



# SLOVENSKI STANDARD

## SIST EN 14617-2:2008

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SIST EN 14617-2:2004

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### Aglomeriran kamen - Preskusne metode - 2. del: Ugotavljanje upogibne trdnosti (zvijanje)

Agglomerated stone - Test methods - Part 2: Determination of flexural strength (bending)

Künstlich hergestellter Stein - Prüfverfahren - Teil 2: Bestimmung der Biegefestigkeit (Schwenkbiegen)

Pierre agglomérée - Méthodes d'essai - Partie 2: Détermination de la résistance a la flexion (traction)

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN 14617-2**

June 2008

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Supersedes EN 14617-2:2004

English Version

## Agglomerated stone - Test methods - Part 2: Determination of flexural strength (bending)

Pierre agglomérée - Méthodes d'essai - Partie 2 :  
Détermination de la résistance à la flexion (traction)

Künstlich hergestellter Stein - Prüfverfahren - Teil 2:  
Bestimmung der Biegefestigkeit (Schwenkbiegen)

This European Standard was approved by CEN on 26 April 2008.

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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 CEN Management Centre has the same status as the official versions.

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[SIST EN 14617-2:2008](https://standards.iteh.ai/catalog/standards/sist/e3629404-4d71-44fd-b4b2-09c9e3ad915a/sist-en-14617-2-2008)

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## Foreword

This document (EN 14617-2:2008) 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of an identical text or by endorsement, at the latest by December 2008, and conflicting national standards shall be withdrawn at the latest by December 2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14617-2:2004.

Test methods for agglomerated stones consist of the following:

EN 14617-1, *Agglomerated stone - Test methods – Part 1: Determination of apparent density and water absorption*

EN 14617-2, *Agglomerated stone – Test methods – Part 2: Determination of flexural strength (bending)*

EN 14617-4, *Agglomerated stone – Test methods – Part 4: Determination of the abrasion resistance*

EN 14617-5, *Agglomerated stone - Test methods – Part 5: Determination of freeze and thaw resistance*

EN 14617-6, *Agglomerated stone - Test methods – Part 6: Determination of thermal shock resistance*

prEN 14617-8, *Agglomerated stone – Test methods – Part 8: Determination of resistance to fixing (dowel hole)*

EN 14617-9, *Agglomerated stone - Test methods – Part 9: Determination of impact resistance*

EN 14617-10, *Agglomerated stone – Test methods – Part 10: Determination of chemical resistance*

EN 14617-11, *Agglomerated stone – Test methods – Part 11: Determination of linear thermal expansion coefficient*

EN 14617-12, *Agglomerated stone – Test methods – Part 12: Determination of dimensional stability*

EN 14617-13, *Agglomerated stone – Test methods – Part 13: Determination of electrical resistivity*

EN 14617-15, *Agglomerated stone – Test methods – Part 15: Determination of compressive strength*

EN 14617-16, *Agglomerated stone – Test methods – Part 16: Determination of dimensions, geometric characteristics and surface quality of modular tiles*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, 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 the United Kingdom.

**EN 14617-2:2008 (E)****1 Scope**

This European standard specifies a method for determination of flexural strength under a concentrated load (bending resistance) of agglomerated stone flat products.

**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.

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

EN 14618, *Agglomerated stone – Terminology and classification*

EN 14617-16, *Agglomerated stone - Test methods - Determination of dimensions, geometric characteristics and surface quality of modular tiles*

**3 Principle**

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

**4 Symbols**

$R_{tf}$  flexural strength, (MPa)

$F$  breaking load, (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**

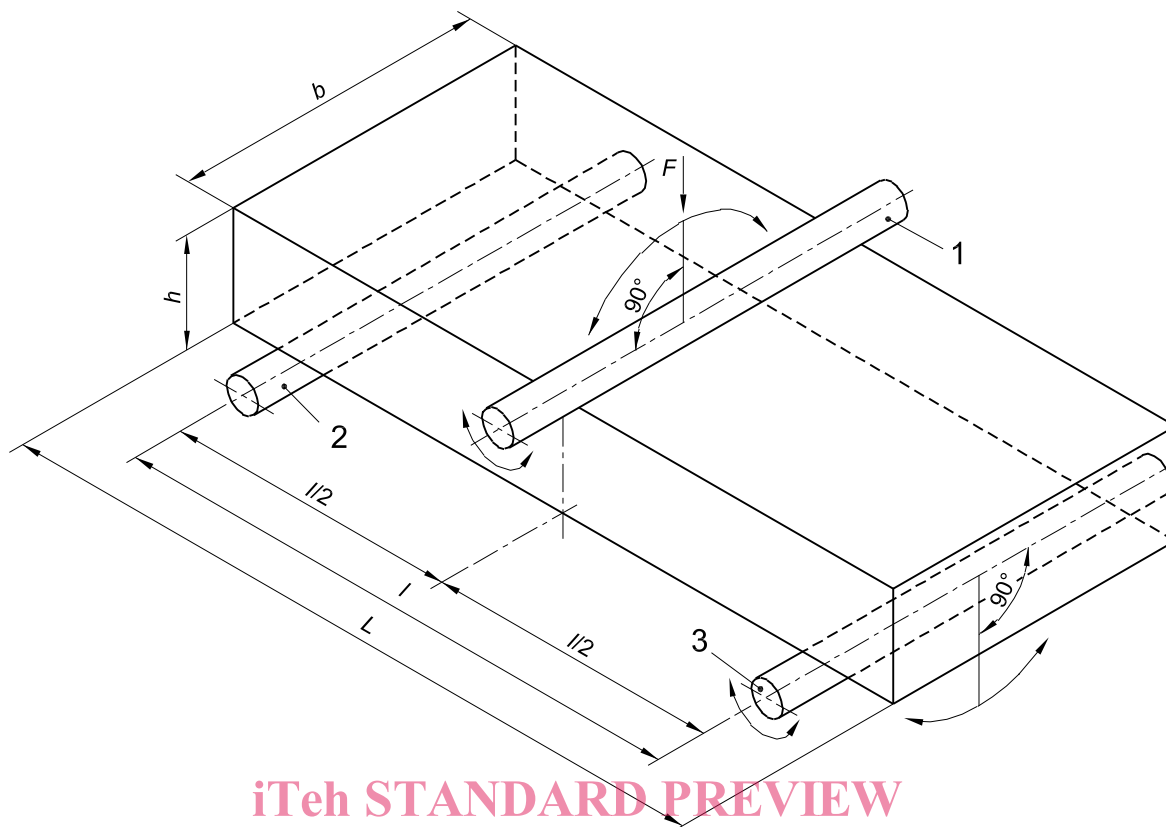
**5.1** Balance capable of weighing the specimen with a precision within 0,01 % of the mass of the specimen.

**5.2** Ventilated oven capable of maintaining  $(40 \pm 5)^\circ\text{C}$ .

**5.3** Linear measuring device with an accuracy of 0,05 mm.

**5.4** Testing machine of appropriate force, in accordance with EN 12372 and calibrated according to this standard.

**5.5** Device for applying loads on the specimen by a centre-point load. It consists of two lower rollers (supporting rollers) and one upper roller (load-applying roller) which shall be centred 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.



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#### Key

- |   |                   |   |
|---|-------------------|---|
| 1 | loading roller    | <a href="https://standards.iteh.ai/catalog/standards/sist/e3629404-4d71-44fd-b4b2-09c9e3ad915a/sist-en-14617-2-2008">SIST EN 14617-2:2008</a>   |
| 2 | supporting roller | <a href="https://standards.iteh.ai/catalog/standards/sist/e3629404-4d71-44fd-b4b2-09c9e3ad915a/sist-en-14617-2-2008">https://standards.iteh.ai/catalog/standards/sist/e3629404-4d71-44fd-b4b2-09c9e3ad915a/sist-en-14617-2-2008</a> |
| 3 | supporting roller |   |

**Figure 1 — Arrangement of loading of test specimen (centre-point loading)**

5.6 Room which can be maintained at  $(20 \pm 5) ^\circ\text{C}$ .

## 6 Preparation of the specimens

### 6.1 Sampling

The sampling is not the responsibility of the test laboratory except when specially requested. When possible, whole agglomerated stones should be tested, however, very large or irregular shapes may be cut in order to arrange them on the instrument. At least six specimens shall be selected from a 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. In case of necessity to test specimens with other surface finishes (e.g. flamed, sandblasted etc.) as required for application, this may be done. The surface intended for use shall be in contact with the two supporting rollers (facing downwards), when the backside face is not perfectly planar. In all other cases the surface intended for use shall be in contact with the upper roller. In any case the kind of surface finish shall be stated in the report.

**EN 14617-2:2008 (E)****6.2.2 Dimensions**

The thickness  $h$  shall be the one forecast for the final product.

The total length  $L$  shall be at least  $(200 \pm 0,3)$  mm.

The distance between the supporting rollers  $l$  shall always be 20 mm. shorter than the total length  $L$ .

The width  $b$  shall be at least  $(50 \pm 0,3)$  mm 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  $\pm 1$  mm of the nominal dimension.

The faces shall not depart from perpendicularity to the axis of the specimen by more than 2 % with a maximum of 2 mm differences when measuring in any direction. The measurement shall be taken in accordance with EN 14617-16.

**6.2.4 Conditioning before testing**

The specimens shall be conditioned at room temperature  $(20 \pm 5)$  °C for  $(24 \pm 2)$  h.

For agglomerated stones with cement or cement and polymer as binder the specimens shall be dried at  $(40 \pm 5)$  °C to a constant mass.

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

After drying and prior to testing the specimens shall be stored at  $(20 \pm 5)$  °C until the thermal equilibrium is reached. After that the test shall be performed within 24 h. [SIST EN 14617-2:2008](https://standards.iteh.ai/catalog/standards/sist/e3629404-4d71-44fd-b4b2-09c9e3ad915a/sist-en-14617-2-2008)

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**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 width and the thickness of the specimen are measured and the dimensions are expressed in millimetres to the nearest 0,1 mm.

The specimen is placed centrally on the supporting rollers (see Figure 1). 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 at least to the nearest 10 N and also the place where the fracture occurs.

**8 Expression of the results**

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

$$R_{ff} = \frac{3Fl}{2bh^2} \quad (1)$$

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.) the test shall be repeated.



## 9 Test report

The test report shall contain the following information:

- a) unique identification number of the report;
- b) number, title and date of issue of this European standard;
- c) name and address of the test laboratory and the address where the test was carried out if different from the test laboratory;
- d) name and address of the client;
- e) it is the responsibility of the client to supply the following information:
  - commercial name of the stone aggregates used in the tested agglomerated stone lots in accordance with EN 14618;
  - name of the supplier;
  - surface finish of the specimens (if relevant to the test);
- f) date of delivery of the sample or of the specimens;
- g) date when the specimens were prepared (if relevant) and the date of testing;
- h) number of specimens in the sample;
- i) dimensions of the specimens;
- j) rate of loading: <https://standards.iteh.ai/catalog/standards/sist/e3629404-4d71-44fd-b4b2-09c9e3ad915a/sist-en-14617-2-2008>
- k) for each specimen: the width and thickness adjacent to the fracture plane and the distance between the supporting rollers in millimetres to the nearest 0,1 mm, the breaking force in Newtons without any decimal place, the flexural strength in Megapascal to the nearest 0,1 MPa and the location of the fracture and any anomalies observed;
- l) for each relevant direction of loading the mean value  $\bar{R}_f$  of the flexural strength and the standard deviations, in Megapascal to the nearest 0,1 MPa;
- m) all deviations from the standard and their justification;
- n) remarks.

The test report shall contain the signature(s) and the 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 written consent of the test laboratory.