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Smernice za postopek podpore evropski standardizaciji cementov

Guidelines for a procedure to support the European standardization of cements

Leitlinien für ein Verfahren zur Unterstützung der europäischen Normung von Zement

Directrices générales pour l'obtention du soutien de la standardisation européenne des ciments

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Guidelines for a procedure to support the European standardization of cements

Directrices générales pour l'obtention du soutien de la standardisation européenne des ciments

Leitlinien für ein Verfahren zur Unterstützung der europäischen Normung von Zement

This Technical Report was approved by CEN on 24 May 2016. It has been drawn up by the Technical Committee CEN/TC 51.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (CEN/TR 16912:2016) has been prepared by Technical Committee CEN/TC 51 “Cement and building limes”, the secretariat of which is held by NBN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Introduction

The willingness to improve construction products leads to the optimization of existing cements as well as to the development of new binders. Improvement may concern in particular the performance of the products, the reduction of production costs or the lowering of the environmental impact. With regards to the environment, a fundamental policy objective of the European Union is to encourage/incentivise a reduction in CO₂ emissions within a framework of sustainable development. Cement manufacturers are reducing their specific CO₂ emissions e.g. by the production of cements with a lower clinker content. At the same time, the expectations of contractors, ready-mixed concrete producers and precast concrete manufacturers should also be met by maintaining high levels of performance in cements and in the durability of concrete.

Existing cement standards, in particular EN 197-1, allow manufacturers to select cement compositions with low clinker content, i.e. CEM III/B and C, CEM IV/B, CEM V. However, these cements are often used for their good resistance to chemically aggressive environments but do not necessarily achieve, in concrete, the early age strength required where formwork is to be removed at less than 24 h.

Maintaining performance, in particular early strength and durability related characteristics, while reducing specific CO₂ emissions by the development of new types of cement is expected to be one of the main challenges of the coming years.

When considering such new cements intended to be used to produce structural concrete the question arises whether these products should be covered by European Standards or by European Technical Assessments (ETAs). For an answer, the various EU policy documents referenced in the bibliography should be considered, in particular the “Council Conclusions on standardization and innovation (Brussels, 25 September 2008)” [7] which highlight “the essential contribution which standardization can make towards developing innovation and competitiveness, by facilitating access to markets, enabling interoperability between new and existing products, services and processes, enhancing protection of users, giving consumers confidence in innovations and disseminating research results”. CEN and CENELEC have responded to all the EU initiatives and adopted, in October 2008, an integrated approach titled “Standardization Innovation and Research (STAIR)”. From this common approach of the EU and CEN, it is clear that European standardization may cover innovation.

An application to standardize a new cement should be submitted to the Technical Committee CEN/TC 51 based on a dossier introduced by the applicant who may, according to CEN/CENELEC Internal Regulations – Part 2:2015 [14], be a national standardization body (CEN Member), a CEN Technical Committee, the EU or EFTA Secretariat, an international organization or an European trade, professional, technical or scientific organization. It is essential that all applicants are aware in advance of the information they should provide to CEN/TC 51 in the dossier in order to demonstrate the fitness for intended use of the new cement. For this purpose, CEN/TC 51 has prepared this CEN Technical Report.

1 Scope

This CEN Technical Report provides guidance for the procedure to be followed in order to support the European standardization of new cements that are not covered by an existing European Standard.

The term “new cement” has been used in this document to describe its primary focus; however, this same guideline procedure may be used for other products to be standardized by CEN/TC 51.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 197-1, *Cement — Part 1: Composition, specifications and conformity criteria for common cements*

EN 197-2, *Cement — Part 2: Conformity evaluation*

EN 206, *Concrete — Specification, performance, production and conformity*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 197-1, EN 197-2 and EN 206 apply.

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4 Procedure of application and standardization of a new cement

4.1 General information on standardization processes

For general information on the process of European product standardization, see <https://standards.iteh.ai/catalog/standards/sist/0b3436bb-6355-4ba5-ade6-06d11e1b810c/cen-tr-16912-2016> or <http://boss.cen.eu/Pages/default.aspx>.

4.2 Classification of new cements

The procedure to be followed in order to support the European standardization of a new cement depends on the type of the cement, i.e. on the question whether the new cement is similar to cements that already have been standardized by CEN/TC 51. Following this principle, new cements can be classified in the following three categories:

- 1) Category 1: cement from a new combination of traditional and well-tried constituents;
- 2) Category 2: cement basically corresponding to cement types defined in existing standards but containing one or more new constituents;
- 3) Category 3: cement differing substantially from those types defined in existing standards, e.g. produced with a new kind of clinker or based on different physicochemical phases/principles.

Cement of category 2 should be similar to common cements, i.e. its hydration should be based on the formation of calcium silicate hydrates (CSH).

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4.3 General criteria for the assessment of new cements

The general requirements for assessing new cements differ depending on their classification according to 4.2; these requirements should be fulfilled before CEN/TC 51 considers the possibility of European standardization of a new cement:

- for cements of category 1, the mechanical, physical and chemical performances listed in 5.3 as well as durability related characteristics described in 5.4.3 should be assessed, taking into account the intended use of the cement.
- for cements of category 2, in addition to the requirements for cement of category 1, the potential environmental and health impacts of end-use construction products that incorporate the cement should be assessed as described in 5.4.4 and 5.4.5, respectively.
- for cements of category 3, in addition to the requirements for cement of category 2, also relevant practical experience should be gained under conditions approved by CEN/TC 51, e.g. through an ETA or another comparable procedure, for assessing the fitness for the intended use prior to identifying the general criteria, amongst other things, for the possibility of European standardization.

The categorization of new cements and the corresponding requirements are summarized in Table 1.

Table 1 — Categorization of new cements and the corresponding requirements

Category 1 Cement from a new combination of constituents according to EN 197-1	Category 2 Cement containing a minor amount of one or more new constituents	Category 3 Cement differing substantially from those types defined in existing standards
Assessment of mechanical, physical and chemical performances		
Assessment of durability related characteristics		
Assessment of influence on environmental performance		Relevant practical experience gained under approved conditions prior to European standardization
Assessment of possible health impact		

4.4 Application for the standardization of a new cement

4.4.1 General

An application for the standardization of a new cement should be presented to CEN/TC 51 for approval using, as the basis of, the CEN form for a New Work Item (NWI) proposal (see <http://boss.cen.eu/Pages/default.aspx>) and a dossier (4.4.2). The dossier may be submitted with the application where considered by the applicant to be complete, alternatively initial proposals for testing procedures etc. may accompany the application (see 4.4.2).

4.4.2 The dossier and its contents

The dossier should provide the necessary information, especially to demonstrate the fitness for intended use of the new cement, i.e. in particular the following:

- definition and, where applicable, name and/or brand name of the product;
- intended use of the product including assumed working life of construction products made using the product;
- specific terms used for the product;
- information on patents and other intellectual property rights (IPR) that may be relevant for the standardization of the new cement;
- proposal concerning the categorization of the new cement according to 4.2;
- constituents of the product, for new constituents appropriate criteria for their characterization;
- description of the manufacturing process;
- packaging, transport and storage of the product;
- methods for the identification and testing of the product and its constituents, i.e. applicable testing standards and/or other test methods including equipment necessary for the testing laboratories;
- name and qualifying criteria for the competence of laboratories assigned to carry out the tests;
- results of tests carried out; [SIST-TP CEN/TR 16912:2016](https://standards.iteh.ai/catalog/standards/sist/0b3436bb-6355-4ba5-ade6-59b7f1c1)
- proposal concerning the system for assessment and verification of constancy of performance (AVCP system) and the conformity criteria for the new cement.

The applicant is free to introduce – as a first step – the description of the product together with a proposal for the testing procedures (including all relevant testing conditions, see provisions given in 5.4) and for the laboratories (including qualification) designated to be assigned with the tests. This is recommended in particular for the testing of durability related characteristics. After approval of the proposal, the risk is lower that testing results are not accepted afterwards by CEN/TC 51.

Testing should be undertaken by competent laboratories. As a rule, the laboratories involved in the testing procedures should be accredited according to EN ISO/IEC 17025 for all testing methods to be used. If this is not or not completely possible, it is strongly recommended that the laboratories involved in the testing are approved by CEN/TC 51 on the basis of the information on the competence of the laboratory to be supplied by the applicant before undertaking the testing.

4.5 Evaluation and decision by CEN/TC 51

The evaluation of an application, and the dossier submitted by the applicant, and any decision to begin the standardization process for a new cement, are in the sole responsibility of CEN/TC 51.

The discussion and evaluation of the dossier will always be on a case-by-case basis. In this regard, distinction should be made between cements for normal structural application in construction and cements designed and produced intentionally for a specific use.

CEN/TC 51 may task one or more of its Working Groups and/or ask other CEN Technical Committees to contribute to the discussion and to the evaluation process.

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The following aspects will be considered by CEN/TC 51 during the evaluation process:

- classification of the new cement according to 4.2 and its intended use;
- characteristics of the new cement which are relevant to its fitness for use;
- methods for the verification and assessment of the relevant product characteristics, i.e. test procedures proposed in the dossier to demonstrate the fitness for the intended use of the new cement;
- qualification of the testing laboratory/laboratories;
- test results;
- AVCP system and associated rules for the assessment and verification of constancy of performance of the new cement proposed in the dossier.

5 Assessment of fitness for use**5.1 Meaning of “fitness for use”**

“Fitness for (the intended) use” of a construction product means that the product has such characteristics that the works in which it is to be incorporated can, if properly designed and built,

- satisfy the basic requirements for construction works when and where such works are subject to regulations containing such requirements and
- be fit for their intended use, account being taken of economy and in this connection satisfy the basic requirements for construction works for an economically reasonable working life, if normally maintained.

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Therefore, it is necessary that the intended use of the new cement be clearly defined in the dossier.

5.2 Elements of the assessment of fitness for use

The assessment of the fitness of a new cement for its intended use should include the following:

- the identification of the characteristics of the new cement which are relevant to its fitness for use;
- the establishment of methods for the verification and assessment of the relevant product characteristics and the expression of the respective product performances;
- the demonstration of practical experiences for cement of category 3.

5.3 Characteristics of the new cement which are relevant to its fitness for use

The product characteristics given in Table 2 may be relevant to the fitness for use of the new cement. It should be stated and explained in detail in the dossier which of the characteristics are relevant and which are not, taking into account the intended use and the classification of the cement in a category according to 4.2. If other product characteristics not listed in Table 2 are relevant to the fitness for use of the new cement, this should in addition be stated and explained in the dossier.

Table 2 — Product characteristics of a new cement that may be relevant to its fitness for use

Product characteristics	Mentioned in harmonized European Standards ^a	Test references	Notes
Constituents and composition	EN 197-1, EN 413-1, EN 459-1, EN 13282-2, EN 14216, EN 14647, EN 15368, EN 15743		See 5.4.2
Compressive strength (early)	EN 197-1, EN 413-1, EN 459-1, EN 13282-1, EN 13282-2, EN 14216, EN 14647, EN 15743	EN 196-1	Requirements expressed in terms of strength classes and limits
Compressive strength (standard)	EN 197-1, EN 413-1, EN 459-1, EN 13282-1, EN 13282-2, EN 14216, EN 15368, EN 15743	EN 196-1	Requirements expressed in terms of strength classes and limits
Initial setting time	EN 197-1, EN 413-1, EN 459-1, EN 13282-1, EN 13282-2, EN 14216, EN 14647, EN 15368, EN 15743	EN 196-3 or EN 413-2	Requirements expressed in terms of lower limits
Final setting time	EN 413-1, EN 459-1	EN 196-3 or EN 413-2	Requirements expressed in terms of upper limits
Soundness (expansion)	EN 197-1, EN 413-1, EN 459-1, EN 13282-1, EN 13282-2, EN 14216, EN 15368, EN 15743	EN 196-3 or EN 459-2	Requirements expressed in terms of upper limits
Penetration depth of fresh mortar	EN 459-1	EN 459-2	Requirement expressed in terms of limits
Air content of fresh mortar	EN 413-1, EN 459-1, EN 15368,	EN 413-2 or EN 459-2	Requirement expressed in terms of upper limits
Water retention of fresh mortar	EN 413-1, EN 15368,	EN 413-2	Requirements expressed in terms of lower limits
Colour		EN 12878	
Density		EN 196-6	