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NEWSLETTER

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The Construction Products Regulation on the test fence

Effects of Basic Requirements 3 and 7 of the CPR on harmonised European standards

The Construction Products Directive (CPD) has been replaced with a European Construction Products Regulation (CPR) which is directly applicable in all member states. This regulation aims to improve the functioning of the European internal market for construction products by means of harmonised technical specifications (European standards).

As opposed to other products, requirements on construction products refer not to the product itself but to construction works. Therefore, the CPR - as did the CPD - determines Basic Requirements for Construction Works. The CPR contains among other things an extension of the Basic Requirement for Construction Works (BWR) 3 ("hygiene, health and environment") as well as the newly introduced BWR 7 ("sustainable use of natural resources").

The possible effects of these Basic Requirements for Construction Works will be discussed in this article, which will also answer the question of how to use Environmental Product Declarations (EPDs) to meet potential sustainability requirements.

Aims and principles of the CPR

The replacement of the Construction Products Directive with the Construction Products Regulation changes neither the aim nor the principal responsibilities. The removal of technical barriers in the field of construction on a European level by means of harmonised technical specifications remains the aim of the regulation. The regulation as well as the directive mentions Basic Requirements for Construction Works, but in the case of BWR 7 a new aspect for the assessment of buildings ("sustainable use of natural resources") has been focused on. The transposition into requirements for construction products remains within the responsibility of the member states. Irrespective of the instructions in Annex 1 of the Construction Products Regulation, the member states determine the essential characteristics of construction products which they consider to be important in order to erect buildings in such a way that they comply with the respective provisions applicable.

The demand for new construction product characteristics cannot automatically be derived from the BWRs

of the CPR. Should new demands be required, these have to be in accordance with harmonised standards as far as this is possible. If there are no harmonised testing standards for (new) product requirements, these have to be developed. In harmonised product standards these testing standards have to be referred to. Furthermore, no demands can be derived from the harmonised product standards for individual member states to use all the characteristics of the construction products and/or to implement them into legal provisions. According to the current version of the CPR, the product characteristics must however be mentioned in the declaration of performance (DoP) of a construction product. For characteristics which are not considered to be relevant in a member state there is the possibility to declare these „no performance determined“ (the NPD-option).

Implementation of BWRs 3 and 7

Essential characteristics of construction products with respect to regulated dangerous substances (BWR 3) result from legal provisions whenever available at EU member state level. After the finalisation of the work on harmonised testing standards carried out by CEN/TC 351, these characteristics will probably be implemented in mandates for (new) construction product standards. As described above, an enhanced DoP could result from such an enhanced product standard. As an alternative to the

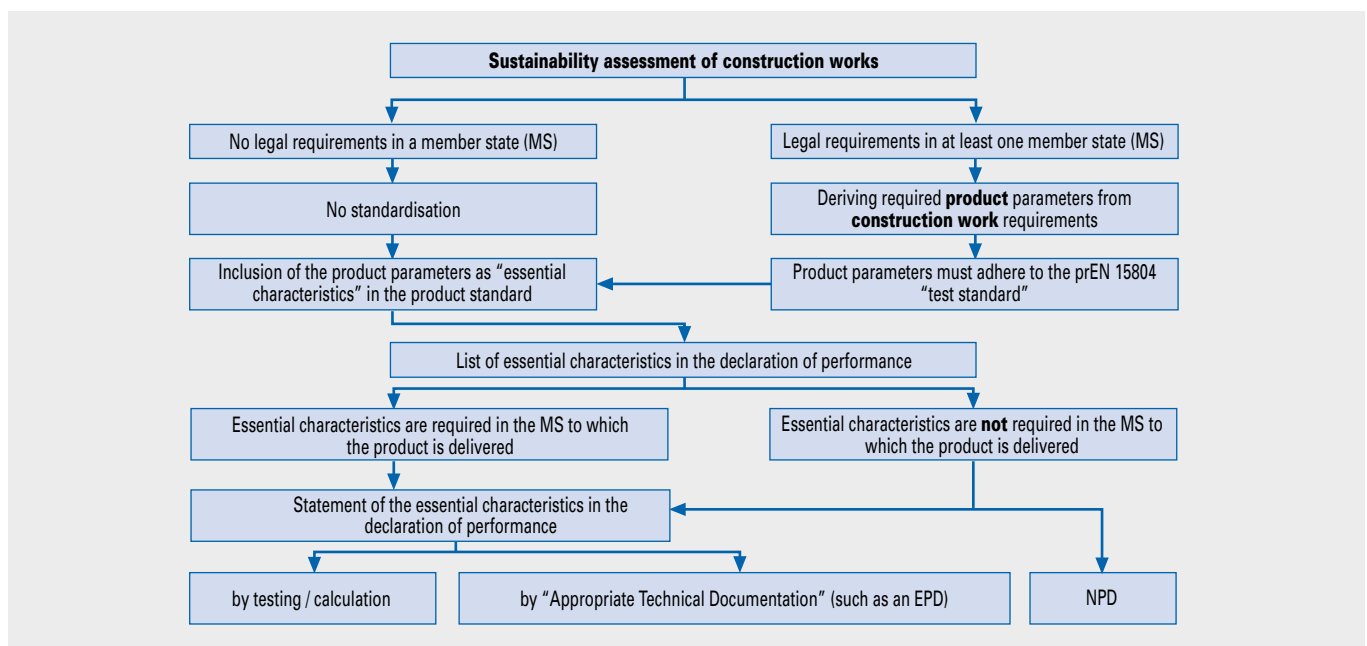


Fig. 1: Probable approach to implementing legal requirements for assessing the sustainability of construction works.

declaration of those characteristics in the DoP, the "NPD-option" can be used.

In contrast to requirements which can be more or less directly assigned from the building to the construction product - for example strength characteristics - other requirements for construction works exist which cannot be transposed directly into product requirements. These include requirements which refer to BWR 3 (e. g. „greenhouse gases“) and BWR 7 ("sustainable use of natural resources") of the CPR. Should there be, for example, a requirement for a construction work to adhere to certain limit values for greenhouse gas emissions, this does not directly result in the construction products also having to comply with such limits. In this case, however, manufactures could be obliged to provide information which is relevant for the assessment of the building. In the given example, these would be the greenhouse gases which occur during the production and transportation of the

construction product, but also parameters such as the thermal conductivity of insulating material which enable the calculation of energy use and thus the greenhouse gas emissions during the life cycle of the construction work. All parameters have to be determined according to harmonised standards. However, the declaration of all these possible parameters in the CE marking of a construction product - as requested by the CPR - is not useful for various reasons. On one hand, the number of possible parameters which, for example, would be necessary for the assessment of sustainability of a construction work, would enlarge the scope of the CE marking to an unnecessary extent. On the other hand, the declaration of these values on the CE marking would also suggest a quality criterion, although this is not the purpose of all these parameters.

Besides the declaration of an essential product characteristic in the declaration of performance by testing, calculation or using the NPD-option,

the CPR mentions the possibility of using an "Appropriate Technical Documentation" (ATD). An ATD is a document for a corresponding product of another manufacturer (or association) which contains the required parameters. The user of the ATD has to obtain the authorisation of the other manufacturer, who remains responsible for the accuracy, reliability and stability of this document. An EPD could be such an ATD for environmental data for the sustainability assessment of a building. Average EPDs for CEM I, CEM II and CEM III/A cements are under preparation. **Fig. 1** shows a probable approach to implementing possible legal requirements for the purpose of assessing the sustainability of construction works.

For example, selected countries are planning to apply legal requirements for the sustainability assessment of buildings. It would therefore seem likely that parameters which are necessary to describe the sustainability of a building will appear in construction product standards in future.

Revision of EN 206: What will remain and what will change?

Flexible boundary conditions for the production of secure and durable concrete structures

The draft of the European concrete standard EN 206 is in so-called CEN-enquiry status from March till August 2012. In this enquiry the CEN-member states are requested to state if they would agree to this draft in the later formal vote or to identify what changes would have to be made in order to obtain the approval of their respective countries. It is therefore currently not sure which changes will be contained in the final standard. However, several basic points which almost certainly will be implemented into it can already be exemplified.

Part 9 (Self-compacting concrete) is to be implemented into the standard according to the present draft so that the „1“ in EN 206-1 will be omitted. Newly implemented have been,

among other items, a table regarding the basic requirements of aggregates and a reference to the technical report regarding the avoidance of a damaging alkalisilica reaction (ASR). Moreover, a revision and amendment of the annexes has been carried out, for example of Annex D (Additional requirements for concrete for special geotechnical works), E (Recommendation for the use of coarse recycled aggregates), F (Recommendation for limiting values of concrete composition), G (Guidelines for self-compacting concrete requirements in the fresh state), H (Application of method C, „control charts“) and J (Deviation to accommodate a notified Spanish regulation for the attestation of conformity for concrete).

The use of cements

In par. 5.1.2 EN 206 the general suitability of cements according to

EN 197-1 (common cements) for the production of concrete conforming to EN 206 is stated. Furthermore, depending on the application requirements, for example the exposure class and the dimensions of structural components, cements according to EN 14216 (special cement with very low heat of hydration) and EN 15743 (supersulfated cement) can also be used. EN 206 contains no further precise normative stipulations on the application of individual cement types. Pursuant to 5.2.2 „Selection of cement“ the cement has to be selected "from the cements whose general suitability has been established", taking the following into account:

- execution of the work;
- end use of the concrete;
- curing conditions (e. g. heat treatment);
- dimensions of the structure (heat development);
- environmental conditions to which the structure is to be exposed
- potential reactivity of the aggregate to the alkalis from the constituents.

The recommendations in the informative Annex F for concrete compo-

Concrete addition	Permitted cement types acc. EN 197-1 (c)	k-value	Additional quantity which can be taken into account to $(w/c)_{eq}$
Fly ash (f) acc. EN 450-1	CEM I	0,4 ¹⁾	$f/c \leq 0,33$
	CEM II/A		$f/c \leq 0,25$
Silica fume (s) acc. EN 13263-1	CEM I and CEM II/A (without CEM II/A-D)	2,0 ¹⁾ for $(w/c)_{eq} \leq 0,45$ 2,0 ¹⁾ for $(w/c)_{eq} > 0,45$, except for exposure classes XC and XF, where $k_s = 1,0$	$s/c \leq 0,11$
Ground granulated blastfurnace slag (h) acc. EN 15167-1	CEM I and CEM II/A	0,6 ²⁾	$h/c \leq 1,0$

¹⁾ acc. standard²⁾ recommended value

Fig 1: Suggestion for the k-value concept according to EN 206

sition will now probably be applicable for CEM I and CEM II. The normative application rules will continue to be contained in the national annexes.

The use of concrete additions

The use of concrete additions in concrete is governed by different principles or concepts within the CEN-member states. Task group 5 of CEN/TC 104/SC1 has compiled these principles and concepts in a report which will be published as a CEN Technical Report (CEN/TR). The prerequisite for the application of the principles and concepts is the conformity of the concrete addition with one of the harmonised European product standards listed in **Fig. 1**.

k-value concept

As a descriptive regulation - i. e. without further tests apart from the attestation of conformity of the concrete - the k-value concept enables part of a stipulated addition content to be taken into account in the (equivalent) water-cement-ratio or the minimum cement content. The present draft of EN 206 suggests the k-values listed in **Fig. 1** for the use of CEM I and CEM II/A.

Equivalent concrete performance

The „Equivalent Concrete Performance Concept“ (ECPC) enables defined deviations from the nationally stipulated descriptive requirements for the maximum water-cement-ratio and the minimum cement content in the case of the combined use of a cement and an addition of which the origin and properties are clearly described. The attestation of the comparable performance is carried out on the basis of durability tests on concrete with the respective combination of materials in comparison to a reference concrete for the respective exposure class(es). In the Netherlands, for example, the procedure, criteria and test methods of the ECPC were stipulated in the national recommendation CUR 48.

Equivalent performance of combinations

In the “Equivalent Performance of Combinations Concept“ (EPCC) a procedure is laid down with which the prerequisites are created for a combination of a specific cement (usually Portland cement CEM I) and a specific addition to be used in the same way as a comparably composed cement type conforming to

EN 197-1. In the UK and Ireland the concept contains strength tests on mortar conforming to EN 196-1. The „Equivalent Performance of Combinations Concept“ (EPCC) therefore differs from the „Equivalent Concrete Performance Concept“ (ECPC) in that the attestation of durability is not provided by durability tests in the specific case in question but is based on the practical experience of the member states in which it has been used under the corresponding national application rules (concrete composition, concrete cover and curing), climatic conditions, construction tradition and need for security.



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