

Eurocodes

Eurocodes and structural construction products

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CPD obligation

- **For manufacturers**
 - To assess and then to declare performances of construction products
 - For pre-determined (mandated) characteristics (ER 1 to 6)
 - Using the ‘technical European vocabulary’ included in hENs and ETAs
 - Assessment methods (test or calculations)
 - Technical definition of characteristics
 - Performances provided in the documents accompanying CE marking
- **For Members States**
 - To authorise CE marked products **to be placed on the market and used** by the users (provided they fulfil national regulations, if any) when they are fit for the intended use

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Two types of obligations or recommendations

- when “structural products” are intended to be used in *construction works* designed using Eurocodes
- when Eurocodes are used as assessment method to determine the performance *of a product*

Products used in construction works designed using Eurocodes

- **Guidance Paper L 1.3.1**
 - Eurocodes should be referred to in hENs and ATEs for products with properties entering into structural calculations of works (ER1 and 2). For them, the assessment methods should be consistent with the assumptions and provisions made in Eurocodes
 - CE marking shall provide all the information necessary to use the product concerned in works or integrate the product characteristics into the structural design of works
- **Commission Recommendation 11.12.2003**
 - **Article 1:** Members states should adopt the Eurocodes as suitable tool for designing construction works
 - **Article 7:** Members states are encouraged to promote ... the use of Eurocodes

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Expectation of manufacturers

- For « structural products » (products playing a structural role in a structure, e.g. precast concrete products, structural timber products, structural steel components, etc.), **the performances linked to mechanical resistance (ER1) and safety in case of fire (ER2), and necessary to apply Eurocodes to the design of construction works, should be required to be provided in the information accompanying CE marking**
- The mandates, and then harmonised standards and ETAs should systematically include provisions to require that these performances are provided in the information accompanying CE marking

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Expectation of manufacturers

- **Manufacturers want that their product reaches the users (contractor, user) and be free to be used by them when it is fit for their intended use**
- **They want that their client be as well as possible informed on the performances of the product which are useful for them**
- **But they do not accept to be subject to number of various requests to provide information and multiply the assessments of their products**
- **They prefer to be subject of a consistent system requiring once a complete assessment valid for all the users**
- **Therefore, they would like that all the characteristics they have to assess are defined in hENs / ETAs and provided once in CE marking**

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Product performance assessed using Eurocodes

- **Principle:**
 - **For « structural products », some performances linked to mechanical resistance (ER1) and safety in case of fire (ER2) may be assessed by calculation (instead of test)**
 - When a « non destructive method » is needed
 - When calculation is cheaper than test
 - When modelisation is sufficiently confirmed by comparison with experience and tests

Product performance assessed using Eurocodes

- **For structural products,**
 - Eurocodes are recommended to be chosen as assessment (calculation) method to determine the performance of products, regarding to mechanical resistance (ER1 and 2)
 - Then, the relevant Eurocode should be referred to in hEN / ETA as the harmonised method usable to assess the performance of products which has to be declared in CE marking
 - Eurocode takes the same status than a test method and becomes a harmonised supporting standard

Guidance Paper L

For structural products, three methods are defined, to provide the information which needs to be declared as accompanying information with the CE marking:

- **Method 1: geometrical data of the components and properties of the materials and constituent products**
- **Method 2: calculated characteristic values or design values**
- **Method 3: reference to design documents of the work or client's orders (the designer of construction work)**

Guidance Paper L

- **Method 1:** Declared values are only geometrical data of the component and performances of materials and constituent products necessary to perform calculation.
 - The calculation is done in the context of the design of work and not in the CE marking of the product (Guidance Paper L, clause 3.3.2)
 - This method can be used for *off-the-shelf products*, or *products designed according to a standard but adjusted to meet a client's particular need*.

Guidance Paper L

- **Method 2.** Declared values are:
 - « **characteristic values** » independent from NDPs, or
 - « **design values** » calculated using NDPs in force where the product can be used

For a product intended to be sold in various countries, CE marking provides the various design values calculated using the various sets of NDPs applicable in the possible countries of destination and the NDPs
- Method 2 may be used for
 - of-the-shelf products
 - « standard » made to measure products (products designed according to a standard, but adjusted to meet a client's particular need)

Guidance Paper L

- Based on method 2, the information provided in CE marking can be
 - Usable as input for calculations according to Eurocodes (**characteristic value**), but the design value is then calculated by the designer of the work, using the NDPs valid in the place where the work is done,
 - Directly usable as design value if it the determination of the **design value** based on NDPs applicable in the country of destination. The choice of the relevant NDP allows to take into account National climatic, geographical specificity or traditions or quality level set up by a Member State

Guidance Paper L

- Method 3 : reference to drawings and documents provided by the client
 - this method is used for a real made to measure products, made in response to a design ordered by another party and used once, in a specific construction work
 - Determination of mechanical resistance and fire resistance aspects are under the responsibility of the designer

Guidance Paper L

- hEN(s) of structural products and kits shall provide for one or several or all of the 3 methods to determine the properties to be declared as information accompanying CE marking
- The choice of the relevant method is done by the manufacturer, under his responsibility, amongst the methods provided for in the product hEN

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Expectation from manufacturers

- If a structural product hEN requires to use Eurocodes to assess mechanical resistance of products,
 - It becomes compulsory to be used by manufacturers everywhere in Europe (even in countries where Eurocodes would not be the single accepted method for the design of construction works) to assess and to declare the performance in the information accompanying CE marking
 - **This assessment shall be recognised and considered by all Members States** (products having a declared value determined according to Eurocodes must be allowed to be placed on the market and used for the purpose they are intended)
 - **No additional test** on the assessment of this performance can be required at national / local level (including in countries where another design method of construction work is accepted)

A consistent system

The *performances of the products* relating to mechanical resistance (including in case of fire) which are *declared in the CE marking* for structural products (and which possibly were assessed by calculation using Eurocodes) ...



... become *input data for the calculation* made for the design of a construction work or to determine the dimensions of constitutive elements, using Eurocodes

A consistent system

- Design of structures:
 - Calculation methods (formulas, with variables and parameters) included in the various Eurocodes
 - NDPs defining actions,
 - NDPs correcting performance of the products

A consistent system

- If the basis to assess the performance of a structural product in CE marking is not complying with the national regulation, or the specific need of a designer or the conditions met in a specific structure for a structural construction product (e.g. statistical conditions to define the performance are not the same),
then the national regulation (or the designer) may correct (adjust) the value by the use of partial factors (NDPs) when the performance of the product declared in the CE marking is introduced as input for the calculation

A consistent system

- Therefore, the performance value of mechanical resistance provided in CE marking may be corrected by Partial factor at the moment the calculation is done for the design of the construction works, using Eurocodes
- Evidently, the “usual” (best) situation should be to have information provided in CE marking consistent and directly usable in Eurocodes calculations

Expectation from manufacturers

- **The consistency of this system shall be preserved,**
- **Do not let Eurocodes be developed independently from harmonised products standards, so CE marking, and diverging from them**
- **And reciprocally, do not let CE marking on structural products be developed independently from Eurocodes**

The revised CPR

- **The Construction Products Regulation (under preparation to revise CPD), as far as we know, and considering the current available information, would not introduce substantial changes.**
 - **Members States will have to decide if the use of Eurocodes to design construction works is authorised, or recommended, or compulsory,**
 - **When a regulation will force to use Eurocodes for the design of specific construction works, it should be compulsory to declare the relevant performances characteristics of products in CE marking**
 - **When a harmonised standard or a European Assessment Document will refer to Eurocodes for the assessment of a characteristic of a structural product, it will continue to be compulsory to use it for the assessment of the performance of the product declared in CE marking**

Expectation from manufacturers

- **The links between Construction products and Eurocodes should be underlined, at least in whereas of the new CPR, and preserved**
- **Commission Services, CEN and EOTA should ensure that the performances of structural products necessary for the calculations using Eurocodes are required to be declared in CE marking**
- **CE marking should remain simple (a single rule), cheap and credible, giving confidence to the users:**
 - To Members States, allowing a single assessment of the product valid for all Countries in the Union,
 - To contractors, and designers, allowing to choose the best product, fit for their intended use, without necessity to provide supplementary information based on additional assessments

More information

- <http://ec.europa.eu/enterprise>
- <http://eurocodes.jrc.ec.europa.eu>
- Info@cepmmc.org
- www.cepmmc.org
- www.cen.eu/cenomr
- www.eota.be