

Methods of testing cement - Part 10: Determination of the water-soluble chromium (VI) content of cement

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of the watersoluble chromium (VI) content of cement

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 196-10:2006 sisaldab Euroopa standardi EN 196-10:2006 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 20.09.2006 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 196-10:2006 consists of the English text of the European standard EN 196-10:2006.</p> <p>This document is endorsed on 20.09.2006 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>This European Standard specifies the method for the determination of the water-soluble chromium (VI) content of cement. A reference method is described consisting of two stages, an extraction procedure and an analysis of the filtered extract. Guidance on other extraction procedures, suitable for screening tests, for factory production control or other purposes, is given but in case of dispute or failure to comply with a regulatory limit only the reference method is used.</p>	<p>Scope:</p> <p>This European Standard specifies the method for the determination of the water-soluble chromium (VI) content of cement. A reference method is described consisting of two stages, an extraction procedure and an analysis of the filtered extract. Guidance on other extraction procedures, suitable for screening tests, for factory production control or other purposes, is given but in case of dispute or failure to comply with a regulatory limit only the reference method is used.</p>
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English Version

Methods of testing cement - Part 10: Determination of the water-soluble chromium (VI) content of cement

Méthodes d'essai des ciments - Partie 10 : Détermination de la teneur du ciment en chrome VI soluble dans l'eau

Prüfverfahren für Zement - Teil 10: Bestimmung des Gehaltes an wasserlöslichem Chrom (VI) in Zement

This European Standard was approved by CEN on 19 June 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This document (EN 196-10:2006) has been prepared by Technical Committee CEN/TC 51 “Cement and building limes”, the secretariat of which is held by IBN/BIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2007, and conflicting national standards shall be withdrawn at the latest by January 2007.

This European Standard on the methods of testing cement comprises the following Parts:

EN 196-1, *Methods of testing cement — Part 1: Determination of strength*

EN 196-2, *Methods of testing cement — Part 2: Chemical analysis of cement*

EN 196-3, *Methods of testing cement — Part 3: Determination of setting time and soundness*

EN 196-5, *Methods of testing cement — Part 5: Pozzolanicity test for pozzolanic cement*

EN 196-6, *Methods of testing cement — Part 6: Determination of fineness*

EN 196-7, *Methods of testing cement — Part 7: Methods of taking and preparing samples of cement*

EN 196-8, *Methods of testing cement — Part 8: Heat of hydration — Solution method*

EN 196-9, *Methods of testing cement — Part 9: Heat of hydration — Semi-adiabatic method*

NOTE A previous part, EN 196-21: Methods of testing cement — Part 21: Determination of the chloride, carbon dioxide and alkali content of cement, has been revised and incorporated into EN 196-2.

Another document, ENV 196-4 Methods of testing cement — Part 4: Quantitative determination of constituents, has been drafted and will be published as a CEN Technical Report.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This European Standard specifies the reference method for the determination of water-soluble chromium (VI) content of cement that consists of two stages, an extraction procedure and an analysis of the filtered extract.

This European Standard test method has adopted the principle that extraction is carried out under conditions approximating as closely as possible to those during the commercial use of cement. Consequently extraction is by standard mortar and subsequent filtration. Other extraction procedures based on paste extraction have traditionally been used and are included in Annexes C and D for use as screening tests, in factory production control or laboratories not having access to equipment specified in EN 196-1 for the production of mortar. The use of paste extraction is outside the normal conditions of use of cement.

This European Standard test method has adopted the principle of analysis by spectrophotometry. The procedures set down generally permit the analysis to be carried out without the need for an oxidation step. On rare occasions some cements may contain reducing species, not controlled by the routine method, that interfere with the analysis and require an oxidation step. Inter-laboratory testing has demonstrated that it is necessary to include an 'initial assessment test' in order to observe the effects on the analysis. By comparing the results obtained from the method with and without the oxidation step, it can be determined whether, for that cement, the reference method should include the oxidation step.

Other instrumental procedures may be used for the analysis of the filtered extract provided they are calibrated against the analysis of the filtered extract using the reference procedure.

In case of dispute or failure to comply with a regulatory limit only the reference method shall be used.

This European Standard test method has drawn heavily on the Danish Standard DS 1020 and the extraction procedure developed by the French cement industry association ATILH. Careful consideration has been given to the details of the German TRGS 613 method developed by Germany's Hazardous Materials Committee in support of Industrial Regulations for Hazardous Materials. Notice was also taken of the British Cement Association 'inherent colour' method; the draft method produced by CEN/TC 193/WG1, reference N680, for cement-based adhesives; European Standard method EN 420 for protective gloves; and to the method, reference ID-215, developed by the Occupational Safety and Health Administration, Salt Lake, USA.

The USA Portland Cement Association, Research and Development report Serial No. 2554 "Review and evaluation of analytical methods for the determination of hexavalent chromium in hydraulic cements and clinker" by Waldemar A. Klemm was found to be most helpful in resolving technical issues. The final draft by CEN/TC292 of CEN/TR 14589 confirmed that chromium species and solubilities are sensitive to pH and redox conditions and care has been taken to address these in this European Standard by controlling sample exposure to air, by adding the indicator to the alkaline filtered extract and by precisely specifying the pH for the analytical procedure.

This European Standard test method was developed in order to provide a reference test method for use in the evaluation of compliance of cement with the requirements in Directive 2003/53/EC of the European Parliament and of the Council of 18 June 2003 amending for the 26th time Council Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations (nonylphenol, nonylphenol ethoxylate and cement). A system for the evaluation of compliance of cement is set out in Annex A.

1 Scope

This European Standard specifies the method for the determination of the water-soluble chromium (VI) content of cement.

A reference method is described consisting of two stages, an extraction procedure and an analysis of the filtered extract. Guidance on other extraction procedures, suitable for screening tests, for factory production control or other purposes, is given but in case of dispute or failure to comply with a regulatory limit only the reference method is used. The reference method has alternatives whereby the filtered extract may be subjected to an oxidation step or not. The criteria by which the appropriate procedure is selected are set down. Other instrumental procedures may be used for the analysis of the filtered extract provided they are calibrated against the analysis of the filtered extract using the reference procedure. In the case of a dispute, only the reference method is used.

Annex A sets out a normative procedure to be followed in case this test method is used as the basis for evaluation of conformity of a cement with the regulatory limit in Directive 2003/53/EC.

This European Standard describes a method that applies to cements. It may have wider applicability but this would need to be verified by testing on a product-by-product basis. Guidance in the possible application of this European Standard to the determination of the water-soluble chromium (VI) content of cement-containing preparations is given in Annex B.

Annexes C and D provide information on other test procedures based on paste extraction and thus depart from the performance of cement in its normal conditions of use. They may be carried out with or without the oxidation process. Users should be aware that results using these methods might be significantly different to those obtained by the reference method. In the case of dispute or failure to comply with the regulatory limit only the reference method is used.

Annex E provides guidance on a method for determination of the excess reducing agent content of cement as used in the factory internal control system of some countries. Manufacturers using such an internal control method should assure themselves of the relevance of results in comparison with testing by the reference method.

2 Normative references

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

EN 196-1:2005, *Methods of testing cement — Part 1: Determination of strength*

EN 196-7, *Methods of testing cement — Part 7: Methods of taking and preparing samples of cement*

EN 45011, *General requirements for bodies operating product certification systems (ISO/IEC Guide 65:1996)*

EN ISO/IEC 17020, *General criteria for the operation of various types of bodies performing inspection (ISO/IEC 17020:1998)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*