



SLOVENSKI STANDARD
oSIST prEN 16301:2011
01-september-2011

Preskusne metode za naravne kamne - Ugotavljanje občutljivosti za naključno obarvanje

Natural stone test methods - Determination of sensitivity to accidental staining

Prüfverfahren für Naturstein - Bestimmung der Empfindlichkeit gegen unbeabsichtigte Fleckenbildung

Méthodes d'essai pour les pierres naturelles - Détermination de la sensibilité au tachage accidentel

<https://standards.iteh.ai/catalog/standards/sist/36c5479a-016b-4baa-b89d-614e2a06ac58/sist-en-16301-2011>

Ta slovenski standard je istoveten z: prEN 16301

ICS:

91.100.15 Mineralni materiali in izdelki Mineral materials and products

oSIST prEN 16301:2011

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 16301

June 2011

ICS 73.020; 91.100.15

English Version

Natural stone test methods - Determination of sensitivity to accidental staining

Méthodes d'essai pour les pierres naturelles -
Détermination de la sensibilité au tachage accidentel

Prüfverfahren für Naturstein - Bestimmung der
Empfindlichkeit gegen unbeabsichtigte Fleckenbildung

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
Foreword.....	3
1 Scope	3
2 Normative references	3
3 Principle	3
4 Definitions	3
5 Apparatus	4
6 Preparation of specimens	5
6.1 Sampling	5
6.2 Test specimens	5
6.2.1 Surface finish	5
6.2.2 Dimensions	6
6.2.3 Testing environment	6
6.2.4 Pre-conditioning and treatment of the samples	6
7 Procedure	6
7.1 Documentation of the test specimens	6
7.2 Staining agents to be used in the standard test	6
7.3 Staining procedure	7
7.4 Washing procedure	7
8 Evaluation of staining and expression of the result	8
9 Precision	8
10 Test report	8
Annex A (informative) Specification of staining agents	10
Annex B (informative) Colour pictures to facilitate the evaluation of staining	11
Bibliography	16

Foreword

This document (prEN 16301:2011) 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.

1 Scope

The European Standard specifies a method to assess the sensitivity of natural stones when exposed to accidental staining. It defines a procedure for the application of the stains, the cleaning and the assessment of the surface appearance after cleaning. It also covers the possibility to assess the efficiency of a surface treatment. Note that the method does not intend to present any de-staining technique.

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.

ISO 1065, *Non-ionic surface-active agents obtained from ethylene oxide and mixed non-ionic surface-active agents -- Determination of cloud point*

ISO 11664-2, *Colorimetry -- Part 2: CIE standard illuminants*

ISO 11998, *Paints and varnishes – Determination of wet-scrub resistance and cleanability of coatings*

3 Principle

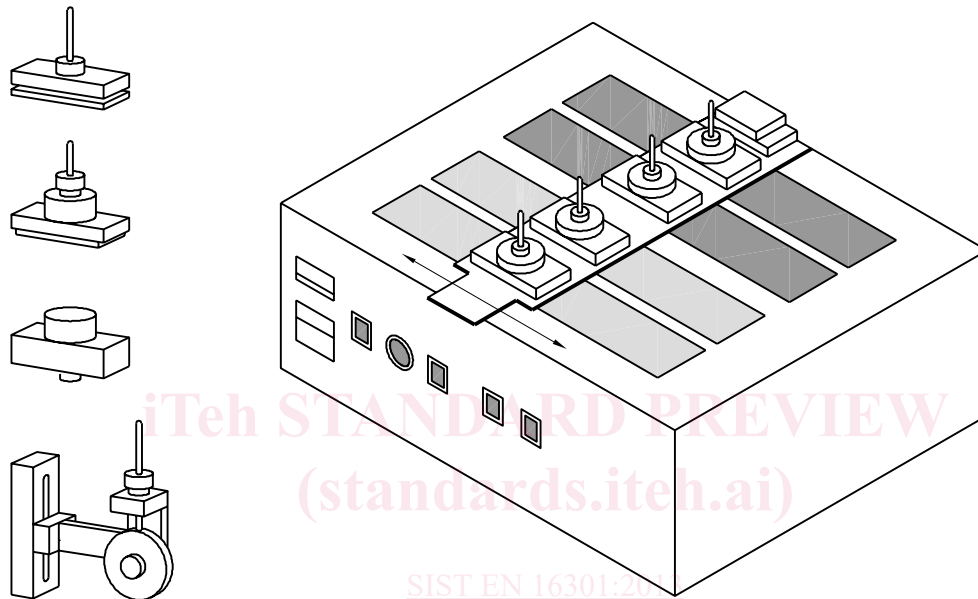
A defined set of staining agents is applied on a defined stone surface. The mode of application is specified. The specimens are conditioned and washed with a standardised washing machine. The stones are dried and the possible remainders of the stains are assessed by a visual observation.

4 Definitions

Surface finishing:	the final surface texture applied to a stone during processing.
Matt finished surface:	surface treatment to produce a very flat, uniform, but no polished finish (e.g. by means of a silicon carbide bonded polishing disk with grain size F 400 mesh).
Surface treatment:	The term implies that a chemical has been used for the protection of the surface by coating.
Impregnation:	Protection of the surface of a stone by a pore-sealing product or a chemical coating.
Staining agent:	Liquid used to produce stains on the surface of the stone.

5 Apparatus

- 5.1 Drying oven**, capable of being operate between $(40 \text{ to } 70) \pm 5^\circ\text{C}$
- 5.2 Pipette**, 0,10 – 1,00 ml
- 5.3 Wet Abrasion Scrub Tester**, according to ISO 11998. The machine (figure 1) works with a sinus-shaped movement with a frequency of 35 cycles per minute, and amplitude of approximately 350 mm. The total weight of the scrubbing arm with dry cloth and its holder shall be $350 \pm 35 \text{ g}$.
- 5.4 Weights** to achieve the specified load on the scrubbing arm.



Abrasion
Scrubbing
Washability

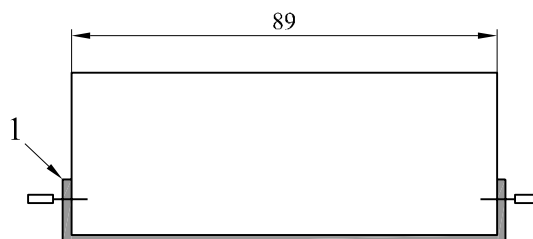
Figure 1 — Washability apparatus for scrub test

5.5 Cleaning cloth

- Dimensions of the cloth $120 \times 38 \text{ mm}$ (may be different depending on the washing equipment)
- Thickness: $2 \pm 0.5 \text{ mm}$
- Area weight: $300 \pm 50 \text{ g/m}^2$
- A thinner cloth may be used in layers to achieve the above stated properties.
- At least 50 % viscose (regenerated cellulose fibres)
- At least 20% cotton

- 5.6 Holder** for the cleaning cloth, e.g. wooden block (figure 2). The scrubbing arm of the machine is equipped with e.g. a wooden block measuring $89 \times 38 \times 32 \text{ mm}$. The block holds a piece of cleaning

cloth measuring 120 × 38 mm. 89 × 39 mm is the standard dimension of the scrubbing area of the brush in the standards mentioned above.



Key

- 1 cloth

Figure 2 — Cleaning cloth on wooden block

- 5.7 Camera**, digital (a minimum of 2,5MPixels, uncompressed), for documentation of unstained and stained test specimens.
- 5.8 Daylight illuminants**: D65 (6500K) according to ISO 11664-2.
- 5.9 Stand** for repeatable photography conditions.
- 5.10 Cleaning solution**: pH-neutral, without abrasive, multipurpose cleaner, surfactant-based anionic type or a product basing the following composition:
- 12.5% (m/m) of a sodium primary (C10-C14) polymer alkyl aryl sulphonate;
 - 12.5% (m/m) polyethylated derivatives of primary or secondary (C8-C16)) alcohols with 5 to 15 ethoxylated groups having a cloud point of 25°C to 75°C in 1% (m/m) aqueous solution (determination of cloud point is described in ISO 1065);
 - 5.0% (m/m) ethanol;
 - 70% (m/m) deionized or distilled water

The cleaning agent shall be stored in a glas bottle in a cool dark place and should be used within 1 year of the day of preparation.

- 5.11 Hand spray pump**, for applying the cleaning solution.
- 5.12 Staining agents**: the set of staining agents to be used for the test is defined in Annex 1.

6 Preparation of specimens

6.1 Sampling

The method of sampling shall be stated in the test report and shall be chosen so that the samples are representative of the batch to be tested.

6.2 Test specimens

6.2.1 Surface finish

For identification test and comparison, the specimens shall have a “matt finished surface”.

prEN 16301:2011 (E)

NOTE Schist and slate are exceptions to this rule. They can be tested on natural cleft surface.

For “technological testing”, object related testing, the actual surface finish to be used in the intended application shall be tested.

6.2.2 Dimensions

One sample set consists of three test specimens sized, minimum 300 mm by 100 mm, and thickness as in use (maximum 30 mm). Alternative dimensions can be used if different washing equipment is used.

6.2.3 Testing environment

The test specimens shall be placed in 23 ± 5 °C and 50 ± 5 % relative humidity during the entire stain exposure.

Daylight or artificial light D65 is used during the photography and the evaluation.

6.2.4 Pre-conditioning and treatment of the samples

Marble and limestone shall be dried in 40 ± 5 °C for one week before the test. Other stone types shall be dried in 70 ± 5 °C for at least 24 hours.

NOTE Commercially used stone products are sometimes impregnated in some way to make them easier to clean. The traditional treatment of carbonaceous stones is soft soap, which partially seals the pores and makes the surface a bit more hydrophobic. For standard test the stones shall be non-treated as a reference. If a carbonaceous stone type is tested, one set should also be treated with soft soap 2.5 vol. % solution in water, or similar which is recommended by the Stone Industry federations. The soap treatment is not mandatory, but highly recommended.

Instruction for the treatment with soft soap:

- The solution is sprayed on with a hand-pumped spray;
- After 3 hours: The next layer is applied;
- After another 21 hours: The excess shall be rinsed off under running water.

The test specimens are kept in 23 ± 5 °C and 50 ± 5 % relative humidity for a minimum 16 hours before applying the staining agents.

If a surface treatment/coating chemical or impregnation chemical shall be tested, the procedure of applying this shall be documented and follow the manufacturer’s instruction.

7 Procedure**7.1 Documentation of the test specimens**

Document the test specimens by digital photography before the stains are applied. Use daylight or artificial light D65.

7.2 Staining agents to be used in the standard test

The set of staining agents to be used for the test is defined in Annex 1.

NOTE For specific uses, it may be required to use also blood, urine and blueberry soup (Annex 1).

Other products can be used and prepared according to instructions by the manufacturer or commissioner.

7.3 Staining procedure

All samples have to be stained in the same way.

The stains shall have the same size and shape.

All staining shall be performed at 23 ± 5 °C and 50 ± 5 % relative humidity. The samples shall remain in this atmosphere during the whole exposure time, usually 15 minutes and 48 hours as a default value.

NOTE Other time schedules may be used provided that the commissioner asks for it.

The diameter of the stains shall be $35 \text{ mm} \pm 5 \text{ mm}$.

NOTE Most water based stains, like Cola, wine and coffee has the same surface properties and a suitable stain volume is 0.70 ml. This volume is also sufficient for ketchup which shall be spread out to the same size. A stain like oil has completely different surface properties and immediately floats out on most stone materials. To get a stain in the same size as for the water based products a volume of 0.15 ml is suitable.

Surface treated samples may need the staining agent to be spread out to reach the optimal $35 \text{ mm } \varnothing$.

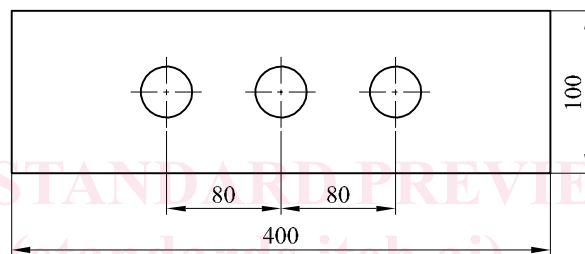


Figure 3 — Optimal sample size and stain pattern

Document the test specimens by photography after the 24 hours conditioning.

7.4 Washing procedure

- Gently remove possible liquid residues of the stains with absorb and dry paper.
- Apply the correct load to the washing arm, 350 ± 10 g (arm, cloth and cloth holder).
- Spray cleaning solution on the stains 4 minutes before the cleaning.
- Soak the cleaning cloth in cleaning solution.
- Mount the cleaning cloth and the holder to the scrubbing arm.
- The stained surfaces are then washed with a “Wet Abrasion Scrub Tester”.
- Ten cleaning cycles (10 strokes back and forth) shall be used in all tests.
- Rinse the surfaces with 150 ml water to remove residues of the cleaning solution.
- Condition the test specimens for 16 hours in 23 ± 5 °C and 50 ± 5 % relative humidity before they are photographed and evaluated.

8 Evaluation of staining and expression of the result

A visual observation of the residual staining shall be made according to the following classification:

- 1) unchanged
- 2) light change
- 3) moderate change
- 4) severe change

The visual assessment is to be performed in daylight or artificial light D65.

Etching effect (gloss change) from acidic staining agents shall be assessed separately. The same classification is used and the result is reported separately. The evaluation can be done in a reflecting light.

Note that an etching effect is, in cases, also observed as a colour change. The use of a gloss meter is not recommended.

See Annex 2, with photos exemplifying the difference between the grades.

The evaluation is performed by three persons individually. The three stains on each test specimen are evaluated as a group. Each stain type is evaluated separately. Present the mean value as an integral number (1, 1, 2 = 1). If the result of two evaluators differs more than one grade, the evaluators have to come to consensus by discussion.

9 Precision

No inter-comparison trial has been performed between different laboratories. The repeatability is based on the fact that three different persons evaluate the changes by using 3 categories. The acceptable difference between the persons is maximum 1 category. If there is more than 1 scale deviation between any of the evaluators they shall discuss until consensus is reached.

10 Test report

The test report shall include the following information (when relevant):

- a) Name and address of the testing laboratory;
- b) Identification number of the test report;
- c) Name and address of the organisation or the person who ordered the test;
- d) Purpose of the test;
- e) Method of sampling and other circumstances (date and person responsible for sampling);
- f) Name and address of the manufacturer or the supplier of the tested object(s);
- g) Name and other identification marks of the test specimens;
- h) Description of the test specimens;
- i) Date of supply of the test specimens;