



SLOVENSKI STANDARD

SIST EN 1015-9:2001

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Metode preskušanja zidarske malte - 9. del: Določevanje časa obdelavnosti in popravljalnega časa sveže malte

Methods of test for mortar for masonry - Part 9: Determination of workable life and correction time of fresh mortar

Prüfverfahren für Mörtel für Mauerwerk - Teil 9: Bestimmung der Verarbeitbarkeitszeit und der Korrigierbarkeitszeit von Frischmörtel

Méthodes d'essai des mortiers pour maçonnerie - Partie 9: Détermination de la période d'ouvrabilité et du temps ouvert du mortier frais

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ICS:

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Mortar

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1015-9

August 1999

ICS 91.100.10

English version

Methods of test for mortar for masonry - Part 9: Determination of workable life and correction time of fresh mortar

Méthodes d'essai des mortiers pour maçonnerie - Partie 9:
Détermination de la période d'ouvrabilité et du temps ouvert
du mortier frais

Prüfverfahren für Mörtel für Mauerwerk - Teil 9:
Bestimmung der Verarbeitbarkeitszeit und der
Korrigierbarkeitszeit von Frischmörtel

This European Standard was approved by CEN on 8 July 1999.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 125 "Masonry", the secretariat of which is held by BSI.

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 February 2000, and conflicting national standards shall be withdrawn at the latest by December 2001.

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

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1 Scope

This European Standard specifies methods for determining the workable life and correction time of freshly mixed mortars (in the following referred to as fresh mortars).

Method A is a method for the determination of the workable life of general purpose masonry or rendering mortars, including those containing mineral binders and both dense and lightweight aggregates.

Methods B and C are methods for the determination of the workable life and correction time for thin layer mortars.

2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 771	Specification for masonry units
prEN 998-1	Specification for mortar for masonry - Part 1 : Rendering and plastering mortar with inorganic binding agents
prEN 998-2	Specification for mortar for masonry - Part 2 : Masonry mortar
EN 1015-2	Methods of test for mortar for masonry - Part 2 : Bulk sampling of mortars and preparation of test mortars
EN 1015-3:1998	Methods of test for mortar for masonry - Part 3 : Determination of consistence of fresh mortar (by flow table)

3 Principle

The workable life of a sample of fresh mortar, initially brought to a defined flow value, is measured by the time in minutes at which it reaches a defined limit of stiffness or workability during a defined type test.

4 Apparatus

4.1 Apparatus for Method A - Workable life of general purpose mortar

4.1.1. A weighing instrument, preferably with a tare device, reading to at least 15 kg with graduations of not greater than 100 g;

4.1.2. Disposable, rigid and open topped moulds or containers with an internal diameter of not less than 75 mm and 50 mm to 100 mm high;

4.1.3. A stop clock;

4.1.4. A penetration rod, consisting of a round brass rod, approximately 5 mm in diameter and with a total length of approximately 65 mm, its lower end enlarged to a diameter of $6,175 \text{ mm} \pm 0,025 \text{ mm}$ over a length of $25 \text{ mm} \pm 0,25 \text{ mm}$ and with the penetrating face flat at right angles to the length of the rod;

4.1.5. A loosely fitting brass washer, approximately 20 mm in external diameter, rests on the stop formed at the change in diameter of the rod. The rod is held vertically in a device such as a lever type drill stand that enables it to be lowered vertically in a controlled and steady manner over a distance of at least 40 mm.
(See figure 1);

4.1.6. A palette knife.

4.1.7. A trowel.

4.2 Apparatus for Method B - Workable life of thin-layer mortar

4.2.1. A flow table in accordance with EN 1015-3;

4.2.2. A trowel;

4.2.3. A palette knife.

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4.3 Apparatus for Method C - Correction time of thin-layer mortar

4.3.1. Masonry units of the material to be used in practice as substrate for the actual thin-layer mortar;

4.3.2. A weighing instrument, accurate to 0,1 % of the mass of the weighed masonry unit;

4.3.3. A ventilated oven, capable of maintaining temperatures of $105 \text{ °C} \pm 5 \text{ °C}$, $70 \text{ °C} \pm 5 \text{ °C}$ and $60 \text{ °C} \pm 5 \text{ °C}$ respectively;

4.3.4. trowel;

4.3.5. A palette knife;

4.3.6. A storage chamber capable of maintaining a temperature of $20 \text{ °C} \pm 2 \text{ °C}$ and a relative humidity of $65\% \pm 5\%$

5 Sampling, preparation and storage of test samples

The fresh mortar for this test shall have a minimum volume of 1,5 l or at least 1,5 times the quantity needed to perform the test, whichever is the greater, and shall be obtained either by reduction of the bulk test sample (see EN 1015-2) using a sample divider or by quartering or by preparation from dry constituents and water in the laboratory. The flow value of the mortar in the bulk test sample shall be determined in accordance with EN 1015-3 and reported.

Laboratory mixed samples shall, before testing, be brought to a defined flow value as specified in EN 1015-2.

Ready to use mortars (factory-made wet mortars which are retarded), and pre-batched air-lime/sand wet mortars when not gauged with hydraulic binders, shall be tested within their specified workable life.

The length of mixing period shall be measured from the moment all constituents are introduced into the mixer.

Before testing, the batch shall be gently stirred by hand using a trowel or palette knife in 5 s to 10 s to counteract any false setting etc., but without any additional mixing of the batch.

Any deviation from the mixing procedure shall be noted.

Two test samples shall be tested.

6 Method A - Workable life of general purpose mortar

6.1 General

The workable life of the fresh mortar is measured by the time in minutes at which it reaches a defined limit of resistance to penetration of a standard rod forced into it.

6.2 Procedure

Fill sufficient moulds with test mortar and any control mix to provide adequate area of surface for the required number of penetrations of the rod. Fill each mould in about 10 increments, minimizing excess mortar to be struck off, and tapping the mould on the bench four times after each increment. Strike off the surface plane and level with the top of the mould using a palette knife.

Store the filled moulds in air at a temperature of $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and a relative humidity of not less than 95 %, e.g. in a sealed polyethylene bag.

Place a mould on the scale under the penetration rod so that the portion of the sample surface immediately beneath the rod is at least 20 mm from the rim of the mould or from the position of any previous penetrations. Adjust the tare device or record the mass of the filled mould. By means of the lever on the drill stand, lower the penetration rod slowly into the sample until the loose washer just touches the surface (see figure 1).

Note the reading of the scale in kilograms. Correct this reading, if necessary, for the mass of the filled mould, and then divide it by 3 to express the resistance to penetration in N/mm^2 .

For a non-retarded mortar measure the resistance to penetration at intervals of 15 min, starting at 30 min before the declared workable life, until it exceeds the prescribed limit of resistance (see 6.3).

For retarded mortars, check the penetration intermittently, at convenient times, until the resistance starts to increase then proceed as described above.

6.3 Calculation and expression of results.

Measure the workable life from the completion of either the addition of water to the dry constituents, or the addition of cement or gypsum to a wet mix of lime and/or sand as follows.

Determine the time in minutes, rounded to the nearest minute, to give the resistance to penetration of $0,5\text{ N}/\text{mm}^2$ by interpolation of the results immediately below and above this figure.

Calculate the mean value from the individual values of each mortar test sample, all values rounded to the nearest minute. The mean value is the workable life of the mortar.

7 Method B - Workable life of thin-layer mortar

7.1 General

The workable life is measured by the time in minutes at which the flow value of the mortar differs by 30 mm from the initial flow value determined 10 min after mixing the batch.

7.2 Procedure

Determine the flow value, in accordance with clause 6 of EN 1015-3:1998 at intervals of 15 min.

During the test period keep the mortar in a bucket, covered with a moist cloth, and stored in air at a temperature of $20\text{ °C} \pm 2\text{ °C}$. Before each test the mortar mix may be given an additional mixing by hand.

7.3 Calculation and expression of results

Determine the time in minutes, rounded to the nearest minute and measured from the time of completion of the mixing, that the flow value of the mortar differs by 30 mm from the initial flow value determined 10 min after mixing, by interpolation of the results immediately below and above this figure.

Calculate the mean value from the individual values of each mortar test sample, all values rounded to the nearest minute. The mean value is the workable life of the mortar.

8 Method C - Correction time of thin-layer mortar

8.1 Principle

The correction time is measured by the time in minutes at which 50 % of the contact surface of a cube, placed on a layer of mortar applied on the specified masonry unit substrate, and then removed, is covered with adhering mortar.

The method is not applicable where perforated masonry units are being used.

8.2 Procedure

Cut cubes with dimensions 50 mm x 50 mm x 50 mm from the specified masonry units ensuring that the face to be used as the contact face is one from the original bed face.

Before performing the test, dry the prescribed masonry units and cubes in an oven at the temperature shown in table 1.