

**Tsemendi katsetamine. Osa 3: Tardumisaja ja  
mahupüsivuse määramine KONSOLIDEERITUD  
TEKST**

Methods of testing cement - Part 3: Determination of  
setting times and soundness CONSOLIDATED TEXT

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 196-3:2005+A1:2009 sisaldab Euroopa standardi EN 196-3:2005+A1:2008 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 29.01.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 26.11.2008.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 196-3:2005+A1:2009 consists of the English text of the European standard EN 196-3:2005+A1:2008.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 29.01.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 26.11.2008.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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English Version

**Methods of testing cement - Part 3: Determination of setting times and soundness**

Méthodes d'essais des ciments - Partie 3: Détermination du temps de prise et de la stabilité

Prüfverfahren für Zement - Teil 3: Bestimmung der Erstarrungszeiten und der Raumbeständigkeit

This European Standard was approved by CEN on 29 December 2004 and includes Amendment 1 approved by CEN on 23 October 2008.

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


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## Foreword

This document (EN 196-3:2005+A1:2008) has been prepared by Technical Committee CEN/TC 51 "Cement and building limes", the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

This document includes Amendment 1 approved by CEN on 2008-10-23.

This document supersedes A1 EN 196-3:2005. A1

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

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 cements*

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.

A1 Amendment A1:2008 contains an alternative method for testing the setting times of slow setting cements. A1

This edition introduces the following technical changes based on comments received by the secretariat:

- a) requirement for the laboratory relative humidity is reduced to a minimum of 50 % from a minimum of 65 % (4.1);
- b) drinking water is permitted for storing and boiling test specimens (4.2.5); drinking water is no longer permitted in the production of paste since such water varies in quality between places and even with time in the same laboratory (4.2.5);
- c) the Vicat mould is permitted to be cylindrical in addition to truncated conical shape (5.1);

- d) the time permitted for scraping paste from the sides and bottom of the mixing bowl is increased from 15 s to 30 s (5.2.1);
- e) the end-point for the determination of standard consistence is increased to  $(6 \pm 2)$  mm from  $(6 \pm 1)$  mm (5.2.3);
- f) the determination of setting time is carried out whilst the specimen is immersed in water (Clause 6);
- g) in the determination of setting time the tolerance on storage temperature for specimens is reduced to  $(20,0 \pm 1,0)$  °C from  $(20 \pm 1)$  °C (6.1.3);
- h) in the determination of setting time automatic apparatus conforming to the requirements of the reference method is permitted (6.1.1);
- i) the end-point for the determination of initial setting time is increased to  $(6 \pm 3)$  mm from  $(4 \pm 1)$  mm (6.2.2);
- j) the end-point for the determination of final setting time is required to be confirmed by testing in two additional positions in the test specimen (6.3.1);
- k) the material of construction of the Le Chatelier apparatus for determination of soundness is extended to any non-corrodible spring metal (7.1.1);
- l) the minimum relative humidity in which specimens for determination of soundness are to be stored is reduced to 90 % from 98 % (7.1.3);
- m) the determination of soundness is carried out once (7.2);
- n) where a retest of the determination of soundness is required the relative humidity at which the cement sample is stored is reduced to 50 % from 65 % (7.4).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, 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.

## 1 Scope

This document specifies the methods for determining standard consistence, setting times and soundness of cements.

The method applies to common cements and to other cements and materials, the standards for which call up this method. It may not apply to other cement types that have, for example, a very short initial setting time. The method is used for assessing whether the setting time and soundness of a cement is in conformity with its specification.

This document describes the reference methods and allows the use of alternative procedures and equipment, as indicated in notes, provided that they have been calibrated against the reference methods. In the event of a dispute, only the reference equipment and procedures are used.

## 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, *Methods of testing cement — Part 1: Determination of strength*

## 3 Principles

Cement paste of standard consistence has a specified resistance to penetration by a standard plunger. The water required for such a paste is determined by trial penetrations of pastes with different water contents.

The setting time is determined by observing the penetration of a needle into cement paste of standard consistence until it reaches a specified value.

The soundness is determined by observing the volume expansion of cement paste of standard consistence as indicated by the relative movement of two needles.

## 4 Laboratory, equipment and materials

### 4.1 Laboratory

The laboratory in which specimens are prepared and tested shall be maintained at a temperature of  $(20 \pm 2) ^\circ\text{C}$  and a relative humidity of not less than 50 %.

The temperature and relative humidity of the air in the laboratory and the temperature of the water in the storage containers shall be recorded at least once per day during working hours.

Cement, water and apparatus used to make and test specimens shall be at a temperature of  $(20 \pm 2) ^\circ\text{C}$ .

**[A1]** NOTE See Annex A for storage conditions to be applied when testing setting times by alternative method. **[A1]**

Where temperature ranges are given, the target temperature at which the controls are set shall be the middle value of the range.