

BRITISH STANDARD

**BS EN
480-5 : 1997**

Admixtures for concrete, mortar and grout — Test methods

Part 5. Determination of capillary absorption



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The European Standard EN 480-5 : 1996 has the status of a
British Standard

ICS 91.100.10

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BS EN 480-5 : 1997

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/3, Admixtures, upon which the following bodies were represented:

Brick Development Association
 British Aggregate Construction Materials Industries
 British Cement Association
 British Ceramic Research Ltd.
 British Precast Concrete Federation Ltd.
 British Ready Mixed Concrete Association
 Building Employers' Confederation
 Cement Admixtures Association
 Concrete Society
 Department of the Environment
 Department of the Environment (Building Research Establishment)
 Institute of Concrete Technology
 Institution of Civil Engineers
 Institution of Structural Engineers
 Mortar Producers' Association Limited
 Society of Chemical Industry

This British Standard, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on 15 June 1997

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Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard:
 Committee reference B/517/3
 Draft for comment 91/13170 DC

ISBN 0 580 27438 1

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 480-5	3



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National foreword

This Part of BS EN 480 has been prepared by Subcommittee B/517/3 and is the English language version of EN 480-5 : 1996 *Admixtures for concrete, mortar and grout — Test methods Part 5: Determination of capillary absorption*, published by the European Committee for Standardization (CEN).

This standard is part of a package of standards comprising BS EN 480 : Parts 1, 2, 4, 5, 6, 8, 10, 11 and 12, BS EN 934 : Parts 2 and 6. When all the standards in this package have been published BS 5075 : Parts 1, 2 and 3 will be amended by deleting clauses which conflict with standards in the package.

This standard has been prepared to provide a method to test water resisting concrete admixtures for conformity to EN 934-2.

NOTE. Water resisting admixtures may be hydrophobic or pore blocking materials or a combination of both types of material.

The standard permits the test mix to have the same w/c ratio or the same consistence as the control mix. Using test and control mixed with the same w/c ratio will show the hydrophobic and pore blocking capabilities of the admixture. If the test and control mixes have the same consistency the reduction in absorption may be due to the reduction in w/c ratio alone.

Cross-reference

Publication referred to	Corresponding British Standard
EN 196-1 : 1994	BS EN 196 <i>Methods of testing cement</i> Part 1 : 1995 <i>Determination of strength</i>
EN 413-2 : 1994	BS EN 413 <i>Masonry cement</i> Part 2 : 1995 <i>Test methods</i>

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 4, an inside back cover and a back cover.

EUROPEAN STANDARD

EN 480-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 1996

ICS 91.100.10; 91.100.30

Descriptors: Construction materials, concrete, mortars, material, grouting, concrete admixtures, tests, water absorption tests, capillary

English version

Admixtures for concrete, mortar and grout — Test methods — Part 5: Determination of capillary absorption

Adjuvants pour béton, mortier et coulis —
Méthodes d'essai — Partie 5: Détermination de
l'absorption capillaire

Zusatzmittel für Beton, Mörtel und Einpreßmörtel
— Prüfverfahren — Teil 5: Bestimmung der
kapillaren Wasseraufnahme

This European Standard was approved by CEN on 1996-08-04. 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.

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

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Ref. No. EN 480-5 : 1996 E

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 EN 480 series for testing admixtures according to the EN 934 series.

The EN 480 series consists of the following Parts:

- Part 1: *Reference concrete and reference mortar 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*

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Contents

	Page
1 Scope	3
2 Normative references	3
3 Principle	3
4 Apparatus	3
5 Reference mortar	3
6 Test Specimens	3
7 Procedure	3
8 Results	4

1 Scope

This European Standard describes a test method for the determination of the effect of admixtures on the capillary absorption of mortar.

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 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*

3 Principle

The test consists of measuring the mass of water absorbed by a mortar test sample under specified conditions.

4 Apparatus

- Balance*, with an accuracy of 0,1 g;
- Receptacle*, 200 mm high, large enough to contain 12 prismatic specimens, with a flat base and a cover;
- A means*, of allowing a constant level of water to be maintained in the receptacle;
- Equipment*, for the preparation of (40 × 40 × 160) mm prisms made of mortar that conforms to EN 196-1;
- An enclosure*, controlled at (20 ± 2) °C and (65 ± 5) % relative humidity.

5 Reference mortar

The reference mortar shall be as specified in EN 480-1. The test mix shall either have the same consistency as the control mix as described in EN 480-1 or the test mix shall have the same water/cement ratio as the control mix ¹⁾. The water content of the admixture shall be taken into account when calculating the required water content of the test mix.

¹⁾ The use of constant consistency or constant water/cement ratio is specified in the requirement or agreed between the purchaser and supplier.

6 Test Specimens

6.1 Preparation of test specimens

Materials for the control mix and test mix, and moulds for the test specimens, shall be conditioned for at least 24 h before use. Conditioning shall be by placing in an enclosure maintained at (20 ± 2) °C and (65 ± 5) % relative humidity.

Mixing of the mortar shall be as described in EN 480-1. Mortar specimens (40 × 40 × 160) mm shall be prepared as described in EN 196-1 except that the moulds shall not be oiled.

In case of equal w/c ratio the water content of the admixture shall be taken into account when calculating the required water content of the mortar.

In case the test mix shall have the same consistence as the control mix this shall be measured by using the workability meter in accordance with EN 413-2.

6.2 Number of specimens

Twelve specimens shall be tested as follows:

- six specimens for control mix;
- six specimens for test mix.

6.3 Curing of specimens

On both the control mix and the test mix, two series of measurements of capillary absorption shall be carried out. The first series shall be performed on three specimens of test mix and three specimens of control mix after 7 days curing. The second series shall be carried out on the other specimens after 90 days curing. The specimens shall be demoulded after 24 h and further cured in the enclosure (see 4e) until 7 days and 90 days old respectively.

7 Procedure

7.1 Placing of specimens

The specimens shall be weighed (M_0) in the enclosure (see 4e) when 7 days or 90 days old as appropriate and placed vertically in a receptacle (see 4b) containing water at a constant level.

The samples shall rest on rods or pins to allow free access of water to the base. The water level shall be maintained at (3 ± 1) mm above the base of the specimen.

Avoid contact between the specimens.

Immediately after placing the specimens in position, put the cover on the receptacle.



7.2 Weighing

At the time specified in 7.3, each specimen shall be removed from the receptacle, wiped lightly with dry paper or cloth in order to remove any surplus water, weighed (M_j) and then again put vertically in the receptacle. The other specimens in each series shall be treated individually in the same way.

7.3 Test schedule

- a) Specimens cured for 7 days under the conditions specified in 6.3 shall then be tested after 1 day and after 7 days in contact with water as described in 7.2.
- b) Specimens cured for 90 days under the conditions specified in 6.3 shall then be tested after 1 day, 7 days and 28 days in contact with water as described in 7.2.

8 Results

The results obtained by testing three specimens at each date, for each type of mortar (control mix and test mix) are expressed as the mean of the three measured values.

Capillary absorption (C_A) after the required time is given in g/mm^2 by

$$C_A = \frac{M_j - M_0}{1600} \quad (1)$$

where

M_0 is the mass of the specimen after curing for 7 days or 90 days, in grams;

M_j is the mass of the specimen after the required absorption time, in grams.

List of references

See national foreword.



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