SLOVENSKI STANDARD
SIST EN 1925:2000

01-april-2000

Preskušanje naravnega kamna - Ugotavljanje vpijanja vode zaradi kapilarnega dviga

Natural stone test methods - Determination of water absorption coefficient by capillarity

Prüfverfahren für Naturstein - Bestimmung des Wasseraufnahmekoeffizienten infolge Kapillarwirkung

Méthodes d'essai pour pierres naturelles - Détermination du coefficient d'absorption d'eau par capillarité

Ta slovenski standard je istoveten z: EN 1925:1999

ICS:

73.020	Rudarstvo in kamnolomsko izkopavanje	Mining and quarrying
91.100.15	Mineralni materiali in izdelki	Mineral materials and products

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EUROPEAN STANDARD

NORME EUROPÉENNE

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ICS 73.020; 91.100.15

English version

Natural stone test methods - Determination of water absorption coefficient by capillarity

Méthodes d'essai pour pierres naturelles - Détermination du coefficient d'absorption d'eau par capillarité

Prüfverfahren für Naturstein - Bestimmung des Wasseraufnahmekoeffizienten infolge Kapillarwirkung

This European Standard was approved by CEN on 12 February 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.

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

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12045b72dca8/sist-en-1925-2000

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 246 "Natural stones", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by September 1999, and conflicting national standards shall be withdrawn at the latest by September 1999.

This draft standard is one of the series of draft standards for tests on natural stone.
Test methods for natural stone consist of the following parts:

EN 1926	Natural stone test methods - Determination of compressive strength
EN 1936	Natural stone test methods - Determination of real density and apparent density and of total and open porosity
EN 12370	Natural stone test methods - Determination of resistance to salt crystallisation
prEN 12371	Natural stone test methods - Determination of frost resistance
EN 12372	Natural stone test methods - Determination of flexural strength under concentrated load
prEN 12407	Natural stone test methods - Petrographic description
prEN 13161	Natural stone test methods - Determination of flexural strength under constant moment
prEN 13364	Natural stone test methods - Determination of the breaking load at a dowel hole
prEN ....(WI 00246011)	Natural stone test methods - Determination of thermal dilatation coefficient
prEN ....(WI 00246012)	Natural stone test methods - Determination of sound - speed propagation
prEN ....(WI 00246014)	Natural stone test methods - Determination of abrasion resistance
prEN ....(WI 00246015)	Natural stone test methods - Determination of Knoop hardness
prEN ....(WI 00246016)	Natural stone test methods - Determination of thermal shock resistance
prEN ....(WI 00246017)	Natural stone test methods - Determination of slip coefficient
prEN ....(WI 00246018)	Natural stone test methods - Determination of static elastic modulus
prEN ....(WI 00246019)	Natural stone test methods - Determination of rupture energy
prEN ....(WI 00246030)	Natural stone test methods - Determination of surface finishes (rugosity)
prEN 13373	Natural stone test methods - Determination of geometric characteristics on units
prEN ....(WI 00246032)	Natural stone test methods - Determination of resistance to ageing by salt mist
prEN ....(WI 00246033)	Natural stone test methods - Determination of resistance to ageing by humidity, temperature, SO_2 action
prEN ....(WI 00246035)	Natural stone test methods - Determination of dynamic elastic modulus (by fundamental resonance frequency)
prEN ....(WI 00246036)	Natural stone test methods - Determination of water absorption at atmospheric pressure

It is intended that other ENs should call up this EN 1925 as the basis of evaluation of conformity. (Nevertheless it is not intended that all natural stones products should be subjected regularly to all the listed tests. Specifications in other standards should call up only relevant test methods).

This European standard has an annex A (informative) and an annex B (informative).

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 a method for determining the water absorption coefficient of natural stone by capillarity.

NOTE: This method is not suitable for stones with an open porosity less than 1% when determined in accordance with EN 1936.

2 Normative references

The present 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 below. For dated references, subsequent amendments 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 last edition of the publication referred to applies.

prEN 12670   Natural stones - Terminology
EN 1936   Natural stone test methods - Determination of real density and apparent density and of total and open porosity
prEN 12440   Denomination of natural stone

3 Principle

After drying to a constant mass, the specimen is immersed in (3 ± 1) mm of water on one of its sides (never the worked side) and the increase in mass is measured as a function of time.

4 Symbols

m_d mass of the dry specimen, in grams;

m_i successive masses of the specimen during testing, in grams;

A area of the side immersed in water, in square metres;

t_i times elapsed from the beginning of the test until the times at which the successive masses m_i were measured, in seconds;

C_1 water absorption coefficient by capillarity perpendicular to the planes of anisotropy of the stone, in grams per square metre per square root of seconds;

C_2 water absorption coefficient by capillarity parallel to the planes of anisotropy of the stone, in grams per square metre per square root of seconds

5 Apparatus

5.1   A covered tank with flat base comprising small non-oxidising and non-absorbent supports for the specimens.

5.2   A device able to maintain a constant water level in the tank, described in 5.1.

5.3   A time counter with an accuracy of 1 s.

5.4   A ventilated oven which can maintain a temperature of (70 ± 5) °C.

5.5   A weighing instrument with an accuracy of 0,01g.

5.6   A linear measuring device with an accuracy of 0,05 mm.

5.7   Air conditioned room with (20 ± 5) °C.

6 Preparation of the specimens

6.1 Sampling

The sampling is not responsibility of the test laboratory except where especially requested.
At least six specimens shall be selected from an homogenous batch and tested for each direction of rise of water in relation to the position of any anisotropy planes (e.g. bedding planes, foliation, etc.) which shall be marked on all specimens by at least two parallel lines.

The specimens shall be rough cut or may have one or two polished or honed faces. These faces are to be placed vertically (the worked face shall never be the immersed face).

6.2 Dimensions of the test specimens

The test specimens shall be cubes with (70 ± 5) mm or (50 ± 5) mm edge or right circular cylinders whose diameter and height are equal to (70 ± 5) mm or (50 ± 5) mm

6.3 Drying the specimens

The test specimens are to be dried to constant mass in a ventilated oven at a temperature of (70 ± 5) °C. Constant mass is reached when the difference between two successive weighings at an interval of (24 ± 2) h is not greater than 0,1% of the mass of the specimen.
The specimens shall be kept in a desiccator until room temperature (20 ± 5) °C is attained.

7 Test procedure

Weigh the specimens after drying (m_d) to an accuracy of 0,01 g and calculate the area of the base to be immersed by measurement of two medians to the nearest 0,1 mm. Express this area in square metres. Place the specimens in the tank on the thin supports provided such that they only rest partially on their base. Ensure that the position of the planes of anisotropy in relation to the rising water matches the requirements. Immerse the base in the water to a depth of (3 ± 1) mm. Start the timer device. Maintain the water level constant throughout the test by adding water as necessary, and close the container to avoid evaporation of the damp specimens. At time intervals, initially very short then longer, remove each specimen in succession, lightly dry the immersed part using a damp cloth to

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remove all water droplets and weigh immediately to the nearest 0,01 g, then replace in the container.
Note the time elapsed since the start of the test until the time of each weighing.

> NOTE: The choice of times depends on the type of stone. For a highly absorbent stone, suitable times t_i are: 1, 3, 5, 10, 15, 30, 60, 480 and 1440 min. For a low absorption stone, suitable times are: 30, 60, 180, 480, 1440, 2880 and 4320 min. These times will be measured with an accuracy of 5%. A minimum of 7 measurements is necessary. The end of the test is reached when the differences between two successive weighings is not greater than 1% of the mass of water absorbed by the specimen.

8 Expression of results

Show as a graph the mass of water absorbed in grams divided by the area of the immersed base of the specimen in square metres as a function of the square root of time expressed in seconds.

> NOTE 1: In general, graphs are obtained as shown in figure 1. These can be approximated by two straight lines.
> If the correlation coefficient between the measured points of the first part of the graph and the regression straight line of this first part is respectively greater than 0,90 (when at least five measurements were taken in the first part of the graph) or than 0,95 (when only four measurements were taken), the coefficient of water absorption by capillarity C_1 or C_2 (in grams per square metre per square root of time in seconds) is represented by the slope of the C_1 respectively C_2 regression line. It can be calculated as the ratio between the ordinate and abscissa of any point of this line using the following formula:

$$C_1 \; or \; C_2 = \frac{m_i - m_d}{A \cdot \sqrt{t_i}}$$

The obtained values of C_1 or C_2 are expressed to three significant figures.

> NOTE 2: This approximate formula cannot be used if the correlation coefficient between the measured points of the first part of the graph and the regression straight line of this part is not satisfactory (see above).
> Annex A (informative) gives an equation more appropriate for this kind of test results.
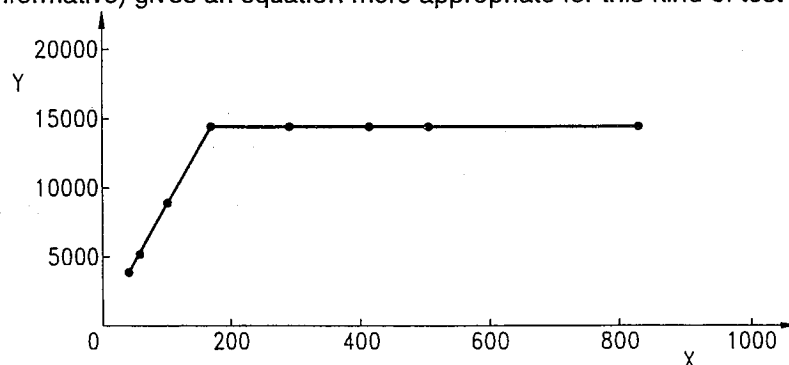
Legend:
Y is the water absorption in g/m²
X is the square root of time in $s^{0,5}$

**Figure 1 - Water absorption by capillarity perpendicular to the planes of anisotropy as a function of the square root of time for a specimen with a low water absorption coefficient
($C_1 = 86,0$ g/m²·s⁰·⁵)**

9 Test report

The test report shall contain the following information:

a) unique identification number of the report;

b) the number, title and date of issue of this European standard;

c) the name and address of the test laboratory and the address where the test was carried out if different from the test laboratory;

d) the name and address of the client;

e) it is the responsibility of the client to supply the following information:

- the petrographic name of the stone;
- the commercial name of the stone in accordance with prEN 12440;
- the country and region of extraction;
- the name of the supplier
- the direction of any existing plane of anisotropy (if relevant to the test) to be clearly indicated on the sample or on each specimen by means of two parallel lines;
- the name of the person or organisation which carried out the sampling;
- the surface finish of the specimen (if relevant to the test);

f) the date of delivery of the sample or of the specimens;

g) the date when the specimens were prepared (if relevant) and the date of testing;

h) the number of specimens in the sample;

i) the dimensions of the specimens;

j) for each specimen the water absorption coefficient by capillarity C_1 perpendicular to or C_2 parallel to the planes of anisotropy, expressed to the three significant figures;

k) the arithmetic mean of the water absorption coefficients C_1 and/or C_2 expressed to the three significant figures;

l) all deviations from the standard and their justification;

m) remarks

The test report shall contain the signature(s) and role(s) of the responsible(s) for the testing and the date of issue of the report. It shall also state that the report shall not be partially reproduced without the written consent of the test laboratory.