



SLOVENSKI STANDARD
SIST EN 413-2:2005

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SIST EN 413-2:1995

Zidarski cement - 2. del: Preskusne metode

Masonry cement - Part 2: Test methods

Putz- und Mauerbinder - Teil 2: Prüfverfahren

Ciment a maçonner - Partie 2: Méthodes d'essai

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ICS:

91.100.10 Cement. Mavec. Apno. Malta Cement. Gypsum. Lime.
Mortar

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 413-2

June 2005

ICS 91.100.10

Supersedes EN 413-2:1994

English version

Masonry cement - Part 2: Test methods

Ciment à maçonner - Partie 2: Méthodes d'essai

Putz- und Mauerbinder - Teil 2: Prüfverfahren

This European Standard was approved by CEN on 29 April 2005.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This European Standard (EN 413-2:2005) has been prepared by Technical Committee CEN/TC 51 "Cement and building limes", the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.

This European Standard supersedes EN 413-2:1994.

EN 413 *Masonry cement* consists of the following Parts.

- Part 1: *Composition, specifications and conformity criteria*
- Part 2: *Test methods*

The main differences between this European Standard and EN 413-2:1994 are:

- Exclusion of workability (cohesivity).
- Introduction of an optional setting time procedure using the specimen storage conditions (in air) that were previously specified in EN 196-3:1994. This is necessary because the (under water) method specified in EN 196-3:2005, is not suitable for some masonry cements which have low clinker contents.
- Diameter of filter paper used in the water retention test increased from 100 mm to the more readily available 110 mm size.
- Specification introduced for non-woven tissue to be used in the water absorption test.
- Weighing precision in water content test increased from 1 g to 0,1 g.
- Improved description of procedure for filling of air content test apparatus.
- Introduction of precision statements for determination of mortar standard consistency, water retention and air content.
- Clarification of requirements for retesting if mortar flow does not lie within the required range.
- Clarification of requirements for retesting if pairs of results for water retention or air content differ by more than twice the standard deviation of repeatability.
- Clarification of calibration procedures for flow table and air content apparatus.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 413-2:2005 (E)

Introduction

This European Standard includes additional test methods to those described in EN 196 *Methods of testing cement* that enable the performance of masonry cement to be assessed when used in mortar for bedding masonry units and for rendering and plastering.

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1 Scope

This European Standard describes reference and alternative test methods to be used when testing masonry cements to assess their conformity to EN 413-1. It gives the tests on fresh mortar for consistence, water retention and air content.

In the event of a dispute, only the reference methods 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*

EN 196-3:2005, *Methods of testing cement — Part 3: Determination of setting time and soundness*

EN 459-2: 2001, *Building lime — Part 2: Test methods*

EN 22768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1:1989)*

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3 General requirements for testing

SIST EN 413-2:2005

3.1 Laboratory

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Unless specifically stated to the contrary, all the tests described in this document shall be carried out in a laboratory where the air temperature is maintained at (20 ± 2) °C and the relative humidity at not less than 50 %.

3.2 Manufacturing tolerances for test equipment

3.2.1 Dimensions

Figures indicating the specified requirements for apparatus used in the tests described in this document shall include essential dimensions for which manufacturing tolerances are given.

Unless otherwise stated, tolerance class m according to EN 22768-1 should be applied.

NOTE All other dimensions are given for guidance.

3.2.2 Mass

Specified masses shall have manufacturing tolerances within ± 1 % of the mass unless otherwise stated.

3.3 Tolerances for test equipment in use

Tolerances applying to apparatus, which has been subjected to wear in use shall not exceed twice the corresponding manufacturing tolerance unless alternative requirements are specified.

EN 413-2:2005 (E)**3.4 Number of tests**

Where the test is one of a series subject to statistical control, determination of each property by a single test shall be the minimum required.

Where the test is not part of a series subject to statistical control, two tests shall be performed to determine each property.

4 Determination of setting time**4.1 General**

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

The setting time is determined in accordance with either method A (4.2) or method B (4.3).

Method B is the reference method.

4.2 Method A

The setting time is determined in accordance with EN 196-3.

NOTE Experience has shown that the method specified in EN 196-3, in which the specimens are tested under water, is not suitable for some masonry cements which have low clinker contents.

4.3 Method B**4.3.1 Test principle**

The equipment used and the specimen preparation procedures are as described in EN 196-3 but with the additional requirement for a room or a humidity cabinet of adequate size and maintained at $(20 \pm 1) ^\circ\text{C}$ and not less than 90 % relative humidity.

4.3.2 Initial setting time procedure

Calibrate the Vicat apparatus with the needle, attached in advance of the test, by lowering the needle to rest on the base-plate to be used and adjusting the pointer to read zero on the scale. Raise the needle to the stand-by position. Fill a Vicat mould in accordance with 5.2.2 of EN 196-3:2005 with paste of standard consistence mixed in accordance with 5.2.1 of EN 196-3:2005.

Place the filled mould and base-plate in the room or humidity cabinet and after a suitable time, position the mould, base-plate and container under the needle of the Vicat apparatus. Lower the needle gently until it is in contact with the paste. Pause in that position for between 1 s and 2 s in order to avoid initial velocity or forced acceleration of the moving parts. Then release the moving parts quickly and allow the needle to penetrate vertically into the paste. Read the scale when penetration has ceased, or 30 s after the release of the needle, whichever is the earlier.

Record the scale reading, which indicates the distance between the end of the needle and the base-plate, together with the time from zero. Repeat the penetration on the same specimen at conveniently spaced positions, not less than 8 mm from the rim of the mould or 5mm from each other and at least 10 mm from the last penetration position, at conveniently spaced intervals of time, e.g. at 10 min intervals. Between penetrations keep the specimen in a room or humidity cabinet. Clean the Vicat needle immediately after each penetration. Retain the specimen if determination of the final setting time is to be made.

4.3.3 Report – initial setting time

Report the time measured from zero at which the distance between the needle and the base-plate is (6 ± 3) mm as the initial setting time of the cement to the nearest 5 min.

If the initial setting time exceeds 6h determine the final setting time.

4.3.4 Final setting time procedure

Invert the filled mould and follow the procedure described in 6.3 of EN 196-3:2005 with the specimen held in the room or humidity cabinet at controlled humidity rather than under water.

4.3.5 Report – final setting time

Report the time measured from zero at which the needle first penetrates only 0,5 mm into the specimen as the final setting time of the cement, to the nearest 15 min.

5 Preparation of standard mortar

5.1 Principle

The properties of fresh mortar made with masonry cement are assessed on standard mortar prepared in accordance with EN 196-1, but with the water content necessary for the standard consistence.

The consistence is measured using the plunger apparatus (see 5.2) as the reference method to achieve the required value of penetration.

A flow table test (see 5.3) is allowed as an alternative to the plunger test but it is important that the flow table spread equivalent to the required value of penetration is established, using the same type of masonry cement as that which is to be tested.

5.2 Consistence of fresh mortar by plunger apparatus (reference method)

5.2.1 Apparatus

The mixer and ancillary equipment shall be as described in EN 196-1.

The plunger apparatus shown in Figure 1 shall conform to the dimensions specified.

The shape of the baseplate (1) shall enable the mortar container (8) to be placed centrally below the plunger (7). The plunger shall have a hemispherical lower end, be resistant to corrosion and not attacked by mortar. The total mass of the rod (6) and plunger (7) shall be (90 ± 2) g. A release mechanism (5) holds the measuring rod in its initial position so that the lower end of the plunger is $(100 \pm 0,5)$ mm above the mortar surface prior to commencing the test (the initial position in 5.2.2).

The tamper (see Figure 2) shall consist of a round rod made of impermeable material with sheet metal protection and shall weigh (250 ± 15) g.

5.2.2 Procedure

Prepare the mortar according to the procedure described in EN 196-1 except that the water content shall be that determined to give the consistence required.

Before the start of each test wipe the plunger with a damp cloth.

Fill the container in two layers immediately after completing the mixing procedure. Compact each layer with 10 light strokes of the tamper.