

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

KS 2177: 2017

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

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Foreword

This Kenya Standard was revised by the Concrete Technical Committee, under the guidance of the standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

This document is part of the series KS 2769 "Admixtures for concrete, mortar and grout – Test methods" which comprises the following

- 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
- Part 13 Reference masonry mortar for testing mortar admixtures
- Part 14 Admixtures for concrete, mortar and grout - Test methods - Part 14: Measurement of corrosion susceptibility of reinforcing steel in concrete - Potentiostatic electro-chemical test method 1)

This document is applicable together with the other standards of the KS 2770 series.

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

1. Scope

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

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.

KS EAS 148-1, Methods of testing cement - Part 1: Determination of strength.

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

KS 2769-1, 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

- 4.1. Balance with an accuracy of 0.1 g;
- 4.2. Receptacle 200 mm high large enough to contain twelve prismatic specimens with a flat base and a cover;
- 4.3. A means of allowing a constant level of water to be maintained in the receptacle;
- 4.4. Equipment for the preparation of (40 x 40 x 160) mm prisms made of mortar that conforms to KS EAS 148-1;
- 4.5. An enclosure controlled at (20 ± 2) °C and (65 ± 5) % relative humidity.

5. Reference mortar

The reference mortar shall be as specified in KS 2769-1. The test mix shall either have the same consistence as the control mix as described in KS 2769-1 or the test mix shall have the same water/cement ratio as the control mix²). The water content of the admixture shall be taken into account when calculating the required water content of the test mix.

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.

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Mixing of the mortar shall be as described in KS 2769-1. Mortar specimens (40 x 40 x 160) mm shall be prepared as described in EAS 148-1, except that the moulds shall not be oiled.

When testing at 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:

- 6 specimens for control mix;
- 6 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 4.5) until 7 days and 90 days old respectively.

7. Procedure

7.1. Placing specimens

The specimens shall be weighed (M_0) in the enclosure (see 4.5) when 7 days or 90 days old as appropriate and placed vertically in a receptacle (see 4.2) 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_f) 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 weighed 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 weighed 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 means of the three measured values.

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

$$C_A = \frac{M_j - M_o}{1600}$$

Where

M_o 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.

9. Test report

The test report shall include at least the following information:

- Date of test;
- Materials used in the reference mortar;
- Details of the admixture and dosage used in the test mix;
- Whether tested at equal w/c or equal consistence
- Individual and average results for the capillary absorption at each age tested
- Person who is performing the test.