

SLOVENSKI STANDARD

SIST EN 12372:2000

01-april-2000

Preskušanje naravnega kamna - Ugotavljanje upogibne trdnosti s koncentrirano obremenitvijo na sredini razpona

Natural stone test methods - Determination of flexural strength under concentrated load

Prüfverfahren für Naturstein - Bestimmung der Biegefestigkeit unter Mittellinienlast

Méthodes d'essai pour pierres naturelles - Détermination de la résistance a la flexion sous charge centrée

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 12372:1999

SIST EN 12372:2000
<https://standards.iteh.ai/catalog/standards/sist/6c627152-618f-4f1b-acf6-c93068da99e5/sist-en-12372-2000>

ICS:

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

SIST EN 12372:2000

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12372:2000

<https://standards.iteh.ai/catalog/standards/sist/6c627f52-618f-4f1b-acf6-c93068da99e5/sist-en-12372-2000>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12372

March 1999

ICS 73.020; 91.100.15

English version

Natural stone test methods - Determination of flexural strength
under concentrated load

Méthodes d'essai pour pierres naturelles - Détermination
de la résistance à la flexion sous charge centrée

Prüfverfahren für Naturstein - Bestimmung der
Biegefestigkeit unter Mittellinienlast

This European Standard was approved by CEN on 12 January 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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

SIST EN 12372:2000

<https://standards.iteh.ai/catalog/standards/sist/6c627f52-618f-4fb-acf6-c93068da99e5/sist-en-12372-2000>



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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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 1925	Natural stone test methods - Determination of water absorption coefficient by capillarity
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
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 prENs should call up this EN 12372 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 (normative).

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12372:2000

<https://standards.iteh.ai/catalog/standards/sist/6c627f52-618f-4f1b-acf6-c93068da99e5/sist-en-12372-2000>

1 Scope

This European standard specifies a test method for determination of flexural strength under a concentrated load for natural stone. Both an identification and a technological product testing procedure are included.

2 Normative references

This 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 hereafter. For dated references, subsequent amendments to or revision of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

prEN 12390	Testing concrete - Determination of compressive strength - Specification for compression testing machines
prEN 12670	Natural stones - Terminology
prEN 12359:1996	Testing concrete - Determination of flexural strength of test specimens
prEN 12440	Denomination of natural stone

3 Principle

The principle of this method is to place a specimen on two rollers and to progressively load the specimen in the middle. The breaking load is measured and the flexural strength calculated.

4 Symbols

R_{ft}	flexural strength, in Megapascals
F	breaking load, in newtons
l	distance between the supporting rollers, in millimetres
b	width of the specimen adjacent to the plane of fracture, in millimetres
h	thickness of the specimen adjacent to the plane of fracture, in millimetres
L	total length of the specimen, in millimetres

5 Apparatus

5.1 A balance capable of weighing the specimen with a precision of 0,01% of the mass of the specimen.

5.2 A ventilated oven capable of maintaining a temperature of $(70 \pm 5)^\circ\text{C}$.

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

5.4 A testing machine of appropriate force, in accordance with prEN 12390 and calibrated according to this standard.

5.5 A device for applying loads on the specimen by a centre-point load, in accordance with annex A of prEN 12359:1996. It consists of two lower rollers (supporting rollers) and one upper roller (load-applying roller) which shall be centered exactly in the middle between the two

supporting rollers (see figure 1). The distance between the two supporting rollers shall be reported as requested in 6.2.2.

5.6 A room which can be maintained at a temperature of $(20 \pm 5)^\circ\text{C}$.

6 Preparation of the specimens

6.1 Sampling

The sampling is not the responsibility of the test laboratory except where specially requested. At least 10 specimens shall be selected from an homogeneous batch (see also 6.2.4).

6.2 Test specimens

6.2.1 Surface finish

As a standard reference, the surface finish of the faces of the specimens shall be sawn, honed or polished (identification test). In case of necessity to test specimens with other surface finishes (e.g. flamed, sandblasted etc.) as required for application, this may be done (technological test). For the technological test the specimens may be final products or sawn from final products. The surface intended for use shall be in contact with the two supporting rollers (facing downwards). In any case the kind of surface finish shall be stated in the report.

6.2.2 Dimensions

The dimensions of the specimens are determined by their thickness h .

- the thickness h shall be between 25 mm and 100 mm and shall be greater than twice the size of the largest grain in the stone
- the total length L shall be equal to six times the thickness
- the distance between the supporting rollers shall be equal to five times the thickness
- the width b shall be between 50 mm and three times the thickness ($50 \text{ mm} \leq b \leq 3h$), and in no case it shall be less than the thickness.

6.2.3 Tolerance

The tolerance on the distance between the supporting rollers l is to be ± 1 mm of the nominal dimension.

6.2.4 Planes of anisotropy

If the stone shows planes of anisotropy (e.g. bedding, foliation etc.) the specimens are to be prepared in accordance with at least one of the arrangements shown in figures from 2 to 4 and the direction of the planes of anisotropy is to be marked on each specimen by at least two parallel lines.

If the use of the stone in respect of the position of the planes of anisotropy is known, the test shall be carried out with the force applied on the face that will be loaded during use.

If the way of use of the stone is not known but the position of the planes of anisotropy is indicated on the specimens (by means of at least two parallel lines), the test shall be carried out on each of the three arrangements shown in Figures from 2 to 4; the total number of specimens will then be 3 times 10.

6.2.5 Conditioning before testing

The specimens shall be dried at $(70 \pm 5)^\circ\text{C}$ to a constant mass.

Constant mass is reached when the difference between two weighings carried out (24 ± 2) h apart is no greater than 0,1% of the first of the two masses.

After drying and prior to testing the specimens shall be stored at $(20 \pm 5)^\circ\text{C}$ until the thermal equilibrium is reached. After that the test shall be performed within 24 h.

7 Test procedure

Wipe the surface of the rollers clean and remove any loose grits from the faces of the specimen that will be in contact with the rollers.

The specimen is placed centrally on the supporting rollers (see figures 1 to 4). The loading roller is placed in the middle of the specimen.

The load is increased uniformly at a rate of $(0,25 \pm 0,05)$ MPa/s until the specimen breaks. Note the breaking load to the nearest 10 N and also the place where the fracture occurs. The width and the thickness of the specimen are measured adjacent to the fracture plane and the dimensions are expressed in millimetres to the nearest 0,1 mm.

8 Expression of the results

The flexural strength R_{ft} of each specimen is calculated using the formula:

$$R_{ft} = \frac{3Fl}{2bh^2}$$

SIST EN 12372:2000

<https://standards.iteh.ai/catalog/standards/sist/6c627f52-618f-4fb-acfb-c93068da99e5/sist-en-12372-2000>

The result shall be expressed in Megapascals to the nearest 0,1 MPa.

If the fracture is situated more than 15% of the distance between the supporting rollers from the middle of the specimen and/or flaws are present (veins, fissures, etc.) it shall be mentioned in the test report.

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;