SLOVENSKI STANDARD

SIST EN 196-6

prva izdaja
september 1995

Metode preskušanja cementa - 6. del: Določanje finosti (prevzet standard EN 196-6:1989 z metodo platnice)

Methods of testing cement - Part 6: Determination of fineness

Méthodes d essais des ciments - Partie 6: Détermination de la finesse

Prüfverfahren für Zement - Teil 6: Bestimmung der Mahlfeinheit

Deskriptorji: cement, določanje, finost, preskusi, sejanje, plinoprepustnost

ICS 91.100.10

Referenčna številka
SIST EN 196-6:1995 (en)

Nadaljevanje na straneh od II do IV in 1 do 17

UVOD

Standard SIST EN 196-6 (en), Metode preskušanja cementa - 6. del: Določanje finosti, prva izdaja, 1995, ima status slovenskega standarda in je z metodo platnice prevzet evropski standard EN 196-6, Methods of testing cement - Part 6: Determination of fineness, 1989, v angleškem jeziku.

NACIONALNI PREDGOVOR

Evropski standard EN 196-6:1989 je pripravil tehnični odbor Evropske organizacije za standardizacijo CEN/TC 51 Cement in apno.

Odločitev za prevzem tega standarda po metodi platnice je sprejela delovna skupina USM/TC CAA/WG 1 Cement, potrdil pa tehnični odbor USM/TC CAA Cement, apno in vlaknatocementni izdelki.

Ta slovenski standard je dne 1995-08-29 odobril direktor USM.

SLOVENSKI STANDARD SIST EN 196 ZA PRESKUŠANJE CEMENTA OBSEGA NASLEDNJE DELE:

SIST EN 196-1:1995 (en)	Metode preskušanja cementa - 1. del: Določanje trdnosti
SIST EN 196-2:1995 (en)	Metode preskušanja cementa - 2. del: Kemijska analiza cementa
SIST EN 196-3:1995 (en)	Metode preskušanja cementa - 3. del: Določanje časa vezanja in prostorninske obstojnosti
SIST ENV 196-4:1995 (en)	Metode preskušanja cementa - 4. del: Kvantitativno določanje sestavin
SIST EN 196-5:1995 (en)	Metode preskušanja cementa - 5. del: Določanje pucolanske aktivnosti za pucolanske cemente
SIST EN 196-6:1995 (en)	Metode preskušanja cementa - 6. del: Določanje finosti
SIST EN 196-7:1995 (en)	Metode preskušanja cementa - 7. del: Metode odvzemanja in priprave vzorcev cementa
SIST EN 196-21:1995 (en)	Metode preskušanja cementa - 21. del: Določanje količine kloridov, ogljikovega dioksida in alkalij v cementu

PREDHODNI IZDAJI

-	JUS B.C8.024:1963 (sh)	Određivanje specifične površine portland-cementa
-	JUS B.C8.026:1966 (sh)	Određivanje specifične površine cemenata, pucolana, zgure i slično

OSNOVA ZA IZDAJO STANDARDA

- Prevzem standarda EN 196-6:1989

OPOMBI

- Povsod, kjer se v besedilu standarda uporablja izraz evropski standard , v SIST EN 196-6:1995 to pomeni slovenski standard .
- Uvod in nacionalni predgovor nista sestavni del standarda.

VSEBINA **stran**

EUROPEAN STANDARD

NORME EUROPEENNE

EUROPÄISCHE NORM

EN 196
Part 6

December 1989

UDC 666.94:691.54:620.1:539.215

Key words: Cement, determination, fineness, tests, sieving, gaz, permeability

English version

Methods of testing cement; Determination of fineness.

Méthodes d'essai des ciments; Détermination de la finesse.

Prüfverfahren für Zement; Bestimmung der Mahlfeinheit.

This European Standard was accepted by CEN on 1989-06-16.
CEN members are bound to comply with the requirements of the CEN/CENELEC Common Rules 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 CEN 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 CEN Central Secretariat has the same status as the official versions.

CEN members are the national standards organizations of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue Bréderode 2, B-1000 Brussels

Ref. No. EN 196-6:1989 E

BRIEF HISTORY

This European Standard was drawn up by the Technical Committee CEN/TC 51 'Cement' the Secretariat of which is held by IBN.

In accordance with the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom

Foreword

The standard EN 196 on methods of testing cement consists of the following Parts:

Part 1: Determination of strength

Part 2: Chemical analysis of cement

Part 3: Determination of setting time and soundness

Part 4: Quantitative determination of constituents

Part 5: Pozzolanicity test for pozzolanic cements

Part 6: Determination of fineness

Part 7: Methods of taking and preparing samples of cement

Part 21: Determination of the chloride, carbon dioxide and alkali content of cement

Contents

1 Object and field of application

This European Standard describes two methods of determining the fineness of cement.

The sieving method serves only to demonstrate the presence of coarse cement particles. This method is primarily suited to checking and controlling the production process.

With the air permeability method (Blaine) the specific surface (mass related surface) is measured by comparison with a reference cement sample. The determination of the specific surface serves primarily to check the consistency of the grinding process of one and the same plant. This method only allows a limited assessment to be made of the properties of the cement in use.[1)]

The methods are applicable to all the cements defined in ENV197 [2)].

2 References

ENV 197	Cement : Composition, specifications and conformity criteria [2)]
ISO 383-1976	Laboratory glassware - Interchangeable conical ground joints
ISO 565-1983	Test sieves - Woven metal wire cloth, perforated plate and electroformed sheet - Nominal sizes of openings
ISO 3310/1- 1982	Test sieves - Technical requirements and testing Part 1: Test sieves of metal wire cloth
ISO 4803-1978	Laboratory glassware - Borosilicate glass tubing

---

1) The air permeability method may not give significant results for cements containing ultrafine materials.

2) At present at the draft stage.

3 Sieving method

3.1 Principle

The fineness of cement is measured by sieving it on standard sieves. The proportion of cement of which the grain sizes are larger than the specified mesh size is thus determined.

A reference sample having a known proportion of material coarser than the specified mesh size is used for checking the specified sieve.

3.2 Apparatus

3.2.1 *Test sieve*, comprising a firm, durable, non-corrodible, cylindrical frame of 150 mm to 200 mm nominal diameter and 40 mm to 100 mm depth, fitted with 90 µm mesh sieve cloth of woven stainless steel, or other abrasion-resisting and non-corrodible metal wire.

The sieve cloth shall comply with the requirements of table 1 of ISO 565-1983 and ISO 3310/1 and shall be free of visible irregularities in mesh size when inspected optically by the methods of ISO 3310/1. A tray fitting beneath the sieve frame and a lid fitting above it shall be provided to avoid loss of material during sieving.

3.2.2 *Balance*, capable of weighing up to 10 g to the nearest 10 mg.

3.3 Material for checking the sieve

A reference material of known sieve residue shall be provided for checking the sieve.

The material shall be stored in sealed, airtight containers to avoid changes in its characteristics due to absorption or deposition from the atmosphere. The containers shall be marked with the sieve residue of the reference material.

3.4 Procedure

3.4.1 *Determination of the cement residue*

Agitate the sample of cement to be tested by shaking for 2 min in a stoppered jar to disperse agglomerates. Wait 2 min. Stir the resulting powder gently using a clean dry rod in order to distribute the fines throughout the cement.

Fit the tray under the sieve. Weigh approximately 10 g of cement to the nearest 0,01 g and place it in the sieve, being careful to avoid loss. Disperse any agglomerates. Fit the lid over the sieve. Agitate the sieve by swirling, planetary and linear movements until no more fine material passes through it. Remove and weigh the residue. Express its mass as a percentage, R_1, of the quantity first placed in the sieve to the nearest 0,1 %. Gently brush all the fine material off the base of the sieve into the tray.

Repeat the whole procedure using a fresh 10 g sample to obtain R_2. Then calculate the residue of the cement R as the mean of R_1 and R_2 as a percentage, expressed to the nearest 0,1 %.

When the results differ by more than 1 % absolute, carry out a third sieving and calculate the mean of the three values.

The sieving process is carried out manually by a skilled and experienced operator.

NOTE - Alternatively a sieving machine may be used provided that it can be shown to give the same results as the manual operation.

3.4.2 *Checking the sieve*

Agitate the sample of cement to be tested by shaking for 2 min in a stoppered jar to disperse agglomerates. Wait 2 min. Stir the resulting powder gently using a clean dry rod in order to distribute the fines throughout the cement.

Fit the tray under the sieve. Weigh approximately 10 g of the reference material (3.3) to the nearest 0,01 g and place it in the sieve, being careful to avoid loss. Carry out the sieving procedure as in 3.4.1 including the repeat determination of residue to yield two values P_1 and P_2 expressed to the nearest 0,1 %.

The two values of P_1 and P_2 for a satisfactory sieve should differ by not more than 0,3 %. Their mean P characterizes the state of the sieve.

Given the known residue on the 90 µm mesh of the reference material, R_0, calculate R_0/P as the sieve factor, F, expressed to the nearest 0,01. The residue, R, determined as in 3.4.1 shall be corrected by multiplying by F, which may have a value of 1,00 ± 0,20.

Check the sieve after every 100 sievings.

NOTE - Any other checking procedure, such as the optical methods described in ISO 3310/1 may be used. All sieves will wear slowly and consequently their sieve factor, F, will slowly change.

3.5 Expression of results

Report the value of R, to the nearest 0,1 %, as the residue on the 90 µm (ISO 565) sieve for the cement tested.

The standard deviation of the repeatability is about 0,2 % and of the reproducibility is about 0,3 %.

NOTE - Where there is local difficulty in obtaining ISO sieves, the same procedure can be followed with the nearest available Standard sieve but the report is to state on which Standard sieve mesh the cement residue has been determined.

4 Air permeability method (Blaine method)

4.1 Principle

The fineness of cement is measured as specific surface by observing the time taken for a fixed quantity of air to flow through a compacted cement bed of specified dimensions and porosity. Under standardized conditions the specific surface of cement is proportional to $\sqrt{t}$ where t is the time for a given quantity of air to flow through the compacted cement bed. The number and size range of individual pores in the specified bed are determined by the cement particle size distribution which also determines the time for the specified air flow.

The method is comparative rather than absolute and therefore a reference sample of known specific surface is required for calibration of the apparatus.

4.2 Apparatus

4.2.1 *Permeability cell*. The cell shall be a rigid right cylinder of the dimensions and tolerances shown in figure 1 a). It shall be of austenitic stainless steel or other abrasion-resisting, non-corrodible material. The top and bottom faces shall be flat and normal to the axis of the cylinder, as shall the upper surface of the ledge at the bottom of the cell. The outer surface of the cylinder shall be tapered to form an airtight fit with the conical socket of the manometer (ISO 383, Joint 19/34).

4.2.2 *Perforated disc*. The disc shall be of non-corrodible metal, perforated with 30 to 40 holes of 1 mm diameter, and shall have the dimensions and tolerances shown in figure 1 b). When in position on the ledge in the cell, its plane surfaces shall be normal to the axis of the cell.

4.2.3 *Plunger*. The plunger is a piston, capable of sliding freely in the measuring cell by means of a clearance to be applied in such a way that, when the cap of the plunger comes to rest on the upper face of the cell cylinder, a distance of 15 ± 1 mm will be maintained between the upper face of the perforated disc and the lower face of the piston.

This piston shall be provided with a flat connected to an annulus around the head to enable air to escape.