of the Directive.***

***They are not judicially binding and they do not modify or amend the Directive in any way. Where procedures are dealt with, this does not in principle exclude other procedures that may equally satisfy the Directive.***

***They will be primarily of interest and use to those involved in giving effect to the Directive, from a legal, technical and administrative standpoint.***

***They may be further elaborated, amended or withdrawn by the same procedure leading to their issue.***

*This Guidance Paper “application and use of Eurocodes” has been prepared by the European Commission services in close co-operation with the authorised Representatives of the Member States (Eurocode National Correspondents). The Commission will monitor the matters related to this Guidance Paper. When necessary, the Guidance Paper will be reviewed in the light of the experience made in its application.*

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- **Abbreviations**

CPD	Construction Products Directive (see references)
PPD	Public Procurement Directives (see references)
SCC	Standing Committee on Construction (articles 19 and 20 of the CPD)
ID	Interpretative Documents (article 11 of the CPD)
ENV	European pre-standard
ENV Eurocode	Version of Eurocode published by CEN as a pre-standard ENV (for subsequent conversion into EN)
NAD	National Application Document for the use of ENV Eurocodes at the National level
EN	European standard
EN Eurocode	Version of Eurocode approved by CEN as a European standard.
hEN	Harmonised European standard for a construction product (to enable CE Marking)
NDP	Nationally Determined Parameter
DAV	Date of availability of the EN standard
DoW	Date of withdrawal of a conflicting national standards
CEN	Comité Européen de Normalisation (European Standardisation Organisation)
CEN/MC	CEN Management Centre
NSB	National Standards Body (CEN Member)
EOTA	European Organisation for Technical Approval (article 9.2 of the CPD)
ETA	European Technical Approval
ETAG	European Technical Approval Guideline
EEA	European Economic Area
EC	European Commission services

- **Definitions**

Approval Body	Body authorised to issue European Technical Approvals (Article 10 of the CPD), Member of EOTA
Boxed Value	The Boxed Value, used at the ENV stage together with the National Application Documents, offered a National choice for a value. It has to disappear in the EN Eurocodes
Construction Works	Building and Civil Engineering Works
European Technical Approval (ETA):	Favourable technical assessment of the fitness for use of a product for an intended use, based on the fulfilment of the Essential Requirements for building works for which the product is used (article 8, 9 and 4.2 of the CPD). An ETA can be issued on the basis of a Guideline (article 9.1 of the CPD) or without guideline (article 9.2 of the CPD)
European Technical Approval Guideline (ETAG):	Document used as the basis for preparing ETAs, which contains specific requirements for the products within the meaning of the Essential Requirements, the test procedures, the methods of assessing and judging the results of the tests, the inspection and conformity procedures, written by EOTA on the base of a mandate received from the Commission (article 9.1 and 11 of the CPD)
National Annex (to an EN Eurocode Part):	

Annex to an EN Eurocode Part containing the Nationally Determined Parameters (NDPs) to be used for the structural design of buildings and civil engineering works in a Member State.

National Application Document (NAD) :	The NADs, which were used at the ENV stage, expressed national choices, in particular wherever “Boxed Values” (see above) were given in the ENV Eurocodes.
National Provisions	National laws, regulations and administrative provisions, imposed by all levels of public authorities, or private bodies acting as a public undertaking or as a public body on the basis of a monopoly position.
Nationally Determined Parameter (NDP)	A National choice left open in a EN Eurocode about values (where symbols are given in the EN Eurocodes), classes or alternative procedures permitted within the EN Eurocodes
Technical Specifications	Harmonised European Standards (hENs) and European Technical Approval (ETAs) for construction products (article 4.1 of the CPD)
Structure	Load-bearing construction, i.e. organised assembly of connected parts designed to provide mechanical resistance and stability to the works (ID 1, clause 2.1.1).
Structural	Relating to a structure.
Structural material	Material or constituent product with properties which enter into structural calculations or otherwise relate to the mechanical resistance and stability of works and parts thereof, and/or to their fire resistance, including aspects of durability and serviceability.
Structural component	Components to be used as load-bearing part of works designed to provide mechanical resistance and stability to the works and/or fire resistance, including aspects of durability and serviceability, (ID 1, clause 2.1.1).
Structural kit	Kit consisting of structural components to be assembled and installed on site. The assembled system made from the structural kit is a "structure".
Material hEN or ETA	The hEN or ETA for a material or constituent product, with properties which enter into structural calculations of works or otherwise relate to their mechanical resistance and stability and/or fire resistance, including aspects of durability and serviceability, such as concrete, reinforcing steel for concrete, certain structural steel products, fire protection materials.
Component hEN or ETA	hEN or ETA for a prefabricated structural component or a kit consisting of structural components, such as prefabricated concrete components, prefabricated stairs or timber frame building kits, with properties determined by calculation applying methods which are used also for structural design of works.

## • *References*

CPD.	Construction Products Directive 89/106/EEC, as amended by CE Marking Directive 93/68/EEC
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PPD.	Public Procurement Directives. This Guidance Paper refers to the Council Directive 93/37/EEC of 14 June 1993 concerning the co-ordination of procedures for the award of <i>public works</i> contracts
Guidance Paper C	The treatment of kits and systems under the Construction Products Directive (CONSTRUCT 96/175 Rev.2, 3 Feb. 1997)
Guidance Paper D:	CE Marking under the CPD (CONSTRUCT 97/220 Rev.5, 10 Dec. 1998)
Guidance Paper E:	Levels and classes under the CPD (CONSTRUCT 99/337 Rev.1, 1 Jul 1999)
Guidance Paper F:	Durability aspects under the CPD (CONSTRUCT 99/367, 1 Jul 1999)
Guidance Paper J:	Transitional Arrangements under the CPD (CONSTRUCT 01/477, 22 May 2001).
Guidance paper K.	The attestation of conformity systems and the role and tasks of the notified bodies in the field of the Construction Product Directive (CONSTRUCT 00/421, 5 July 2000)

## Part 1: General

### 1.1 Aims and benefits of the Eurocode programme

1.1.1 The Eurocodes provide common design methods, expressed in a set of European standards, which are intended to be used as reference documents for Member States to:

- prove the compliance of building and civil engineering works or parts thereof with Essential Requirement n°1 *Mechanical resistance and stability* (including such aspects of Essential Requirement n°4 *Safety in use*, which relate to mechanical resistance and stability) and a part of Essential Requirement n°2 *Safety in case of fire*, including durability, as defined in Annex 1 of the CPD
- express in technical terms, these Essential Requirements applicable to the works and parts thereof;
- determine the performance of structural components and kits with regard to mechanical resistance and stability and resistance to fire, insofar as it is part of the information accompanying CE marking (e.g. declared values).

1.1.2 EN Eurocodes are intended by the European Commission services, and the Member States, to become the European recommended means for the structural design of works and parts thereof, to facilitate the exchange of construction services (construction works and related engineering services) and to improve the functioning of the internal market.

In approving the mandate to CEN to prepare the EN Eurocodes, Member States have recognised Eurocodes as an acceptable means to achieve these aims and to prove compliance of construction works with the respective Essential requirements, in their territory. However, following the spirit of the new approach, Member States may recognise also other means as being acceptable for these purposes (see 2.1.7).

The Commission expects CEN to publish all of the standards<sup>1</sup> constituting the different parts of the EN Eurocodes, and expects the Member States to implement these standards as an acceptable means for the design of works, in their territory.

1.1.3 The intended benefits and opportunities of Eurocodes are to:

- provide common design criteria and methods to fulfil the specified requirements for mechanical resistance, stability and resistance to fire, including aspects of durability and economy,
- provide a common understanding regarding the design of structures between owners, operators and users, designers, contractors and manufacturers of construction products
- facilitate the exchange of construction services between Member States,
- facilitate the marketing and use of structural components and kits in Member States,
- facilitate the marketing and use of materials and constituent products, the properties of which enter into design calculations, in Member States,
- be a common basis for research and development, in the construction sector,

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<sup>1</sup> At present the program contains 58 Parts

- allow the preparation of common design aids and software,
- increase the competitiveness of the European civil engineering firms, contractors, designers and product manufacturers in their world-wide activities.

## 1.2 Background of the Eurocode programme

1.2.1 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.

1.2.2 Within this action programme, the Commission took the initiative to establish a set of harmonised technical rules for the structural design of construction works which, in the first stage, would serve as an alternative to the national rules in force in the Member States and, ultimately, would replace them.

1.2.3 For fifteen years, the Commission, with the help of a Steering Committee containing Representatives of Member States, conducted the development of the Eurocodes programme, which led to the publication of a set of first generation European codes in the 80's.

1.2.4 In 1989, the Commission and the Member States decided, on the basis of an agreement with CEN<sup>2</sup>, endorsed by the SCC, to transfer the preparation and the publication of the Eurocodes to CEN through a Mandate, in order that they would, in the future, have the status of European Standards.

*Note: This links the Eurocodes with the provisions of the Council's Directives and Commission's Decisions dealing with European standards (e.g. the CPD and Public Procurement Directives initiated to assist with setting up the internal market).*

1.2.5 Originally, the Eurocodes were elaborated by CEN as 62 pre-standards (ENVs). Most were published between 1992 and 1998, but, due to difficulties in harmonizing all the aspects of the calculation methods, the ENV Eurocodes included "boxed values" which allowed Members States to chose other values for use on their territory. National Application Documents, which gave the details of how to apply ENV Eurocodes in Member States, were, generally, issued with a country's ENV.

The conversion of ENVs into European standards started in 1998. Publication of the EN Eurocode Parts is expected between 2002 and 2006.

1.2.6 The Eurocodes, insofar as they concern construction works, have a direct relationship with Interpretative Documents<sup>3</sup>, referred to in Article 12 of the CPD<sup>4</sup>. Therefore, technical

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<sup>2</sup> 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 (CONSTRUCT 89/019).

<sup>3</sup> According to Art. 3.3 of the CPD, the essential requirements (ERs) shall be given concrete form in interpretative documents for the creation of the necessary links between the essential requirements and the mandates for hENs and ETAs.

<sup>4</sup> According to Art. 12 of the CPD the interpretative documents shall:

- 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 approval.

The Eurocodes, de facto, play a similar role in the field of the ER 1 and a part of ER 2.

aspects arising from the Eurocodes have to be taken into account by CEN Technical Committees, EOTA Working Groups and EOTA Bodies working on product specifications, with a view to achieving full compatibility between the product specifications and the EN Eurocodes.

1.2.7 The European Commission has supported, from the beginning, the elaboration of Eurocodes, and contributed to the funding of their drafting. It continues to support the task mandated to CEN to achieve the publication of EN Eurocodes. It will watch the implementation and use of the EN Eurocodes in the Member States.

### **1.3 Objectives of the Guidance Paper**

1.3.1 This Guidance Paper expresses, with the view of achieving the aims and benefits of the Eurocode programme mentioned in 1.1, the common understanding of the Commission and the Member States on:

- The application of EN Eurocodes in the structural design of works (chapter 2).
- The use of EN Eurocodes in harmonised standards and European technical approvals for structural construction products (chapter 3). A distinction is made between:
  - a) products with properties which enter into structural calculations of works, or otherwise relate to their mechanical resistance and stability, including aspects of durability and serviceability, and which for this reason should be consistent with the assumptions and provisions made in the EN Eurocodes ("structural materials" are the most concerned - see chapter 3.2)
  - b) products with properties which can directly be determined by methods used for the structural design of works, and thus should be determined according to the EN Eurocode methods (prefabricated "structural components and kits" are the most concerned - see chapter 3.3).

1.3.2 The objectives of this document are to:

- Give guidance on the elaboration, implementation and use of the EN Eurocodes
- Provide, for the writers of EN Eurocodes, the framework in which they will elaborate or finalise the EN Eurocodes on the basis of the existing ENV Eurocodes
- Provide, for the writers of product specifications, the framework in which they will make reference to incorporate, or to take into account, the EN Eurocode Parts in harmonised standards and European technical approvals for structural products as explained in 1.3.1,
- Allow for the inclusion in EN Eurocodes and in technical specifications for structural products the necessary parameters or classes or allowance for levels to enable the Member States to choose the level of safety, durability and economy applicable to construction works, in their territory,
- Provide to Member States and the authorities concerned the elements needed to prepare public contracts, in respect of the Public Procurement Directive

1.3.3 This Guidance Paper considers all the issues and conditions related to the satisfactory implementation of the EN Eurocodes, as well as their links to the implementation of the CPD.

1.3.4 This Guidance Paper is intended for enforcement authorities, regulators, national standards bodies, technical specification writers, notified bodies and industry.

In the context of this Guidance Paper, references to Member States also apply to the European Free Trade Association (EFTA) States, members of the European Economic

Area EEA. References to specification writers apply to CEN and CENELEC as well as to EOTA and the EOTA bodies issuing ETAs.

## Part 2: Use of EN Eurocodes for structural design of works

### 2.1 National Provisions for the structural design of works

- 2.1.1 The determination of the levels of safety<sup>5</sup> of buildings and civil engineering works and parts thereof, including aspects of durability and economy<sup>6</sup>, is, and remains, within the competence of the Member States.
- 2.1.2 Possible differences in geographical or climatic conditions (e.g. wind or snow), or in ways of life, as well as different levels of protection that may prevail at national, regional or local level in the sense of article 3.2 of the CPD<sup>7</sup>, will be taken into account, in accordance with Guidance Paper E, by providing choices in the EN Eurocodes for identified values<sup>8</sup>, classes<sup>9</sup>, or alternative methods<sup>10</sup>, to be determined at the national level (named Nationally Determined Parameters). Thus allowing the Member States to choose the level of safety, including aspects of durability and economy, applicable to works in their territory.
- 2.1.3 When Member States lay down their Nationally Determined Parameters, they should:
- choose from the classes included in the EN Eurocodes, or
  - use the recommended value, or choose a value within the recommended range of values, for a symbol where the EN Eurocodes make a recommendation<sup>11</sup>, or
  - when alternative methods are given, use the recommended method, where the EN Eurocodes make a recommendation,

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<sup>5</sup> The word safety is encompassed in the Eurocodes in the word reliability

<sup>6</sup> The introductory provisions of Annex I of the CPD lay down: *"The products must be suitable for construction works which (as a whole and in their separate parts) are fit for their intended use, account being taken of economy, and in this connection satisfy the following essential requirements where the works are subject to regulations containing such requirements. Such requirements must, subject to normal maintenance, be satisfied for an economically reasonable working life. The requirements generally concern actions which are foreseeable."* Aspects of economy include aspects of serviceability.

<sup>7</sup> Article 3.2 of the CPD says that for each essential requirement classes may be established in the interpretative documents and the technical specifications (hENs and ETAs) *"in order to take account of possible differences in geographical or climatic conditions or in ways of life as well as different levels of protection that may prevail at national, regional or local level"*. This applies to the Eurocodes in so far as they give concrete form to ER 1 and a part of ER 2.

<sup>8</sup> *"Choices about values"* will be made where symbols are given in the EN Eurocodes in order to identify a value to be determined nationally

<sup>9</sup> Generally, the classes to be envisaged should have the status of *"technical classes"* in the sense of guidance paper E (see articles 4.2, 4.3 and 4.4 of the Guidance paper). *"Regulatory classes"* should only be envisaged in cases in which this is necessary to ensure full implementation in the Member States.

<sup>10</sup> *"Choices about methods"* will be made where alternative methods of calculation are included in the EN Eurocodes which are identified to be chosen nationally

<sup>11</sup> see EN 1991-1.1 – foreword – National standards implementing EN Eurocodes

- take into account the need for coherence of the Nationally Determined Parameters laid down for the different EN Eurocodes and the various Parts thereof.

Member States are encouraged to co-operate to minimise the number of cases where recommendations for a value or method are not adopted for their nationally determined parameters. By choosing the same values and methods, the Member States will enhance the benefits listed in 1.1.3

- 2.1.4 The Nationally Determined Parameters laid down in a Member State should be made clearly known to the users of the EN Eurocodes and other parties concerned, including manufacturers.
- 2.1.5 When the EN Eurocodes are used for the design of construction works, or parts thereof, the Nationally Determined Parameters of the Member State on whose territory the works are located shall be applied.

*Note: Any reference to a EN Eurocode design should include the information on which set of Nationally Determined Parameters was used, whether or not the Nationally Determined Parameters that were used correspond to the recommendations given in the EN Eurocodes (see 2.1.3).*

- 2.1.6 National Provisions should avoid replacing any EN Eurocode provisions, e.g. Application Rules, by national rules (codes, standards, regulatory provisions, etc.).

When, however, National Provisions do provide that the designer may – even after the end of the coexistence period - deviate from or not apply the EN Eurocodes or certain provisions thereof (e.g. Application Rules), then the design will not be called “a design according to EN Eurocodes”.

- 2.1.7 When Eurocode Parts are published as European standards, they will become part of the application of the Public Procurement Directive.

In all cases, technical specifications shall be formulated in public tender enquiries and public contracts by referring to EN Eurocodes, in combination with the Nationally Determined Parameters applicable to the works concerned, apart from the exceptions expressed in article 10.3 (Directive 93/37, article 10.2).

However, in application of the PPD, and following the spirit of the New Approach, the reference to EN Eurocodes is not necessarily the only possible reference allowed in a Public contract.. The PPD foresees the possibility for the procuring entity to accept other proposals, if their equivalence to the EN Eurocodes can be demonstrated by the contractor.

Consequently, the design of works proposed in response to a Public tender can be prepared according to:

- EN Eurocodes (including NDPs), which give a presumption of conformity with all legal European requirements concerning mechanical resistance and stability, fire resistance and durability, in compliance with the technical specifications required in the contract for the works concerned;
- Other provisions expressing the required technical specification in terms of performance. In this case, the technical specification should be detailed enough to allow tenderers to know the conditions on which the offer can be made and the owner to choose the preferred offer. This applies, in particular, to the use of national codes, as long as Member States maintain their use in parallel with EN Eurocodes (e.g. a Design Code provided by National Provisions), if also specified to be acceptable as an alternative to an EN Eurocode Part by the Public tender;

## 2.2 Indications to writers of EN Eurocodes

- 2.2.1 When preparing the EN Eurocodes for the design and execution of works, CEN/TC 250 shall provide for National choices as relevant, in accordance with 2.1.2.
- 2.2.2 When converting the ENV Eurocodes into EN Eurocodes:
- "Boxed values" which do not relate to safety levels and differences referred to in 2.1.2 should be transformed into unique values.
  - "Boxed values" which relate to safety levels and differences referred to in 2.1.2 should be replaced by Nationally Determined Parameters. Where relevant, the possible range for these Parameters should be given for information. "Boxed values" which have an influence on the level of serviceability or durability should be treated as Nationally Determined Parameters.
- Note: This request satisfies the requirement of the Mandate to eliminate the "boxed values" or, where necessary, to transform them into classes.*
- 2.2.3 The EN Eurocodes should be formulated in such a way that they can easily be referred to in hENs, ETAGs and ETAs for construction products, in particular those for structural components and kits. Therefore, reference in EN Eurocodes to other standards should only be made when, and as far as is necessary, technical criteria are to be defined; the references should be unambiguous. In order to prevent ambiguity, the normative text should not contain "open ends" or allow different interpretations. General references should be avoided.
- 2.2.4 Where EN Eurocodes give technical classes or threshold values (in the sense of Guidance Paper E), it should be made clear that these classes or threshold values are applicable only to the design of works. They may not be relevant for harmonised specifications for structural components or kits, which must have the possibility to include other classes or threshold values, as appropriate, such as those that have been used up to now, for structural components legally placed on the market<sup>12</sup>.
- 2.2.5 The EN Eurocodes should be formulated in such a way that the reader of the ENs will be aware that, by definition, design "according to the EN Eurocodes" means compliance with all of the EN Eurocodes provisions, i.e. Principles and Application Rules, together with the respective Nationally Determined Parameters.
- Note: Providing the possibility of deviating from, or not applying the EN Eurocodes or certain provisions thereof (e.g. Application Rules) is not a matter to deal with in the EN Eurocodes themselves, but only for the National Provisions implementing them (see 2.1.6).*
- 2.2.6 The EN Eurocodes should be formulated in such a way that a proper distinction is made between calculation methods and administrative provisions on which the National Annex can give information.
- 2.2.7 In order to improve the transparency and the applicability of the Eurocodes system, each EN Eurocode Part shall include the full list of the symbols, classes or methods for which a choice or determination at national level is possible (NDPs - see 2.3.3).
- 2.2.8 No delay or objection should be caused as a result of including fundamental changes or new rules, during the conversion from the ENV to EN, in fields in which there is no, or not sufficient, practical experience in Member States.
- 2.2.9 References in an EN Eurocode Part to other Parts should, where possible, be made only to the EN version of those parts.
- 2.2.10 When specifying materials and constituent products in EN Eurocodes, CEN/TC 250 shall take account of the following:

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<sup>12</sup> This applies e.g. to the concrete cover to reinforcing steel which, according to existing national rules for pre-cast concrete components, may be less than the minimum concrete cover for in situ works according to EN Eurocodes

- Materials and constituent products with properties which enter into the calculation of structures (e.g. by characteristic values), or otherwise relate to the mechanical resistance and stability and/or fire resistance of the works, including aspects of their durability, should be specified in EN Eurocodes by reference to the respective product hENs, or ETAs. If an hEN or ETA is not yet available or is not foreseen, see footnote 30 and 34.
- For the transitional period during which hENs or ETAs for materials or constituent products are not available or are not binding (i.e. during the co-existence period), EN Eurocodes should, as far as practicable, give, in an informative part, information regarding the properties of materials and constituent products necessary for the structural design of works, according to the EN Eurocodes, and they should state that the respective material and constituent product specifications may be subject to the National Provisions of the Member State in which the works are located<sup>13</sup>.

## 2.3 National Annexes of the EN Eurocode Parts

- 2.3.1 When a Eurocode Part is circulated by CEN for publication as an EN, the final text of the approved EN, according to CEN rules, is made available by CEN Management Centre to CEN members (the NSBs) in the 3 official languages (English, French and German)<sup>14</sup>.

Each NSB shall implement this EN as a national standard by publication of an equivalent text (i.e. a version translated into another language) or by endorsement of one of the 3 language versions provided by CEN Management Centre (by attaching an “endorsement sheet”), within the timescale agreed for publication.

The National standard transposing the EN Eurocode Part, when published by a National Standards Body (NSB), will be composed of the EN Eurocode text (which may be preceded by a National title page and by a National Foreword), generally followed by a National Annex.

- 2.3.2 The National Standards Bodies should normally publish a National Annex, on behalf of and with the agreement of the national competent authorities.

A National Annex is not necessary if an EN Eurocode Part contains no choice open for Nationally Determined Parameters, or if an EN Eurocode Part is not relevant for the Member State (e.g. seismic design for some countries).

*Note: As stated by the CEN Rules, the National Annex is not a CEN requirement (a NSB can publish an EN Eurocode Part without one). However, in the context of this Guidance Paper, the National Annex serves for NSBs to publish the Nationally Determined Parameters, which will be essential for design.*

- 2.3.3 The National Annex may contain<sup>15</sup>, directly or by reference to specific provisions, information on those parameters which are left open in the Eurocodes for national choice, the 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 EN Eurocode,
- values to be used where a symbol only is given in the EN Eurocode,
- country specific data (geographical, climatic, etc.), e.g. a snow map,

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<sup>13</sup> For as long as references to the respective hEN has not been published in the Official Journal of the European Communities or the letter from the Commission informing Member States on the endorsement of the respective ETA Guideline has not been sent to Member States and its period of coexistence has not yet ended (for further information see Guidance Paper J).

<sup>14</sup> This step correspond to the DAV – Date of Availability

<sup>15</sup> See EN 1990 and EN 1991 Part 1-1 – Foreword – National standards implementing Eurocodes

- the procedure to be used where alternative procedures are given in the EN Eurocode,

It may also contain the following:

- decisions on the application of informative annexes, and,
- reference to non-contradictory complementary information to assist the user in applying the Eurocode.

- 2.3.4 A National Annex cannot change or modify the content of the EN Eurocode text in any way other than where it indicates that national choices may be made by means of Nationally Determined Parameters.
- 2.3.5 The National Annex of an EN Eurocode Part will normally be finalised when the safety and economy levels have been considered, i.e. at the end of the period allocated for the establishment of the Nationally Determined Parameters (see Annex A).
- 2.3.6 If a Member State does not choose any NDPs, the choice of the relevant values (e.g. the recommended value), classes or alternative method will be the responsibility of the designer, taking into account the conditions of the project and the National provisions.
- 2.3.7 The National Annex has an informative status. The content of a National Annex can be the basis for a national standard, via the NSB, and/or can be referred to in a National Regulation.
- 2.3.8 The National Annex can be amended, if necessary, according to CEN rules.

## **2.4 Packages of EN Eurocode Parts**

- 2.4.1 The purpose of defining packages, by grouping Parts of EN Eurocode, is to enable a common date of withdrawal (DoW)<sup>16</sup> for all of the relevant parts that are needed for a particular design. Thus conflicting national standards shall have been withdrawn at the end of the coexistence period, after all of the EN Eurocodes of a package are available, and National Provisions will have been adapted by the end of the National Calibration period, as described in Annex A. Publication of the individual Parts in a Package is likely to occur over a long period of time so that, for many Parts, the coexistence period will be much longer than the minimum given in 2.5.5. When a National standard has a wider scope than the conflicting Eurocode Package, only that part of the National standard whose scope is covered by the Package has to be withdrawn.

When more than one package of EN Eurocodes is likely to be needed for the design of works the dates of withdrawal of the related Packages can be synchronised.

- 2.4.2 No Parts from EN 1990 or the EN 1991, EN 1997 or EN 1998 series form a package in themselves; those Parts are placed in each of the Packages, as they are material independent.
- 2.4.3 The list of the EN Eurocode Parts contained in the various Packages for each of the main materials, i.e. concrete, steel, composite concrete and steel, timber, masonry and aluminium, and their respective target dates, will be up dated and made available through the CEN/MC web-site<sup>17</sup> (see Annex C which presents the packages as they are currently foreseen)

## **2.5 Arrangements for the implementation of EN Eurocodes and period of co-existence with national rules for the structural design of works**

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<sup>16</sup> At the date of withdrawal related to a new standard, all the specifications existing previously in the National collection of standards conflicting with the new standard have to be withdrawn and the national provisions have to be adapted to allow the legitimate use of EN Eurocodes

<sup>17</sup> Address: <http://www.cenorm.be/sectors/construction/eurocode.htm>

2.5.1 The arrangements for the implementation of an EN Eurocode Part include, from the time the final draft<sup>18</sup> of the EN Eurocode is produced by the CEN/TC250, five periods:

- Two periods before the date of availability (DAV):

- Examination period.
- CEN process period.

- Three periods after the date of availability:

- Translation period,
- National calibration period,
- Coexistence period,

The detailed content of each of the five periods is given in the table and chart in Annex A.

The progress of each EN Eurocode (or package), within these periods, will be provided by CEN/MC on their web-site.

2.5.2 The following basic requirements need to be fulfilled by the EN Eurocode Parts in order to be referred to in the national provisions:

- Calculations executed on the basis of the Eurocode Part, in combination with the Nationally Determined Parameters, shall provide an acceptable level of safety.
- The use of the EN Eurocode Part, in combination with the Nationally Determined Parameters, does not lead to structures that cost significantly more, over their working life<sup>19</sup>, than those designed according to National standards or provisions, unless changes in safety have been made and agreed.

2.5.3 The European Commission encourages Member States to implement EN Eurocodes in the framework of their National Provisions. During the coexistence period, the construction regulation authorities should accept the use of EN Eurocodes, as an alternative to the previous rules (e.g. National codes, standards or other technical rules included, or referred to, in national provisions) for the design of construction works. Member States are also encouraged to adapt their national provisions to withdraw conflicting national rules before the end of the co-existence period.

2.5.4 When an EN Eurocode Part is made available, the Member States should:

- set officially, before the end of the National calibration period (see Annex A), the Nationally Determined Parameters to be applied on their territory. In the event of any unexpected obstacles to carrying out the calibration of an EN Eurocode Part, the Member State shall inform the Commission, when an extension of the period could be agreed by the SCC.
- adapt, as far as necessary, their National Provisions so that the EN Eurocode Part can be used on their territory:
  - as a means to prove compliance of construction works with the national requirements for "mechanical resistance and stability" and "resistance to fire", in the sense of Annex I of the CPD, and
  - as a basis for specifying contracts for the execution of public construction works and related engineering services. If no NDPs are to be produced for an EN Eurocode Part the co-existence period begins at DAV and ends at DoW. Thus the EN Eurocode is

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<sup>18</sup> CEN/MC will communicate this date on its web-site

<sup>19</sup> see Interpretative Document 1, clause 1.3.5

available and any existing national standard is still available, so that both can be used during this period.

At the end of the “coexistence period” of the last EN Eurocode Part of a Package, the Member States should have adapted all their National Provisions which lay down (or refer to) design rules within the scope of the relevant Package.

- 2.5.5 Owing to the need for operational Packages (as defined in 2.4), the reference to the coexistence period of a Package is defined as the coexistence period of the last Eurocode Part of that Package. In Member States intending to implement EN Eurocodes, the coexistence period of this last part should be three years. After the three years coexistence period of the last EN Eurocode Part of a Package, the whole Package-related former conflicting national standards will be withdrawn, i.e 5 years maximum after DAV<sup>20</sup>. Conflicting National Provisions that would not allow the use of the first parts of a Package should be arranged, in order to allow the legitimate use of those Parts.
- 2.5.6 In order to increase the overall transparency of the implementation of the EN Eurocodes, the Commission wishes to be informed, by the Member States, of the main phases: translation, national calibration and coexistence Period, for each EN Eurocode Part, and the adaptation of National Provisions.

*Note: the Commission intends to prepare, for this purpose, a “test reporting form” on the basis of the items mentioned in the Annex B.*

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<sup>20</sup> It is intended that the end of the coexistence period for each package will be laid down by the Commission after consultation of Member States

## Part 3: Use of EN Eurocodes in technical specifications for structural products

This part of the Guidance Paper only deals with such *structural products*, which are construction products in the sense of the CPD.

### 3.1 Distinction between specifications for material with properties to be determined by test and specifications for components with properties to be determined by calculation

3.1.1 It follows from the CPD<sup>21</sup> and the Interpretative Documents<sup>22</sup> that there is a need for consistency between the technical specifications for construction products (hEN and ETA) and the technical rules for works.

3.1.2 For construction products, which contribute to the mechanical resistance and stability and/or fire resistance of works, two types of properties are distinguished, according to the validation method:

- Properties to be determined by testing (generally in the case of structural materials and constituent products, such as concrete, reinforcing steel for concrete, fire protection material, etc.), and
- Properties to be determined by calculation following methods, which are also used for the structural design of works (generally for prefabricated structural components and kits, consisting of structural components, such as prefabricated concrete components, prefabricated stairs, timber frame buildings kits, etc.).

For both types of product properties the resulting values are to be “declared” in the information accompanying the CE marking<sup>23</sup> of the product and used in the structural design of works or parts thereof.

3.1.3 For the reference to, or use of, EN Eurocodes in harmonised product specifications a distinction is made in this Part 3 between:

- structural materials and constituent products with properties to be determined by testing, and
- prefabricated structural components and kits consisting of structural components with properties to be calculated according to EN Eurocode methods.

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<sup>21</sup> Article 2.1 and 3.3

<sup>22</sup> clauses 4.2, 4.3.1, 4.3.2 and 5.2 of ID 1

<sup>23</sup> By application of CPD and in conformity with the mandate given by the Commission

### 3.2 Indications to writers of hENs and ETAs for structural material and constituent products with properties to be determined by testing

3.2.1 For structural materials and constituent products, with properties which enter into structural calculations of works or otherwise relate to their mechanical resistance and stability and/or fire resistance including aspects of durability and serviceability, material hENs and ETAs shall meet the following:

- Material hENs and ETAs shall take the technical requirements of the EN Eurocodes into account so that the assumptions of design according to the EN Eurocodes are met. This applies in particular to the general principles and requirements given in EN 1990, Basis of structural design, e.g. with regard to the definition of values of material or product properties such as the *characteristic value*<sup>24</sup>
- Material hENs and ETAs will, therefore, have to lay down the methods for determining these properties and to specify the requirements for the factory production control and for the conformity attestation in such a way that each declared value or declared class corresponds, as far as practicable, to a defined statistical confidence (defined fractile and confidence level) and can, for the structural design of works, be taken as the “characteristic value”.
- In order to take into account "possible differences in geographical or climatic conditions or in ways of life, as well as different levels of protection that prevail at national, regional or local level" in the sense of Art. 3.2 of the CPD<sup>7</sup>, levels and classes<sup>9</sup> may have to be established in the material hENs and ETAs, in accordance with Guidance Papers E and F, taking into account the established competence of the Member States concerning the levels of safety, including aspects of durability and economy. The Member States may then choose the levels and classes to be observed in their territory.

*Note: Harmonised specifications shall not exclude from the market products legally in use in at least one Member State. Therefore, materials hENs or ETAs may include specific provisions deviating from the EN Eurocode provisions, provided that the declared values remain usable for the design of construction works, according to the EN Eurocodes.*

3.2.2 When making provisions in material hENs or ETAs which determine the declared values or classes, CEN product TCs and EOTA WGs should be aware that:

- Uncertainties concerning declared values of “structural materials and products” will, in design calculations according to the EN Eurocodes, be allowed for by material partial safety factors,
- The value or class of a property or performance of a “structural material or constituent product”, which is needed in the design of works and parts thereof (and is consequently important for the competitiveness of that material or product) will not be the declared characteristic value or class but the *design value*<sup>25</sup>.

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<sup>24</sup> EN 1990, § 1.5.4.1 defines the *characteristic values* as "Value of a material or product property having a prescribed probability of not being attained in a hypothetical unlimited test series. This value generally corresponds to a specific fractile of the assumed statistical distribution of the particular property of the material or product. A nominal value is used as the characteristic value in some circumstances". However, often, the characteristic value takes also the confidence level into account.

<sup>25</sup> According to EN1990, § 1.5.4.2 and 1.6, the *design value* of a material or product property is defined as “value obtained by dividing the characteristic value by a partial factor  $\gamma_m$  (for material property) or  $\gamma_M$  (for material property also accounting for model uncertainties and dimensional variation) or, in special circumstances, by direct determination”

- Deciding on the safety factors, including the material partial factors, which are used to determine the *design value* from the *characteristic value*<sup>24</sup>, remains the responsibility of Member States.

3.2.3 All of the provisions concerning the CE marking and the accompanying information on the properties of a product or material shall be given in the relevant hEN or ETA, in accordance with the mandates and the guidance papers of the Commission.

3.2.4 For material properties needed for the structural design of works, and that are linked to the Essential Requirements, the material hEN or ETA shall provide that all of their values or classes, relevant for the calculation or the design assumptions of the EN Eurocodes, are declared in the information accompanying the CE marking.

If one of those properties, for which values or classes have to be declared, is missing in the mandate, the CEN/TC or EOTA/WG shall inform the Commission so that the corresponding mandate can, if justified, be amended and, if needed, transitional arrangements can be made to enable the hEN, or ETA to be published without delay.

3.2.5 Provisions made in 3.2.1 to 3.2.4 with regard to ETAs shall also be taken into account by EOTA in the preparation of the ETA Guidelines (ETAGs), as appropriate.

### **3.3 Indications to writers of hENs and ETAs for structural components and kits with properties to be determined according to EN Eurocodes<sup>26</sup>**

#### 3.3.1 Introduction

The hENs and ETAs for structural components or kits, hereinafter referred to as “component hENs and ETAs”, shall provide for one, or several, or all<sup>27</sup>, of the following methods to determine the properties relating to the essential requirements N°1 “mechanical resistance and stability” (including such aspects of Essential Requirement n°4 *Safety in use*, which relate to mechanical resistance and stability) and aspects of Essential Requirement n°2 “resistance to fire”, to be declared as information accompanying the CE marking:

- Method 1: Indication of geometrical data of the component and of properties of the materials and constituent products used, according to 3.3.2.
- Method 2: Determination of properties by means of the EN Eurocodes (with the results expressed as characteristic values or design values) according to 3.3.3
- Method 3: Reference to design documents of the works or client’s order according to 3.3.4.

CE marking and the accompanying documents for such a product shall provide all of the information necessary to use the product in works, or to integrate the product characteristics into the structural design of works or parts thereof.

Products that have declared values determined according to EN Eurocode calculation methods, following the harmonised technical specifications, and that are CE marked on

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<sup>26</sup> Properties of structural components and kits can also be determined by testing. The methods to be applied are those which will be given in the hEN or ETA for the structural component or kit concerned.

<sup>27</sup> For a given product, one or several properties can be subject to one of these methods, and other properties can be subject to another of these methods

this basis, must be allowed to be placed on the market and used for the purpose for which they are intended in all Member States (see CPD article 6.1).

### 3.3.2 Method 1

The component hEN or ETA provides that the CE marking shall be accompanied by the following information:

- the geometrical data (dimensions and cross sections, including tolerances) of the structural component or, in the case of kits, of the installed system and the components of the kit, and
- the properties of the materials and constituent products used<sup>28</sup> that are needed to determine, according to the National Provisions, valid in the place of use, or possible use, load-bearing capacities and other properties, including aspects of durability and serviceability, of the structural component (or, in the case of kits, of the assembled system) installed in the works - see 3.3.3 (f)

The adequacy of the respective provisions should be verified in consultation with CEN/TC 250.

It is intended that examples for the application of method 1, and examples of CE marking, developed by product CEN/TCs or EOTA/WGs, will be made publicly available by the Commission services, in their web-site.

### 3.3.3 Method 2

The component hEN or ETA uses EN Eurocode methods as the means of determining the properties of the structural component or kits relating to the essential requirements "mechanical resistance and stability" or "resistance to fire" in terms of characteristic values or design values, taking into account the following:

#### 3.3.3.1 General

- (a) Component hENs, and ETAs shall comply with the principles and requirements given in EN 1990 Basis of structural design e.g. with regard to the definition of values of material or product properties such as the characteristic value<sup>24</sup> and the design value<sup>25</sup>. Thus component hENs and ETAs will have to:

- define the properties of structural components and kits, which relate to "mechanical resistance and stability" or "resistance to fire" that are to be used in the structural design of works, and
- lay down the methods for determining those properties and specify the requirements for the factory production control and for the conformity attestation,

in such a way that each declared value or declared class corresponds, as far as practicable, to a defined statistical confidence (defined fractile and confidence level) and can, for the structural design of works, be taken as the "characteristic value" or "design value".

- (b) Component hENs, and ETAs shall use the methods given in the specific EN Eurocodes, as far as applicable.

The adequacy of the provisions of components hENs and ETAs concerning the indication of properties related to mechanical resistance and stability and resistance to fire should be verified in consultation with CEN/TC 250.

Nevertheless, harmonised specifications shall not exclude from the market products legally in use in at least one Member State. Therefore, a component hEN or ETA may include specific provisions deviating from the EN Eurocode provisions, provided that the

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<sup>28</sup> The properties of the materials and constituent products used should be indicated by reference to the respective product specification.

component or, in the case of kits, the assembled system, remains usable for works designed according to EN Eurocodes.

*Note: EN Eurocode methods referred to in hENs and ETAs have the same status as a test method described in a supporting standard and referred to in an hEN or ETA. By use of a reference, the respective EN Eurocode clauses become part of the harmonised product specification.*

- (c) Component hENs and ETAs shall take into account the established competence of the Member States concerning the levels of safety, including aspects of durability and economy<sup>29</sup>, and of country specific data related to "differences in geographical or climatic conditions or in ways of life or different levels of protection that prevail at National, regional or local level" in the sense of Art. 3.2 of the CPD<sup>7</sup> For this purpose, appropriate levels and classes<sup>9</sup>, which give the possibility of national choices for the respective parameters and which can be referred to in the National Provisions, may have to be given in the component hENs and ETAs, taking into account the relevant Nationally Determined Parameters.

With respect to these levels and classes, Guidance Paper E applies with the provisions concerning threshold levels (section 3; minimum/maximum values), classes of product performance (section 4) and possible National requirements concerning levels of product performances (section 5). As structural components and kits are prefabricated (parts of) works bearing the CE marking according to the CPD, also section 2 of Guidance Paper E applies. The levels and classes should be presented in such a way that the Member States' choice is not predetermined (e.g. by the name given to a certain level or class).

Member States are encouraged to co-operate to minimise the number of classes and levels to be introduced in hENs and ETAs by specification writers for "structural components and kits"

- (d) As far as durability is concerned, Guidance Paper F on durability applies also to structural components or kits and their properties related to the Essential Requirements "mechanical resistance and stability" or "resistance to fire". For parameters that have an influence on the durability of the works, the Component hENs and ETAs shall also give the possibility for national choices by means of levels or classes according to Guidance Paper E.
- (e) The use of EN Eurocode provisions in component hENs and ETAs taking the Nationally Determined Parameters into account in the component hEN or ETA by appropriate levels and classes, if relevant (see 3.3.3.2, note 2), may be done by:
- Referring, in the component hEN or ETA, to the respective EN Eurocode Part(s) indicating the relevant sections or clauses (this method is preferred), or
  - Incorporating the respective EN Eurocode provisions in the component hEN, or ETA, where necessary with appropriate adaptation or simplification,
- (f) Component hENs and ETAs should specify the materials and constituent products to be used by referring to the respective product hEN<sup>30</sup> or ETAs (for transitional arrangements, see 3.3.3.3). This applies to any material or constituent product, which is to be considered as a construction product in the sense of the CPD and the properties of which:
- enter into the calculation of properties of the structural component or kit, by the characteristic value, or

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<sup>29</sup> which includes the aspects of serviceability in the sense of EN Eurocodes

<sup>30</sup> In specific cases, to be identified by the Commission and Member States, component hENs or ETAs may refer to European product standards which do not, or not yet, have the status of harmonised standard in the sense of the CPD, for instance EN 206 "concrete".

- relate indirectly to the mechanical resistance and stability of the works, in particular with regard to durability aspects<sup>31</sup>, even if they do not enter into the calculation.

- (g) All rules related to the CE Marking and the accompanying information on the properties of structural components or kits must be given, with the details necessary for the application by the manufacturers, in the component hEN or ETA, in application of the mandate given by the Commission and in accordance with Guidance Paper D.

The provisions concerning the "indications to identify the characteristics of the product" and the "guidance to specification writers regarding the identification of product characteristics" (clauses 3.6 and 4 of Guidance Paper D) apply also to properties related to the essential requirements "mechanical resistance and stability" and "resistance to fire". Thus, the hEN or ETA shall provide that the information accompanying the CE marking of a structural component or kit, shall include the levels or classes of the properties related to the essential requirements "mechanical resistance and stability" and "resistance to fire", expressed in terms of declared values or declared classes, including the design assumptions used by the manufacturer. It will be up to the manufacturer of such prefabricated parts of works to choose, in each case, levels and classes according to the intended use (see 3.3.3.1 (c) and (d) as well as 3.3.3.2).

- (h) When making provisions in hENs or ETAs for structural components or kits that determine the declared values or classes, CEN product TCs and EOTA bodies should be aware that:
- the values or classes of performance of the structural component or kit, which are essential for the design of works (and, consequently, for the competitiveness of the structural component or kit) will not be the characteristic values but the design values;
  - uncertainties concerning declared values or classes of the CE-marked structural component or kit will, according to the EN Eurocodes (but also according to the prevailing national design rules), be taken into account in calculations of the works by material partial factors applicable to the structural component or, in the case of a kit, to the installed system;
  - laying down the material partial factors, applicable to the structural component or, in the case of a kit, to the installed system, remains the responsibility of the Member States.

### 3.3.3.2 Expression of properties related to "mechanical resistance and stability" and "resistance to fire"

The properties related to "mechanical resistance and stability" and "resistance to fire" and the information accompanying the CE marking should be specified in component hENs or ETAs as simply as possible with regard to the needs of fulfilling the National Provisions. This may be done by expressing the properties in terms of:

- (a) characteristic values for strength and other cross section properties from which the load-bearing capacities and other aspects<sup>32</sup> of the structural component (or, in the case of kits, of the assembled system) installed in the works, taking into account the National Provisions, can be calculated, or
- (b) design values provided that the NDPs applicable to works have been taken into account by appropriate levels and classes, which correspond to sets of NDPs (see 2.1.2 to 2.1.5 and 2.2.2).

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<sup>31</sup> e.g. concrete admixtures, possibly having a negative effect concerning corrosion of reinforcing steel, aggregates possibly leading to alkali-silica reaction, or structural steel which, depending on its composition, could be more or less sensitive to corrosion, or fire protection materials to reduce temperature of structural products

<sup>32</sup> for instance *thermal insulation*, for fire separating elements

*Note 1: To express a property of a structural component or kit by the “design value” involves that the set of NDPs, which are applicable to the component or kit in the end use conditions, are expressed in the hEN or ETA in terms of classes.*

*For this purpose, the classes will be defined in component hEN or ETA by the combination of NDPs applicable in Member States.*

*Normally, for a given structural component or kit and its intended use:*

- . a number of symbols, classes or alternative methods, which in EN Eurocodes have the status of NDPs, will not be relevant, and*
- . the relevant NDPs will not always be different from one Member State to the other.*

*This means that, in most cases, a reduced number of classes, in the component hEN or ETA will be sufficient to cover the NDPs and the differences of NDPs in the various Member States, applicable to the component or kit.*

*Note 2: Eventually, in particular cases, it may happen for a given component or kit that there is just one set of NDPs to be taken into account in the component hEN or ETA, which covers the end use conditions in all the Member States.*

It is intended that examples for the application of method 2, and examples of CE marking, developed by product CEN/TCs or EOTA/WGs, will be made publicly available by the Commission services, in their web-site.

### 3.3.3.3 Transitional arrangements

The following transitional arrangements shall be taken into account in the drafting of component hENs or ETAs:

- For the period of time in which the respective EN Eurocodes are not yet available and, thus, cannot be referred to in the Component hEN or ETA or used by manufacturers of the structural component or kit, it is recommended to refer to<sup>33</sup>, or to incorporate, as far as practicable, the relevant EN Eurocode provisions, in their latest version in consultation with CEN/TC 250. These provisions shall be replaced by references to the respective EN Eurocodes, when these become available.
- For the period of time in which the relevant material hENs, or ETAs, are not yet available and, thus, cannot be referred to in the component hEN or ETA, or used by manufacturers of structural components or kits, it is recommended to incorporate, as far as practicable, the material or product specification in the component hEN or ETA (preferably in Annexes), in consultation with the respective material TCs/WGs,<sup>34</sup>

Provisions in component hENs or ETAs for such transitional arrangements will be necessary until the co-existence periods relating the respective materials and constituent products have come to their end. For further information on "Transitional Arrangements" applicable to hENs and ETAs for materials and constituent products, see Guidance Paper J.

### 3.3.4 Method 3

For cases in which a structural component or kit is produced in accordance with the design details (drawings, material specifications, etc.) prepared by the designer of the works following the National Provisions, component hENs or ETAs shall provide, where relevant, that the information to accompany the CE marking with regard to the product

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<sup>33</sup> Reference can only be made to documents, which are publicly available.

<sup>34</sup> In most cases, such a preliminary harmonisation of the structural materials or constituent products used will not be practicable. Eventually, further mandates for hENs or ETAs, or green light for an ETAs without guideline could be provided for by the European Commission.

properties can be given by making reference, in an unambiguous way, to the respective design documents of the works, e.g. using a position number.

For cases in which the producer has designed and produced a structural component or kit following the provisions of the client's order, in accordance with the National Provisions applicable to the works, the component hEN or ETA shall provide, where relevant, that the information to accompany the CE marking with regard to the product properties can be given by making reference, in an unambiguous way, to the drawings and material specifications linked to the client's order.

### 3.3.5 Attestation of conformity

Concerning the conformity attestation of structural components and kits, as of any other construction product, all of the tests and procedures shall be performed and documented according to the provisions of the CPD to be transposed into the technical specification of the product (see Guidance Paper K, clause 2.4).

Therefore, component hENs or ETAs shall contain the necessary provisions to define the tasks of the manufacturer and the Notified Bodies with regard to the attestation of conformity of the product.

Properties of a structural component or kit, which relate to "mechanical resistance and stability" and "fire safety" and which are determined by calculation, are subject to the procedure of attestation of conformity, as is any other property.

Within the systems of attestation of conformity referred to in Annex III of the CPD, in the case of method 2, the checking of calculations shall be considered as a part of the "initial type testing" of the product.

### 3.3.6 Application to ETAs

Provisions made in 3.3.2 to 3.3.5 with regard to ETAs should also be taken into account by EOTA in the preparation of the ETA Guidelines (ETAGs), as appropriate.

## **Part 4: Future actions related to the Eurocode Programme**

### **4.1 Education**

4.1.1 To build on the strong pedigree of the EN Eurocodes described above, the Commission recognises the importance of building on this with programmes of education to help the professions to implement the EN Eurocodes.

4.1.2 Aspects of education that need to be covered, include:

- informing and making the profession as a whole aware of the EN Eurocodes
- providing continuing professional development and training to the profession
- encouraging the production of handbooks, design aids, software etc to facilitate the implementation of the EN Eurocodes
- encouraging Universities and Technical Colleges to base their teaching of civil and structural engineering design on the EN Eurocodes

4.1.3 The Commission, in liaison with industry and Member States, will encourage:

- Publication of easily understandable "jargon free" booklets covering the EN Eurocodes;
- The holding of European seminars aimed at the profession as a whole as key EN Eurocodes become available as ENs (e.g. EN 1990:Basis of Design);
- Publication of documents on the adoption of the EN Eurocodes through Government or on behalf of Government
- The holding of meetings organised by professional and industry bodies to inform construction professionals and university teachers, to listen to and discuss their concerns, and to promote the opportunities offered by the EN Eurocodes.
- The arrangement of continuing professional development and training courses
- The development of aids to implementation

4.1.4 Central to any initiatives taken on education is the production of :

- Handbooks, worked examples and background documents;
- Software;
- Guides for everyday structures (e.g. normal buildings) based on the EN Eurocodes

Publishing companies, software houses and trade organisations will carry out these important activities, mainly as commercial ventures. Encouragement to these bodies can be given by a strong commitment to implementation of the EN Eurocodes both by the EC and the Member States.

- 4.1.5 Member States should encourage the use of the EN Eurocodes in private contracts, particularly through education and information campaigns, regardless of what may be requested by National provisions.

## **4.2. Research with regard to EN Eurocodes**

- 4.2.1 The Commission services recognises that, for the Construction sector to remain competitive in the world construction industry, it is essential that the EN Eurocodes, once published, should remain the most up to date, useable International Codes of Practice, meeting the requirements for a profession practising in a competitive environment.

- 4.2.2 The EN Eurocodes should be able to develop according to the innovative pressures of the market and the progress of scientific knowledge and methods.

- 4.2.3 The pressures from the market are generated by:

- new material and new products;
- new ways for procurement and execution of works;
- needs for economy whilst maintaining acceptable levels of safety.

The progress of the scientific knowledge and methods are generated by:

- the need to avoid disasters in the area of safety (eg seismic, fire);
- a knowledge of phenomena acquired in other domains (eg aeronautics for wind action);
- the answer to new economic or social needs (eg High Speed Railways, nuclear plants);
- the availability of powerful and widely-distributed tools for calculation (computers and software).

- 4.2.4 Initiatives for research arise from

- the industry or the users concerned;
- public authorities in charge of safety, economy, scientific development and education (for example, the development of NDPs)
- universities and research organisations experienced from their involvement as third parties.

- 4.2.5 In many cases there will be a mutual interest for both industry and public authorities (including the European Commission) in research and this should be reflected by agreements on common funding according to the following criteria:

- Industrial and user's sources - the main funding for research whose objectives are short-term benefits or particular advantages for special innovative companies and associated industries and users (e.g. unique verifications and ETA's).
- EC or National public funding - the main funding for research whose objectives are medium to long term benefits for the European construction industry (e.g. for improving technical specifications and design codes, harmonising models for actions and resistances, improving safety aspects).

## **4.3. Maintenance of EN Eurocodes**

- 4.3.1 The maintenance of the EN Eurocodes is essential; the need for updating, revision and completion is strongly recognised so that an improved second generation of EN Eurocodes can evolve. However, a period of stability should be observed before embarking on change<sup>35</sup> other than to correct errors.
- 4.3.2 Maintenance work will involve:
- Reducing open choices (NDPs)
  - urgent matters of health and safety;
  - correcting errors;
  - ensuring the most up to date information is in the EN Eurocodes, recognising recent proven innovations and improvements in construction technology;
  - feedback from use of the EN Eurocodes in the various Member States through CEN;
  - requests from industrial organisations or public authorities to CEN members for revision.
- 4.3.3 The organisation of maintenance should start after the receipt of a positive vote on a draft EN Eurocode, a Maintenance Group should be formed by the relevant CEN/TC250 SC to:
- give further consideration of co-ordination items arising from the work of other Project Teams (this is necessary as the various parts of the EN Eurocodes are not being prepared simultaneously);
  - provide explanations to questions arising from the use of the EN Eurocode, e.g. on background and interpretation of rules;
  - collect comments and requests for amendment;
  - prepare action plans for urgent revision in the case of safety related matters, or future systematic revisions according to the CEN procedure and as decided by CEN/TC250.
- 4.3.4 The strategy to provide adequate resources to support the maintenance of the EN Eurocodes should be decided by the European Commission, Member States, Industry and CEN seeking to find a balance between:
- the requirements for public safety
  - the competitive demands of industry
  - the availability of funds

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<sup>35</sup> No revision should be published until after the coexistence period has finished.

## Annex A

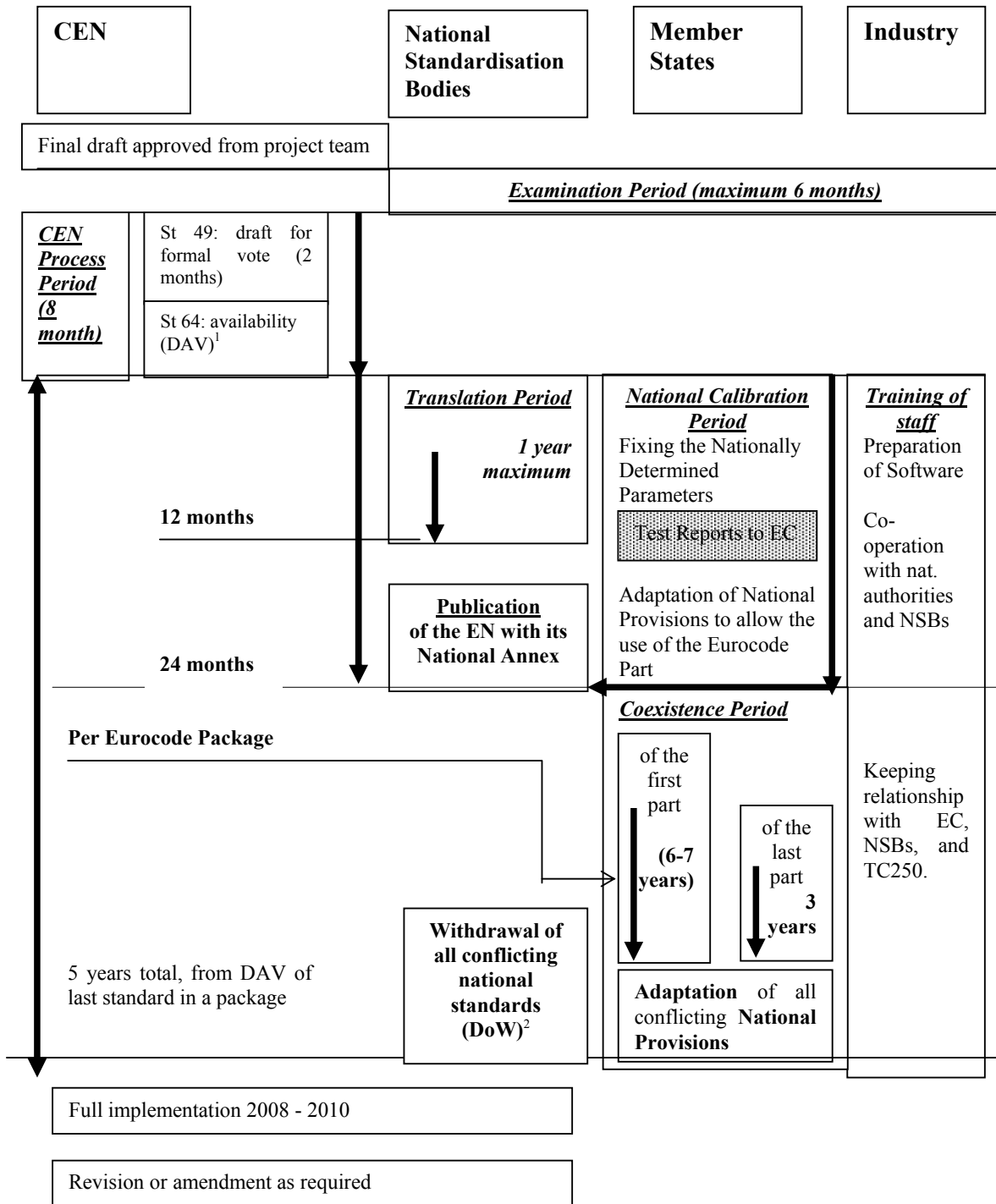
### Arrangements for the implementation of the EN Eurocodes

<b>Periods</b>	<b>Description</b>	<b>Action</b>
<b><i>Examination Period</i></b>	After the final draft prepared by the Project Team is sent to the sub-committee for progressing to the vote, a period should be allowed for examination of the content of the Eurocode Part, by both competent authorities and Sub-committee members. After taking into account any comments generated from this examination, the Sub-committee approves the document to go to formal vote and sends it to CEN/MC (CEN stage 49). A maximum period for the examination, revision in the sub-committee and final approval to go to formal vote is 6 months.	CEN/ NSBs
<b><i>CEN Process Period</i></b>	After receiving the final draft (CEN stage 49), CEN/MC organises the formal vote and the ratification, leading to the date of availability (DAV) of the approved European standard. This process requires about 8 months, depending on editing, translation (translation of the EN Eurocode Parts to the other two official languages of CEN) and finalisation of the document prior to making it available to CEN members for publication	CEN/ NSBs
<b><i>Translation Period</i></b>	The translation of an Eurocode Part in authorised national languages may be started, at the latest when the National Standardisation Bodies have received the Eurocode from CEN (DAV). The maximum time allowed for translation is 12 months after DAV.	NSBs
<b><i>National Calibration Period</i></b> (in parallel with translation period)	A period of two (2) years after DAV is the maximum time allowed to fix the Nationally Determined Parameters. The SCC could, however, examine requests, for exceptions. At the end of this period, the national version of an EN Eurocode Part will be published, with the National Annex, which will include the Nationally Determined Parameters. At the end of this 2-year period, the Member States should have adapted their National Provisions so that this Eurocode Part can be used on their territory. The National Annex shall be sent to the EC services for information (see 2.5.6). During this period, the Member States shall inform the Commission about the result of the tests undertaken using this EN Eurocode Part (see 2.5.6 and Annex B).	MSs/ NSBs

<b><i>Coexistence Period of a Eurocode Package</i></b>	During the coexistence period, which starts at the end of the National Calibration period, the Eurocode Part can be used, just as the former national system (codes and provisions) can also be used. The coexistence period of an Eurocode Package will last up to a maximum time of three (3) years after the national publication of the last Part of a Package. At the end of the coexistence period of a Package, the NSBs shall withdraw all conflicting national standards, and the Member States shall make sure that all the Parts of the related Package can be used without ambiguity on their territories by adapting their National Provisions as necessary. Thus all conflicting National Standards <sup>36</sup> in a package should be withdrawn a maximum of 5 years after DAV of the last available standard in the package (see 2.5.5)	MS/ NSBs/ Industry
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<sup>36</sup> The words “conflicting National Standards” mean standards whose scope covers the same subjects as those of the EN Eurocode Parts



- 1. DAV = Date of availability
- 2. DoW = Date of withdrawal of conflicting National Standard

## Annex B

### Items to be considered for the report on the EN Eurocode trial use

*Note: Keep answers as short as possible; do not add the calculations and drawings themselves.*

- A Title of the report: Include SUBJECT, MATERIAL, COUNTRY**
- B Basic Information**  
 Subject of report  
 Date of report  
 Author(s)  
 EN Eurocodes(s) used  
 Calibration study or design  
 Any National Code (or ENV Eurocode, with its NAD) used for comparison  
 Executive summary of work and results obtained
- C Description of the structure(s) designed**  
*Type of the construction works; is it an existing one, or new build?*  
 Include small-scale figures to illustrate the construction works
- D1. The design (or the checking) of the structure using national codes and standards**  
 D1.1 The national codes and standards used:  
 1. Basis for the design  
 2. Actions  
 3. Materials  
 D1.2 Summary of the design checking operations  
 D1.3 Results
- D2. The design (or the checking) of the structure using EN Eurocodes**  
 D2.1 Which EN Eurocode Part used? List of NDPs and values or classes or alternatives methods used where NDPs are identified in the EN Eurocode Part.  
 D2.2 Summary of the design checking operations  
 D2.3 Results
- E Comparison between the two calculations (if relevant)**
- F Observations on use of EN Eurocodes**  
 Usability  
 Understandability  
 Clarity  
 Conciseness  
 Omissions  
 Level of complexity  
 Relative time to do calculations compared with National Code  
 Overall impression of EN Eurocode(s)

## Annex C

### Packaging of the EN EUROCODE Parts

(According to the actual understanding of CEN)<sup>37</sup>

#### **Eurocode 2: Concrete Structures**

1. Package 2/1 Building and Civil Engineering Structures, excluding bridges and liquid retaining and containment structures.
2. Package 2/2 Bridges.
3. Package 2/3 Liquid retaining and containment structures.

#### **Eurocode 3: Steel Structures**

4. Package 3/1 Building and Civil Engineering Structures, excluding bridges, silos, tanks and pipelines, steel piling, crane supporting structures, and towers and masts.
5. Package 3/2 Bridges.
6. Package 3/3 Silos, tanks and pipelines.
7. Package 3/4 Steel piling.
8. Package 3/5 Crane supporting structures.
9. Package 3/6 Towers and Masts.

#### **Eurocode 4: Composite Steel and Concrete Structures**

10. Package 4/1 Building and Civil Engineering Structures, excluding bridges.
11. Package 4/2 Bridges.

#### **Eurocode 5: Timber Structures**

12. Package 5/1 Buildings and Civil Engineering Structures, excluding bridges.
13. Package 5/2 Bridges.

#### **Eurocode 6 : Masonry Structures**

14. Package 6/1 Building and Civil Engineering Structures, excluding bridges.
15. Package 6/2 Simplified design.

#### **Eurocode 9 : Aluminium**

16. Package 9/1 All without fatigue.
17. Package 9/2 With fatigue.

- Eurocode Parts from EN 1990, 1991, 1997 and 1998 do not appear as Packages, but are necessary parts of the Eurocode packages for design with particular materials, described above.
- Where a Eurocode Part appears in more than one Package, the DoW for that Part is the same as that for the Package with the DoW furthest in the future.

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<sup>37</sup> This list should be up-dated by CEN as appropriate

