

<p>GNB-CPR GNB-AG</p>	<p>Co-ordination of the Group of Notified Bodies for the Construction Products Regulation (EU) 305/2011</p>	<p>NB-CPR/17/724r4 Issued 01 November 2018 APPROVED GUIDANCE</p>
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Position Paper:

The role of notified bodies in relation structural construction products in AVCP system 2+

1 INTRODUCTION

For structural construction products like concrete elements, timber structures, and structural steel components, the manufacturers are allowed to use various principles, both for the assessment of structural performance (including 'resistance to fire') and for the declaration of the performances of these essential characteristics of their products.

It should be recognised that structural construction products are often designed and manufactured for the use in a specific building and that their structural performance may be determined in close connection with the structural design of that building. Therefore, the documentation principles used for structural components may often be closer to the principles for the documentation of buildings than to the principles normally applied to construction products. In many cases, the structural performance of a construction product is assessed by calculations made specifically for the single construction work in which the construction product is intended to be installed.

As buildings are subject to non-harmonised rules of the Member States, the definition and application of a harmonised technical language for structural construction products has its particular challenges.

Some harmonised standards have introduced the so-called "CE marking methods" which were first introduced by the Commission's CPD Guidance L on the "Application and use of Eurocodes".

The terminology of Guidance L dates back to CPD. In a contemporary CPR context, the term "CE marking methods" seems not to be very precise. Rather than methods for the CE marking as such they should be understood as general principles for the assessment and the declaration of the essential characteristics related to structural performance, including loadbearing resistance in case of fire, of structural construction products.

However, as the "CE marking methods" are not described unambiguously and as their descriptions are not updated to the terminology and principles of CPR the "CE marking methods" may not be the best entrance for the definition of roles and responsibilities of manufacturers and notified bodies.

Even if a harmonised standard for structural construction products has not introduced the CE marking methods, the manufacturer may have several options for the assessment and declaration of structural performance.

This position paper is intended to provide guidance for Notified Bodies on their tasks in the framework of the assessment and verification of constancy of performance for structural construction products depending on which principles the manufacturer applies for the assessment of performance and for the declaration of performance.

In cases where the standard defines tasks for NBs that are different from those described in this position paper the wording of the standard may prevail, unless in contradiction with the CPR.

This position paper is not intended to cover structural construction products for which ETAs have been issued.

2 DEFINITIONS

Structural performance: The performance of essential characteristics related to Basic Works Requirement No. 1 (Mechanical resistance) and essential characteristics related to load bearing capacity (part of resistance to fire) as defined by Basic Works Requirement No. 2, 1st pin.

Synonym of the term “performance of structural behaviour” used in Regulation No. (EU) 574/2014.

3 ASSESSMENT OF PERFORMANCE

This position paper concerns the structural performance. As structural performance is understood the performance of essential characteristics related to BWR 1 (mechanical resistance and stability) and to load-bearing capacity in case of fire (BWR 2).

As the structural performance of construction products is normally assessed and verified under AVCP system 2+, this position paper is only focusing on AVCP system 2+.

However, it is recognised that in some cases other systems of AVCP may apply. If AVCP systems 1+ or 1 apply, some principles of this position paper may still be applicable *with the necessary adjustments*, though in these systems of AVCP the responsibility for the assessment of performance lies with the notified product certification body.

In AVCP system 2+, the assessment of performance is the responsibility of the manufacturer. The notified FPC certification body shall satisfy itself that the assessment of performance is (or was) carried out correctly and forms a valid basis for the verification of constancy of performance (See NB-CPR 17/722, 8.3)

3.1. PRINCIPLES OF THE ASSESSMENT OF PERFORMANCE

CPR Annex V, 1.3 (a), (i) requires the manufacturer to carry out

“...an assessment of the performance of the construction product on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of that product;”

Hence, CPR leaves the manufacturer four different principles to choose between insofar the principles are allowed for by the harmonised specification applied.

3.1.1. TESTING (INCLUDING SAMPLING)

Harmonised standards for structural components do not always indicate test methods for the *structural performance*.

When harmonised standards make reference to Eurocode standards (for mechanical resistance characteristics) and/or to EN 13501-2 (for resistance to fire), methods and conditions for testing may be specified by these standards.

However, for structural components, testing remains rather the exception than the rule.

3.1.2. CALCULATION

For calculation to be used as the basis for the assessment of performance, the harmonised standards for structural components do generally refer to Eurocodes and may indicate additional criteria for the calculations¹.

3.1.3. TABULATED VALUES

The use of tabulated values presumes the harmonised specification to contain tables of 'conventionally accepted performance' and the criteria for their use.

Presently, harmonised standards for structural components do generally not contain such tables for mechanical resistance.

Eurocodes may contain tables for the assessment of load bearing capacity related to resistance to fire. However, such tables would be applicable only if the harmonised standard makes reference to the Eurocode for the assessment of resistance to fire performance.

3.1.4. DESCRIPTIVE DOCUMENTATION

For structural components, descriptive documentation would normally mean a reference to design documents such as drawings or structural calculations.

4 THE DECLARATION OF PERFORMANCE (DOP)

In CPR Annex III (Regulation 574/2014), instructions are included for drawing up a DoP. For structural performance, the manufacturer has 3 possibilities:

- 1) Declare a level or a class,
- 2) Insert a description, in relation to the structural performance
- 3) Insert a reference to the "respective production documentation or structural design calculations". In this case, the relevant documents shall be attached to the DoP.

However, it should be clear that only the possibilities allowed for by the harmonised standard can be used.

¹ In some Member States, the application of Eurocodes is not mandatory. However, if Eurocodes are referred to in the hEN (in an exclusive manner – not just as an option) it becomes a mandatory part of the reference for the assessment and verification of constancy of performance.

For structural behaviour, harmonised standards do normally not allow for above 2nd possibility, to insert a description. Accordingly, this possibility is not described any further in this position paper.

The third possibility, does consist of two sub-possibilities, either to refer to *production documentation* or to *structural design calculations*. In this position paper, these two sub-possibilities are considered separately.

It should be noticed that CPR does not require the manufacturer to indicate in the DoP which CE marking method(s) he has applied for the construction product. Accordingly, the DoP model in CPR Annex III has no “placeholder” for the indication of CE marking method(s), and the instructions in CPR Annex III do not in any way require the CE marking method(s) to be indicated.

Hence, the CE marking method or methods behind the declaration will never appear explicitly in the DoP. However, the CE-marking methods may often be derived from the content of the DoP.

5 COMBINATIONS OF ASSESSMENT PRINCIPLES AND DECLARATION PRINCIPLES

In the below table are listed a number of combinations of principles for the assessment of performance and principles for the declaration of performance.

As not all combinations seem relevant, only some of them are listed and described further below.

Basis for the assessment of performance	Expression of structural performance		
	(A) Level or class	(B) Reference to production documentation	(C) Reference to structural design calculations
(1) Testing	Option 1 (section 5.1)	ND*	ND*
(2) Calculation	Option 2 (Section 5.2)	ND*	Option 3 (Section 5.3)
(3) Tabulated values	ND*	ND*	ND*
(4) Descriptive documentation	ND*	Option 4 (Section 5.3)	Option 5 (Section 5.5)

*ND – Combination not described

5.1. OPTION 1: DECLARATION OF LEVEL OR CLASS ON THE BASIS OF TESTING

Option 1 corresponds to the most common procedure for non-structural essential characteristics, i.e. the harmonised standard indicates a test method and the declaration of level/class of performance is based on the result of testing to that method. However, this option is rarely used for the structural performance.

Normally, the evidence forming basis for the assessment of performance would be a test report according to a test method described by the harmonised specification. The results would be expressed by means of levels and/or classes in accordance with the provisions of the harmonised specification.

In AVCP system 2+, the manufacturer is responsible as well for the sampling as for the testing and the reporting. If the manufacturer so wishes he may subcontract - fully or partially – any part of the sampling, testing and reporting.

“Option 1” would normally be understood as corresponding to CE marking method 2.

5.2. OPTION 2: DECLARATION OF LEVEL OR CLASS ON THE BASIS OF CALCULATION

Evidence of the calculation would be a calculation report specifying the calculation method, the input data, and the calculation results.

The calculation shall be made in accordance with the harmonised specification, which in many cases would refer to the relevant Eurocode. When Eurocodes are applied, nationally determined parameters are to be applied in accordance with the national Eurocode annex of the Member State at the place of use.

For *structural performance*, this combination would normally be understood as corresponding to CE marking methods 2 or 3b, method 2 being reserved to calculations according to Eurocode.

5.3. OPTION 3: DECLARATION BY REFERENCE TO STRUCTURAL DESIGN CALCULATIONS ON THE BASIS OF A CALCULATION

In many cases, the *structural performance* cannot be expressed by single values (levels/classes). Indeed, many parameters may need to be considered, as the *structural performance* may relate to a multitude of sections of the element, under a large variety of circumstances. Loading diagrams or other methods may be used to express the structural performance.

The calculations may be made to Eurocodes or to other rules for calculation applicable at the place of use.

When the calculations attached to the DoP are provided by the manufacturer in response to the client's order, Option 3 may be considered to correspond to “CE-marking method 3b”.

5.4. OPTION 4: DECLARATION BY REFERENCE TO PRODUCTION DOCUMENTATION ON THE BASIS OF DESCRIPTIVE DOCUMENTATION

In option 4, the manufacturer is not declaring any quantified performance but declaring that the construction product is in conformity with ‘production documentation’. In this option, the documents referenced shall be attached to the DoP.

The production documentation may contain geometrical properties, properties of the constituents (e.g. steel grade or concrete strength).

Under this option, the document(s) attached to the DoP would not contain any calculated performance values, but may make reference to (national) standards for the design of the components.

The production documentation may be provided by the client of the manufacturer or by the manufacturer himself.

If the attached production document only indicates geometrical data of the component and properties of the materials and constituents used, this option would normally correspond to “CE marking method 1”.

If the production document attached indicates a design made by or on behalf of the client of the manufacturer, this option would normally correspond to “CE marking method 3a”.

If the production document attached indicates a design made by or on behalf of the manufacturer in response to the client’s order, this option would normally correspond to “CE marking method 3b”.

5.5. OPTION 5: DECLARATION BY REFERENCE TO STRUCTURAL CALCULATIONS ON THE BASIS OF DESCRIPTIVE DOCUMENTATION

Option 5 may be considered a variation of Option 4 where the client is providing structural calculations or drawings indicating geometrical data of the structural construction product and requirements regarding properties of the materials and constituents.

Under Option 5, the manufacturer may not declare that the construction product has the calculated structural performance but only that the structural construction product is in conformity with the data used as basis for the calculation or drawing provided by the client.

Option 5 may be considered to correspond to “CE-marking method 3a” or “CE-marking method 3b”.

6 VERIFICATION OF CONSTANCY OF PERFORMANCE

The verification of constancy of performance is generally described in the position paper NB-CPR 17/722.

As part of the verification of constancy of performance the Notified Factory Production Control Certification Bodies will need to satisfy themselves that the assessment of performance is (or has been) conducted in a trustworthy manner allowing it to serve as a solid basis for the verification of constancy of performance. This is described in NB-CPR 17/722, section 8.3.

No matter which of the above-mentioned options the manufacturer applies, for the notified FPC certification bodies the overall objective is to verify that the manufacturer by his FPC is effectively ensuring that product is in conformity with the DoP.

For structural components, the below general methodology may be applied:

- 1) On the basis of the DoP, identify the combination of assessment principle(s) and principle(s) applied by the manufacturer for the declaration of *structural performance*
- 2) Verify that the assessment of performance provides a solid basis for the verification of constancy of performance
- 3) Inspect and evaluate the FPC with regard to its ability to ensure the constancy of performance as assessed and declared by the manufacturer

6.1. OPTION 1

In option 1, notified bodies shall apply the general guidance found in NB-CPR 17/722, section 8.3 without any particular additions.

6.2. OPTION 2

In option 2, the notified FPC certification body will first need to satisfy itself that the calculations on which the DoP is based would serve as a valid basis for the verification of constancy of performance. To this end, the principles of Position Paper NB-CPR/17/722, section 8.3 shall apply.

The notified FPC certification body should satisfy itself that the manufacturer has suitable practices and resources in place for the structural calculations including the determination of nationally determined parameters forming basis for the levels or classes declared. However, the notified FPC certification body is not supposed to check/verify the correctness of calculations.

The inspection and assessment of the factory production control will then focus on the ability of the FPC to ensure that the products manufactured will be in conformity with the input data on which the calculations are based.

It would not be the role of the notified FPC certification body to assess any calculations related to construction works in which the products are intended to be used.

6.3. OPTION 3

In option 3, the role and responsibilities of the notified FPC certification body are the same as under Option 2.

6.4. OPTION 4

In Option 4, the notified FPC certification body will first need to satisfy itself that the production documentation (drawings, technical descriptions) attached to the DoP would serve as a valid basis for the verification of constancy of performance, i.e. that they are clear and unambiguous and provide a sufficient level of detail.

The inspection and assessment of the factory production control will then focus on the ability of the FPC to ensure the conformity of the products manufactured with the production documents attached, insofar the conformity would be significant for the structural behaviour of the product.

If the production documentation makes reference to national rules, e.g. national annexes to the Eurocodes or national application standards, the notified FPC certification body should satisfy itself that the manufacturer has suitable practices and resources in place for the identification of such national rules and that the FPC ensures the conformity with the rules referred to.

It would not be part of the role of the notified FPC certification body to assess any calculations related to construction works in which the products are intended to be used.

6.5. OPTION 5

In Option 5, the role and responsibilities of the notified FPC certification body is the same as under Option 4.

Annex 1 - INFORMATIVE

A.1. THE CE MARKING METHODS

The 3 methods described by Guidance Paper L are:

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

Method 3 is often subdivided into methods 3a and 3b. In sub method 3a, the design documents referred to are provided by the client of the manufacturer; in sub method 3b, the manufacturer draws up the design in accordance with the client's order.

Below is found a general understanding of the CE marking methods. It should however be noted that the descriptions are not unambiguous and that it may be difficult to draw clear lines between the methods. For instance, it may be difficult to draw a clear line between method 1 and method 3a. It may also be difficult to draw the line between method 2 and method 3b.

Therefore, the below descriptions are only informative.

A.1.1 CE MARKING METHOD 1

In CE-marking method 1, the determination of the geometrical data (dimensions and cross sections, including tolerances) and the properties of the materials and constituent products used would also be the assessment of performance of the essential characteristics related to mechanical strength and fire resistance of the product.

Hence, the assessment of performance is done only on the basis of “*descriptive documentation*” (4th possibility mentioned by CPR Annex V).

No testing and no calculation would form basis for the DoP.

In relation to the buildings in which the structural components are to be used, structural calculations may be made for the purpose of documenting the mechanical strength and stability and the safety in case of fire of the building. On request from the building authorities, such calculations should normally be made available by the builder or building owner, but the calculations are not considered part of the assessment of performance.

A.1.2 CE MARKING METHOD 2

In CE-marking method 2, the assessment of performance is done either on the basis of testing (1st possibility mentioned by CPR Annex V), *calculation* (2nd possibility), or tabulated values (3rd possibility). Calculations seem to be the most common basis.

Calculations shall be carried out in accordance with the relevant Eurocode including the relevant national annex and using the nationally determined parameters (NDPs) applicable in the place of use.

The use of tabulated values would require tables to be defined by the harmonised specifications. For the time being, harmonised standards for structural components do not

include such tables of structural performance. In Eurocodes, they may exist, however, for fire resistance.

In method 2, calculations are forming basis for the DoP, which member state authorities are supposed to consider accurate and reliable unless they have objective indications to the contrary (CPR Art. 4(3)).

However, market surveillance authorities may request the manufacturer to document any calculation on which the DoP is based.

A.1.3 CE MARKING METHOD 3

In CE-marking method 3 (both 3a and 3b), the performance of the product is given by the design document(s) to which the construction product is manufactured. Hence, the decision of the manufacturer to use specific design documents would also be the assessment of performance, which then falls under the category “*descriptive documentation*” (4th possibility mentioned by CPR Annex V).

Based on the design document(s), whether drawn up by the client (method 3a) or by the manufacturer (method 3b), structural calculations may be made for the purpose of documenting the mechanical strength and stability and the safety in case of fire of the building. On request from the building authorities, such calculations should normally be made available by the builder or building owner, but they are not considered part of the assessment of performance of the product.

A.1.4 IDENTIFICATION OF MARKING METHODS

As there's no one-to-one relationship between the 3 CE marking methods and the 3 possibilities given by the instructions in CPR Annex III, the DoP will not always allow for an unambiguous identification of the CE marking method(s) used by the manufacturer.

It should be recognised that the manufacturer may use different CE marking methods for different essential characteristics stated in the same DoP for the same product and may switch between methods from one individual product to another.

For instance, the resistance to fire performance of a structural component may be declared by means of the general R, I and E classification system (CE marking method 2) while the load bearing capacity for the same component may be declared by means of a reference to a design document attached to the DoP (CE marking method 3).

Annex 2 - INFORMATIVE

Overview of the options for assessment and declaration of structural performance

	Option 1	Option 2	Option 3	Option 4	Option 5
Declaration principle	Declaration of level or class on the basis of testing	Declaration of level or class on the basis of calculation	Declaration by reference to structural design calculations on the basis of calculation	Declaration by reference to production documentation on the basis of descriptive documentation	Declaration by reference to structural design calculations on the basis of descriptive documentation
Quantified performance (levels/classes) declared as part of DoP	Yes	Yes	No	No	No
Reference for the determination of load bearing capacity	Harmonised specification	Eurocodes (incl. NDPs)	Eurocodes (incl. NDPs) or rules applicable at the place of use	Eurocodes (incl. NDPs) or rules applicable at the place of use	Eurocodes (incl. NDPs) or rules applicable in the place of use
Responsible for determination of structural performance	Manufacturer	Manufacturer	Manufacturer	Not the manufacturer	Not the manufacturer