

Natural stone test methods — Determination of water absorption at atmospheric pressure

ICS 73.020; 91.100.15

National foreword

This British Standard is the UK implementation of EN 13755:2008. It supersedes BS EN 13755:2002 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/545, Natural stone.

A list of organizations represented on this committee can be obtained on request to its secretary.

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de l'absorption d'eau à la pression atmosphérique

Prüfverfahren für Naturstein - Bestimmung der
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Foreword

This document (EN 13755:2008) 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of an identical text or by endorsement, at the latest by October 2008, and conflicting national standards shall be withdrawn at the latest by October 2008.

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This document supersedes EN 13755:2001.

This European Standard is one of the series of European Standards for tests on natural stone.

Test methods for natural stone consist of the following parts:

EN 1925, *Natural stone test methods — Determination of water absorption coefficient by capillarity*

EN 1926, *Natural stone test methods — Determination of uniaxial 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*

EN 12371, *Natural stone test methods — Determination of frost resistance*

EN 12372, *Natural stone test methods — Determination of flexural strength under concentrated load*

EN 12407, *Natural stone test methods — Petrographic examination*

EN 13161, *Natural stone test methods — Determination of flexural strength under constant moment*

EN 13364, *Natural stone test methods — Determination of the breaking load at dowel hole*

EN 13373, *Natural stone test methods — Determination of geometric characteristics on units*

EN 13755, *Natural stone test methods — Determination of water absorption at atmospheric pressure*

EN 13919, *Natural stone test methods — Determination of resistance to ageing by SO₂ action in the presence of humidity*

EN 14066, *Natural stone test methods — Determination of resistance to ageing by thermal shock*

EN 14146, *Natural stone test methods — Determination of the dynamic modulus of elasticity (by measuring the fundamental resonance frequency)*

EN 14147, *Natural stone test methods — Determination of resistance to ageing by salt mist*

EN 14157, *Natural stone test methods — Determination of abrasion resistance*

EN 14158, *Natural stone test methods — Determination of rupture energy*

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EN 14205, *Natural stone test methods — Determination of Knoop hardness*

EN 14231, *Natural stone test methods — Determination of the slip resistance by means of the pendulum tester*

EN 14579, *Natural stone test methods — Determination of sound speed propagation*

EN 14580, *Natural stone test methods — Determination of static elastic modulus*

EN 14581, *Natural stone test methods — Determination of linear thermal expansion coefficient*

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1 Scope

This European Standard specifies a method for determining the water absorption of natural stone – see EN 12670 for terminology and EN 12440 for denomination - by immersion in water at atmospheric pressure.

2 Normative references

Not applicable.

3 Principle

After drying to a constant mass, each specimen is weighed and then immersed in water at atmospheric pressure for a specified period of time. Determination of the water absorption at atmospheric pressure, expressed as a percentage, by the ratio of the mass of the saturated specimen (obtained at constant mass) to the mass of the dry specimen.

4 Symbols

m_d mass of the dry specimen, in grams;

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

m_s mass of the saturated specimen (after immersion in water until constant mass is reached), in grams;

A_b water absorption at atmospheric pressure, expressed as a percentage.

5 Apparatus

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

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

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

6 Preparation of the specimens

6.1 Sampling

The sampling is not under the responsibility of the test laboratory except where especially requested.

At least six specimens shall be selected from a homogenous batch.

6.2 Test specimens

The test specimens shall have the form of a cylinder, cube or prism (70 ± 5) mm or (50 ± 5) mm and shall be obtained by diamond sawing or coring. Their apparent volume calculated by geometrical measurements shall be at least 60 ml. In addition, the surface area to volume ratio shall be between $0,08 \text{ mm}^{-1}$ and $0,20 \text{ mm}^{-1}$.

NOTE The specimens prepared for the determination of compressive or flexural strength can be used if they satisfy the surface/volume ratio.

6.3 Drying the specimens

The test specimens are to be dried to constant mass at a temperature of $(70 \pm 5) ^\circ\text{C}$. 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 first of the two masses.

The specimens shall be kept in a desiccator until room temperature $(20 \pm 5) ^\circ\text{C}$ is attained.

7 Test procedure

Weigh the specimens after drying (m_d) to an accuracy of 0,01 g. Place the specimens in the tank on the supports provided. Each specimen needs to be at least 15 mm from adjacent specimens. Then add tap water at $(20 \pm 10) ^\circ\text{C}$ up to half the height of the specimens (time t_0). At time $t_0 + (60 \pm 5)$ min add tap water until the level of the water reaches three-quarter of the height of the specimens.

At time $t_0 + (120 \pm 5)$ min add tap water until the specimens are completely immersed to a depth of (25 ± 5) mm of water.

At time $t_0 + (48 \pm 2)$ h the specimens are taken out of the water, quickly wiped with a damp cloth and then weighed within 1 min to an accuracy of 0,01 g (m_i).

Immerse the specimens again in water and continue the test. Every (24 ± 2) h the specimens are taken out of the water, quickly wiped with a damp cloth and then weighed within 1 min to an accuracy of 0,01 g.

Note the successive masses of the specimens (m_i).

Continue the test up to constant mass of the specimens. Constant mass is reached when the difference between two successive weighings is not greater than 0,1 % of the first of the two masses.

The result of the last weighing is the mass of the saturated specimen (m_s).

8 Expression of results

The water absorption at atmospheric pressure A_b of each specimen is calculated by the equation:

$$A_b = \frac{m_s - m_d}{m_d} \cdot 100$$

The result shall be expressed as a percentage to the nearest 0,1 %.

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, i.e. EN 13755:2008;
- 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;
 - 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 at atmospheric pressure to the nearest 0,1 %;
- k) the arithmetic mean of the individual values of water absorption at atmospheric pressure expressed to the nearest 0,1 %;
- 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.

Bibliography

- [1] EN 12440, *Natural stone — Denomination criteria*
- [2] EN 12670, *Natural stone — Terminology*

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