SLOVENSKI STANDARD
SIST EN 480-2:1998

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Kemijski dodatki za beton, malto in injekcijsko maso - Metode preskuġanja - 2. del: Doloļ anje ļ asa vezanja

Admixtures for concrete, mortar and grout - Test methods - Part 2: Determination of setting time

Zusatzmittel für Beton, Mörtel und Einpreßmörtel - Prüfverfahren - Teil 2: Bestimmung der Erstarrungszeit

Adjuvants pour béton, mortier et coulis - Méthodes d'essai - Partie 2: Détermination du temps de prise

Ta slovenski standard je istoveten z: **EN 480-2:1996**

ICS:

91.100.10	Cement. Mavec. Apno. Malta	Cement. Gypsum. Lime. Mortar
91.100.30	Beton in betonski izdelki	Concrete and concrete products

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English version

Admixtures for concrete, mortar and grout - Test methods - Part 2: Determination of setting time

Adjuvants pour béton, mortier et coulis - Méthodes d'essai - Partie 2: Détermination du temps de prise

Zusatzmittel für Beton, Mörtel und Einpreßmörtel - Prüfverfahren - Teil 2: Bestimmung der Erstarrungszeit

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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.

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CEN

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

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 104 "Concrete (performance, production, placing and compliance criteria)", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by March 1997, and conflicting national standards shall be withdrawn at the latest by March 1997.

This standard is applicable together with the other standards of the series EN 480 for testing admixtures according to the series EN 934.

This Standard series EN 480 consists of the following parts:

Part 1: Reference concrete and reference motar for testing

Part 2: Determination of setting time

Part 4: Determination of bleeding of concrete

Part 5: Determination of capillary absorption

Part 6: Infrared analysis

Part 8: Determination of the conventional dry material content

Part 10: Determination of water soluble chloride content

Part 11: Determination of air void characteristics in hardened concrete

Part 12: Determination of the alkali content of admixtures

According to the CEN/CENELEC Internal Regulations, the national standards organizations of 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 the United Kingdom.

1 Scope

This European Standard describes a method for determining setting time of mortar with and without admixtures. It is an adaptation of the setting time test described in EN 196-3.

This standard describes the reference method; it allows the use of alternative apparatus as indicated in notes provided that they do not effect the results.

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.

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

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

EN 413-2 Masonry cement - Part 2: Test methods

EN 480-1 Admixtures for concrete, mortar and grout - Test methods - Part 1: Reference concrete and reference mortar for testing

prEN 1008 Mixing water for concrete

3 Test principle

The setting time is determined by observing the penetration of a needle into a reference mortar until it reaches a specified value.

The reference mortar with admixture (test mix) shall have the same consistence as the reference mortar without admixture (control mix) that conforms to EN 480-1.

For this purpose the mixing water required shall be determined in advance according to EN 413-2.

4 General requirements for testing

4.1 Laboratory

The laboratory in which specimens are prepared and tested shall be maintained at a temperature of (20 ± 2) °C and a relative humidity not less than 65 %.

After preparation and between tests the specimens shall be stored in a room or cabinet having a relative humidity of not less than 90 % and a temperature of (5 ± 1) °C or (20 ± 2) °C as appropriate to the test requirements.

4.2 Apparatus

a) Balance, accurate to 1 g.

b) Graduated cylinder or burette, accurate to 1 % of the volume measured.

c) Mixer, complying with EN 196-1.

4.3 Materials

Mortar shall be prepared by using the standard sand described in EN 196-1.

Water according to prEN 1008 shall be used as mixing water[1]).

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[1]) Distilled or de-ionized water may be used.

Cement, sand, water, admixture and apparatus used to make the specimens shall be stored at a temperature selected for the test (5 ± 1) °C or (20 ± 2) °C for at least 12 h before the mortar is prepared.

5 Setting time test

5.1 Apparatus

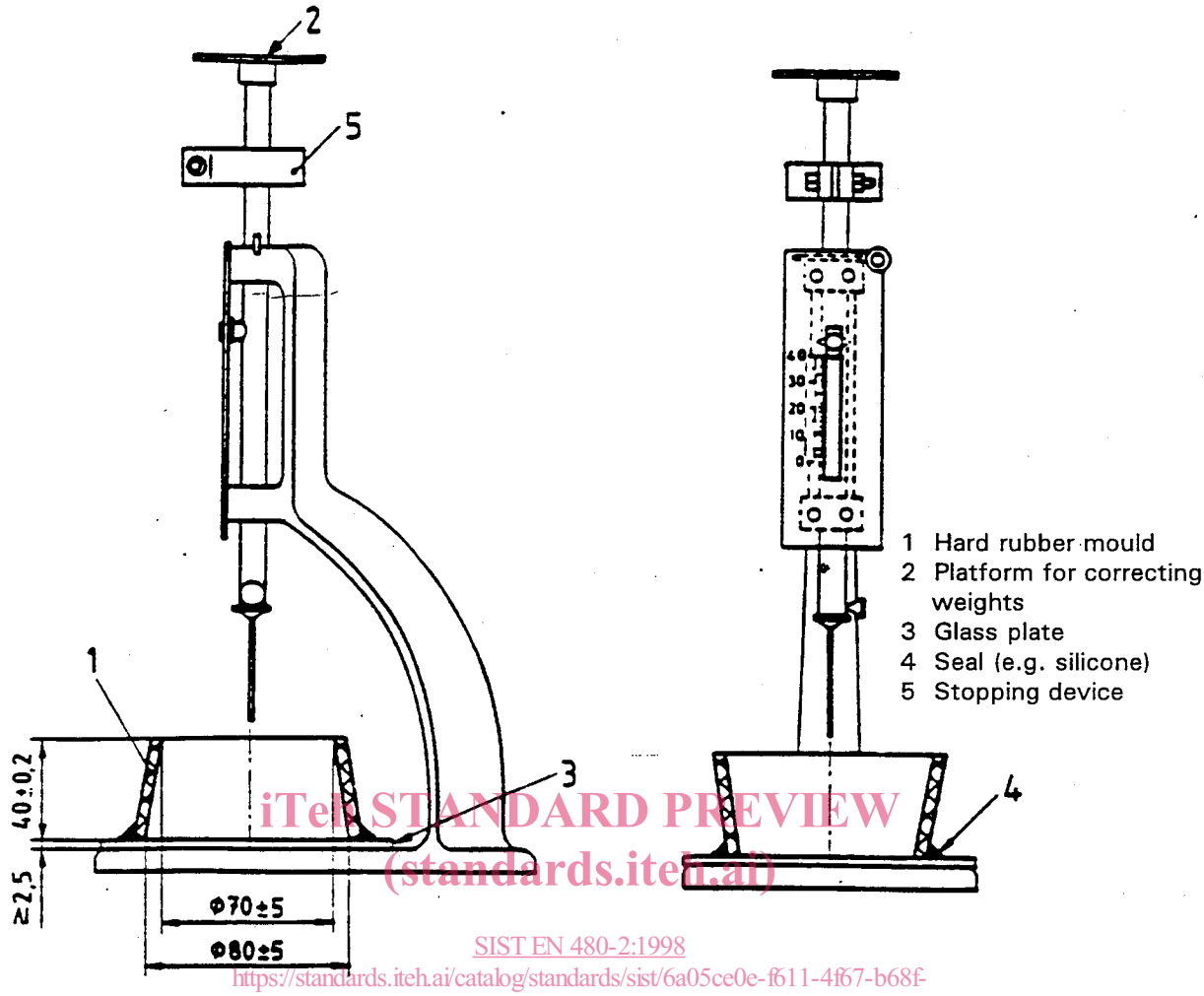
Vicat apparatus as shown in figures 1 (a) and 1 (b) with the needle shown in figure 1 (c). The needle (figure 1(c)) shall be of non-corrodible metal with an effective height of (50 ± 1) mm and a diameter of (1,13 ± 0,05) mm.

To prevent the needle of the Vicat apparatus striking the baseplate of the mould, a stopping device is recommended. A suitable device fixed to the central plunger of the apparatus such that the needle can be stopped at approximately 2 mm from the bottom of the mould is shown in figure 1 (d). This device takes the form of a split clamp which can be fixed in any position to suit the apparatus, and when loosened should not impart any friction to the plunger.

The total mass of the moving parts, including the stopping device, shall be (1000 ± 2) g. Their movement shall be truly vertical and without appreciable friction, and their axes shall coincide with that of the needle.

NOTE 1: Devices for automatic determination of the setting time are commercially available and may be used provided that they can be shown to give the same test results to those obtained with the specified apparatus and procedure.

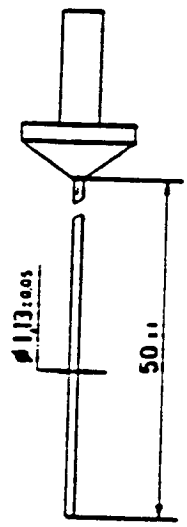
Dimensions in millimetres

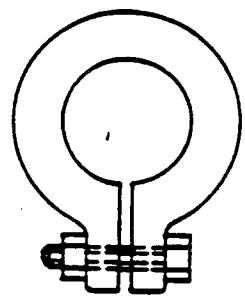


1 Hard rubber mould
2 Platform for correcting weights
3 Glass plate
4 Seal (e.g. silicone)
5 Stopping device

(a) Side view with mould in upright position for initial setting time determination

(b) Front view with mould inverted for final setting time determination





(c) Needle

(d) Example of a stopping device

Figure 1: Vicat apparatus for determining the setting time of mortar

The Vicat mould (see figures 1 (a) and (b)) to contain the mortar under test shall be of hard rubber. It shall be of truncated conical form (40,0 ± 0,2) mm deep and shall have internal diameters at top and bottom of (70 ± 5) mm and (80 ± 5) mm respectively. It shall be adequately rigid and shall be provided with a plane glass or hard rubber baseplate larger than the mould and at least 2,5 mm thick.

NOTE 2 : Moulds may be of metal or plastics and of cylindrical shape provided that they are of the specified depth and that they can be shown to give the same test results as the specified hard rubber mould of truncated conical form.

5.2 Preparation of the mortar

The mortar shall be prepared in accordance with the specifications in EN 480-1.

5.3 Filling the mould

Place the mortar in the mould (previously placed on a flat, lightly greased baseplate) immediately after mixing. Seal the joint between the mould and the baseplate to prevent bleeding. Fill the mould completely without undue segregation or vibration. Remove the excess mortar by a careful back and forth movement with a tool having a straight edge so as to leave the mortar filling the mould with its top surface as flat as possible.

Transfer this specimen immediately to the storage conditions as described in 4.1.

5.4 Test procedure

5.4.1 Determination of initial setting time

First, set the Vicat apparatus by lowering the needle onto the baseplate to adjust the zero reference of the scale.

Keep the filled mould and its baseplate in the room or humidity cabinet specified in 4.1 and after a suitable period of time align them beneath the needle of the Vicat apparatus. Lower the needle carefully until it comes into contact with the mortar. Wait for 1 or 2 s in this position so as to avoid any initial velocity or forced acceleration of the plunger. Then release the plunger rapidly. The needle should penetrate the mortar vertically. Read the scale when penetration is complete or 30 s after the plunger has been released, whichever of these two time limits is the earlier. Record the reading which indicates the distance between the end of the needle and the baseplate together with the time which has elapsed since completion of mixing. Repeat the penetration test on the same specimen at suitably spaced positions more than 10 mm from the edge of the mould or each other and at suitable time intervals, for example at intervals of 10 min.

Keep the specimen in a room or humidity cabinet in accordance with 4.1 between penetration tests.
If using an automatic setting time meter determine the initial setting time by drawing the characteristic line.

The time measured from completion of mixing, until the time at which the distance between the needle and the baseplate is 4,0 mm is the initial setting time for the mortar. For manual and automatic methods select time intervals between penetrations so that the initial setting time can be determined within ca 5 % of the measured value.

Results may be interpolated to determine the exact initial setting time.

NOTE: The presence of sand will cause a greater spread in the penetration depth results than when using cement paste.

5.4.2 Determination of final setting time

Turn over the filled mould used in 5.4.1 onto the baseplate of the Vicat apparatus so that final setting time tests can be carried out on the face of the specimen which was originally in contact with the baseplate.