

SLOVENSKI STANDARD

oSIST prEN 12370:2019

01-april-2019

Preskušanje naravnega kamna - Ugotavljanje odpornosti proti kristalizaciji soli

Natural stone test methods - Determination of resistance to salt crystallisation

Prüfverfahren für Naturstein - Bestimmung des Widerstandes gegen Kristallisation von Salzen

Méthodes d'essai pour pierres naturelles - Détermination de la résistance à la cristallisation des sels

Ta slovenski standard je istoveten z: prEN 12370

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73.020	Rudarstvo in kamnolomsko izkopavanje	Mining and quarrying
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Will supersede EN 12370:1999

English Version

Natural stone test methods - Determination of resistance to salt crystallisation

Méthodes d'essai pour pierres naturelles -
Détermination de la résistance à la cristallisation des
sels

Prüfverfahren für Naturstein - Bestimmung des
Widerstandes gegen Kristallisation von Salzen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 246.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 12370:2019) has been prepared by Technical Committee CEN/TC 246 “Natural stones”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12370:1999.

The significant changes between this European Standard and the previous edition are listed herewith:

— updating of Clauses 8.

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Introduction

This document describes a test designed to assess the salt crystallization resistance of natural stones where it is considered relevant. The test cannot be used in isolation and results will be considered with other physical tests to indicate durability; these include EN 12371 “Determination of frost resistance”.

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1 Scope

This document specifies a test method to assess the relative resistance of natural stones with an open porosity of greater than 5 %, measured in accordance with EN 1936, to damage caused by the crystallization of salts. The test is not necessary for low porosity stones.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 12440, *Natural stone — Denomination criteria*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Symbols

M_d	is the mass of the dried specimen, in grams
M_{d1}	is the mass of the dried specimen with label before first cycle, in grams
M_f	is the mass of the dried specimen with label, after 15 cycles, in grams
ΔM	is the relative difference of masses before and after testing (mass loss or mass gain), in percent.

5 Principle

After drying to constant mass, the specimen is immersed in a solution of sodium sulphate, dried and allowed to cool to room temperature. This cycle is carried out 15 times and the percentage mass change measured.

6 Apparatus

- 6.1 A ventilated oven capable of maintaining a temperature of $(105 \pm 5) ^\circ\text{C}$
- 6.2 A weighing instrument capable of weighing the specimens to $\pm 0,001 \text{ g}$
- 6.3 A room or water bath capable of maintaining the temperature of the specimens and solution to $(20 \pm 0,5) ^\circ\text{C}$
- 6.4 A 14 % solution of sodium sulphate decahydrate (i.e. 14 g of $\text{Na}_2 \text{SO}_4 \cdot 10\text{H}_2\text{O}$ for every 86 g de-ionized water). The density of this solution at $20 ^\circ\text{C}$ is $1\,055 \text{ kg/m}^3$.

7 Preparation of specimens

7.1 Sampling

The sampling is not the responsibility of the test laboratory except where specially requested. At least six test specimens, which are considered representative of the body of stone being tested, shall be selected.

7.2 Dimensions of test specimens

Cubes of (40 ± 1) mm sides shall be prepared. Specimens shall be wet diamond sawn and any surface irregularities removed by grinding.

7.3 Washing

All loose material shall be washed from the surface of the specimen using potable water.

7.4 Drying

The specimens are to be dried in an oven at a temperature (105 ± 5) °C until a constant mass is reached. This is assumed to have been attained when the difference between two weighings at an interval of (24 ± 2) h is not greater than 0,1 % of the first weighing. They are then allowed to cool to room temperature and weighed to $\pm 0,01$ g (M_d). Each specimen is then labelled with a durable tag that is wired on to the cube. The specimen is then re-weighed to $\pm 0,01$ g (M_{d1}).

8 Procedure

The procedure entails the use of a 14 % solution of sodium sulphate decahydrate. The density of the solution shall be checked prior to use. The solution shall only be used for one test cycle.

Each of the dried specimens is placed in a 250 ml container and covered with the sodium sulphate solution to a depth of (8 ± 2) mm above the top of the specimen and the container covered to reduce evaporation. Alternatively, the specimens may be placed in a single container provided that there is a minimum of 10 mm between specimens and at least 20 mm between the specimens and the sides of the container. The specimens are then left to soak for 2 h at $(20 \pm 0,5)$ °C.

NOTE Changing the soaking temperature can markedly affect the results.

After immersion the specimens are removed from the solution and dried in an oven. The oven shall be arranged to provide a high relative humidity in the early stages of drying and to raise the temperature of the specimens to (105 ± 5) °C in not more than 15 h. The initial high relative humidity may be obtained by placing a tray of water in the cold oven, and switching on the heater for (30 ± 5) min before putting in the specimens. The volume of water in ml placed in the tray should be $(2,5 \pm 0,5)$ ml for each litre of oven volume. For example (300 ± 25) ml has been found to be adequate in an oven with a 125 l which is capable of holding 48 specimens.

The specimens are left in the oven for at least 16 h and then they are cooled at room temperature for $(2,0 \pm 0,5)$ h before re-soaking in fresh sodium sulphate solution. The cycle of operation is carried out 15 times in all, except when the specimens break up before this. After the 15th cycle the specimens are removed from the oven and stored for (24 ± 1) h in water at (23 ± 5) °C, finally, they are washed thoroughly with flowing water. The specimens are weighed after drying to constant mass (as in 7.4) if they are sufficiently coherent. If the test is to be interrupted at any time, the specimens are to be left in the oven at (105 ± 5) °C.

9 Expression of results

The results are expressed as relative mass difference ΔM (mass loss or gain) as a percentage of the initial dry mass M_d or as the number of cycles required to induce failure if the specimen is too shattered to weigh after the final drying.

$$\Delta M = \frac{M_f - M_{d1}}{M_d} \cdot 100 \quad (1)$$

If failure has occurred or the specimen has fractured during testing, then this shall be recorded together with the number of completed cycles of testing.

A photographic record of the initial and final condition shall be made.

10 Test report

The test report shall contain the following information:

- a) unique identification number for 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 of 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 EN 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 organization which carried out the sampling;
 - the surface finish of the specimens (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 test specimen, the percentage mass change;
- k) the arithmetic mean of the results for the test specimens;

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- 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.

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