

RECYCLING AND THE EUROPEAN DIRECTIVE FOR CONSTRUCTION PRODUCTS

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Introduction

Free movement of goods is a cornerstone of the single market in the European Union. The mechanisms in place to achieve this aim are based on prevention of new barriers to trade, mutual recognition and technical harmonisation. National legislation brings about much discussion amongst parties concerned. As can be expected, European legislation is even more difficult to achieve. In this context the period of 11 years between the adoption of the 'Construction Products Directive (CPD)' and the appearance of the first building products bearing the CE marking is not that long. Many other building products will follow the coming years.

Before I will go into the specific aspects of the use of so-called secondary materials in relation to the Construction Products Directive a general outline of the latter is given.

Construction Products Directive

The Construction Products Directive has been adopted by the Council of the European Union on 21 December 1988. The full title of this document is: 'Council directive on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (89/106/EEC)'. It aims to remove technical barriers to trade arising from national laws and regulations in member states, thus enabling the single European market in construction products. This directive is based on the so-called New Approach, having the following main principles:

- Harmonisation is limited to essential requirements
- Only products fulfilling the essential requirements may be placed on the market and put into service
- Harmonised standards are presumed to conform to the corresponding essential requirements

Essential requirements

The products must be suitable for construction works which as a whole and in their separate parts are fit for their intended use. The construction products must satisfy the following essential requirements where the works are subject to regulations containing such requirements:

1. Mechanical resistance and stability
The construction works must be designed and built in such a way that the loadings that are liable to act on it during its construction and use will not lead to collapse, inadmissible deformations or damage.
2. Safety in case of fire
In the event of an outbreak of fire the load-bearing capacity must remain for a period of time, the generation and spread of fire and smoke must be limited and the safety of rescue teams must be taken into consideration.
3. Hygiene, health and the environment
The construction works must be designed and built in such a way that it will not be a threat to the hygiene or health of the occupants or neighbours, in particular as a result of any of the following:
 - the giving-off of toxic gas
 - the presence of dangerous particles or gases in the air
 - the emission of dangerous radiation
 - pollution or poisoning of the water or soil
 - faulty elimination of waste water, smoke, solid or liquid wastes
 - the presence of damp in parts of the works or on surfaces within the works
4. Safety in use
The works may not present unacceptable risks of accidents in service such as slipping, falling, collision, burns, electrocution, injury from explosion.
5. Protection against noise
Noise perceived by the occupants or people nearby has to be kept down to a level that will not threaten their health and will allow them to sleep, rest and work in satisfactory conditions.
6. Energy economy and heat retention
The construction works and its heating, cooling and ventilation installations must be designed and built in such a way that the amount of energy required in use shall be low, having regard to the climatic conditions of the location and the occupants.

Interpretative documents

The Construction Products Directive is different from other new approach directives in that the essential requirements do not apply directly to the products themselves. They are broad functional requirements which apply to the construction works in which the products are to be incorporated. So-called Interpretative documents have been drawn up to 'translate' each essential requirement for the works into requirements for the products.

These documents contain comments on the specific essential requirement, starting points for verification of meeting the essential requirement, guide lines for technical specifications as well as durability.

In addition, so-called Guidance Papers have been drawn up to clarify specific aspects of the harmonisation process.

Harmonised European Standards (hEN)

Based on mandates given by the European Commission and using the above-mentioned documents and guidance papers, CEN drafts European Standards which quantifies the performance of the products with respect to the essential requirements on the construction works. All European Standards drawn up within the framework of the Construction Products Directive are obligatory to all member states. In this way the relevant properties of the construction products will be determined in the same manner in all member states and no need will be left to test a specific product in each member state again. For each property determined by such harmonised standards classes can be defined (if desirable).

All construction products have been grouped into about 40 product families. For most of them CEN received mandates to draw up European Standards. This amounts up to about 1000 standards, of which 500 are already ratified, another 300 are under approval and about 200 are under development. If for a specific product no mandate is given to CEN, the possibility exists to obtain a mandate to draw up a so-called European Technical Approval Guideline (ETAG) by the European Organisation for Technical Approval (EOTA) based on the same essential requirements of the Construction Products Directive.

Conformity assessment

Before placing a product on the European Union market, the manufacturer must subject the product to a conformity assessment procedure given in the Construction Products Directive. There are 4 systems of conformity assessment. Depending on the impact of the product on the performance of the construction works with respect to the essential requirements, the role of the independent third party is enhanced.

In system 4 the declaration of conformity is given by the manufacturer, without any supervision of a third party. The manufacturer declares the specification of its products. In system 3 again all conformity activities are performed by the manufacturer except the initial type test, which is done by a third party ('Notified Body'). In system 2 the initial assessment of the production process is performed by the third party (sometimes also the verification of the process quality control by the manufacturer). In system 1 the role of the third party is maximal. The 'Notified Body' has a close view on the process and provides a certificate of conformity. However, the manufacturer remains responsible for its products meeting the requirements.

CE marking

Construction products meeting the requirements of the harmonised European Standard or the European Technical Approval Guideline receive the well known CE marking. This CE marking is an indication that the product complies with the essential requirements of the Construction Products Directive and that the product have been subject to a conformity assessment procedure provided in the directive. The member states are obliged to take appropriate measures to protect the CE marking.

Secondary materials

By-products of industrial processes and recycled construction and demolition waste can be used as raw materials for construction products. One has to consider the specific properties of such secondary materials in respect to the 6 essential requirements. Special attention should be paid to those properties which deviate fundamentally from materials which have a long track record for the application intended.

For instance, the stability of certain steel slags can be a problem when applied as an aggregate in concrete. Hence, essential requirement no. 1 is not met. Concrete with such an expanding slag can not be used in works of which this essential requirement is of vital importance. However, it can be used in applications where the stability of the concrete is of minor importance.

CEN Technical Committee 154 draws up harmonised standards for aggregates for different end uses (concrete, asphalt, road and railway works). Aggregates are considered as one family and each different end use as a subfamily. Based on the 6 essential requirements performance characteristics have been determined for each subfamily. For instance, aggregates for concrete have the following performance characteristics:

- essential requirement 1 and 4:
 - particle shape, size and density
 - percentage of crushed particles
 - cleanliness
 - resistance to fragmentation/crushing
 - resistance to polishing/abrasion/wear
 - composition/content (Cl, SO₄, ...)
 - volume stability
 - water absorption
- essential requirement 3:
 - emission of radioactivity (concrete in buildings)
 - release of heavy metals
 - release of polyaromatic carbons
 - release of other dangerous substances (Council Directive 76/769/EEC)

No performance characteristics for essential requirements 2 (safety in case of fire), 5 (protection against noise) and 6 (energy economy and heat retention) have been formulated. These characteristics are formulated for the concrete itself. However, this can also be said for some of the characteristics mentioned for essential requirement no. 3.

It is very difficult to draw up harmonised European standards for the performance characteristics of essential requirement no. 3. To prevent further delay in the release of the harmonised European standards, a two-step approach has been adopted. During the first step further details about the release of dangerous substances and ionising radiation are left out of the first generation of harmonised European standards (unless harmonised test methods are already accepted by the CEN Technical Committees). In this first generation of standards a special text is incorporated, indicating that the product shall comply with national provisions on dangerous substances in the member state of destination.

This decision creates the possibility for a well-considered approach for the incorporation of the release of dangerous substances and ionising radiation in the next generation of harmonised European standards and European Technical Approvals. This is the second step.

In order to stimulate instead of frustrating the use of secondary materials in construction products, it is very important that test methods proposed by CEN to characterise such materials gives a proper indication of the performance in real practise. Test methods which have a good track record for natural aggregates does not necessarily have to be suited for secondary materials.

Moreover, one has to take care that certain requirements or definitions in the harmonised European standards incorrectly prevent the application of secondary materials in construction products. Such an event almost occurred for aggregates.

Although much work has been done, still a lot of work has yet to be performed and will be a challenge for the coming years.