



SLOVENSKI STANDARD

SIST EN 1052-4:2002

01-januar-2002

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Methods of test for masonry - Part 4: Determination of shear strength including damp proof course

Prüfverfahren für Mauerwerk - Teil 4: Bestimmung der Scherfestigkeit bei einer Feuchtesperrschicht

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Méthodes d'essai de la maçonnerie - Partie 4: Détermination de la résistance au cisaillement, en tenant compte de la couche de coupure de capillarité

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91.080.30 Zidane konstrukcije Masonry

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1052-4

May 2000

ICS 91.080.30

English version

Methods of test for masonry - Part 4: Determination of shear strength including damp proof course

Méthodes d'essai de la maçonnerie - Partie 4:
Détermination de la résistance au cisaillement, en tenant
compte de la couche de coupure de capillarité

Prüfverfahren für Mauerwerk - Teil 4: Bestimmung der
Scherfestigkeit bei einer Feuchtesperrschicht

This European Standard was approved by CEN on 22 April 2000.

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.

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 125 "Masonry", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

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.

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1 Scope

This European Standard specifies a method for determining the in plane shear strength of horizontal bed joints in masonry incorporating sheet damp proof course material using a specimen tested in double shear with load applied perpendicular to the bed joints.

Guidance is given on the preparation of the specimens, the conditioning required before testing, the testing machine, the method of test, the method of calculation and the contents of the test report.

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 revisions 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 772-1 Methods of test for masonry units - Part 1 : Determination of compressive strength
- EN 772-10 Methods of test for masonry units - Part 10 : Determination of moisture content of calcium silicate and autoclaved aerated concrete units
- prEN 998-2 Specification for mortar for masonry - Part 2 : Masonry mortar
- EN 1015-3 <https://standards.iteh.ai/catalog/standards/sist/62340213-2817-4186-895-b8cfa65ba7d/sist-en-1052-4-2002> Methods of test for mortar for masonry - Part 3 : Determination of consistence of fresh mortars (by flow table)
- EN 1015-7 Methods of test for mortar for masonry - Part 7 : Determination of air content of fresh mortar
- EN 1015-11 Methods of test for mortar - Part 11 : Determination of flexural and compressive strength of hardened mortar

3 Principle

The shear strength of masonry incorporating sheet damp proof course material is derived from the strength of small masonry specimens tested to destruction. The specimens are tested in double shear under three-point load with precompression perpendicular to the bedjoints. The shear strength is defined by the initial shear strength and the coefficient of friction.

4 Definitions and Symbols

4.1 Definitions

For the purposes of this standard the following definitions apply:

4.1.1 Masonry. An assemblage of masonry units laid in a specified pattern and jointed together with mortar.

4.1.2 Shear strength of masonry. The strength of masonry subjected to shear forces.

4.2 Symbols

- A_i is the cross-sectional area of the masonry specimen parallel to the bed joints, (mm^2)
- $F_{i,max}$ is the maximum shear load withstood by an individual masonry specimen, (N).
- f_{vi} is the shear strength of an individual masonry specimen at a particular precompressive stress, (N/mm^2).
- f_{pi} is the precompressive stress, (N/mm^2).
- F_{pi} is the precompressive load, (N).
- f_{vim} is the mean shear strength of the three masonry specimens tested at a particular precompressive stress, (N/mm^2).
- f_{vo} is the mean value of shear strength at zero precompressive load, (N/mm^2).
- f_{vck} is the characteristic value of shear strength, (N/mm^2).
- l is the length of the specimen, in mm
- h is the height of the specimen, in mm
- w is the width of the specimen, in mm
- α is the angle of internal friction, in degrees.
- α_k is the characteristic angle of internal friction, in degrees.

5 Materials

5.1 Masonry units

5.1.1 Conditioning of the units

The conditioning of masonry units shall be as specified:

Measure the moisture content by mass of autoclaved aerated concrete and calcium silicate masonry units in accordance with **EN772-10**. For other types of masonry unit record the method of conditioning the units prior to laying. Record the age of non autoclaved concrete units at the time of testing the masonry specimens.

5.1.2 Determination of the compressive strength of the masonry units

Determine the compressive strength of a sample of masonry units, using the test method given in **prEN 772-1**. For non autoclaved concrete units determine the compressive strength at the time of testing the masonry specimens.

5.2 Mortar

The mortar, its mixing procedure and its flow value shall conform with the requirements of **prEN 998-2**, unless otherwise specified, and these shall be reported in the test report.

Take representative samples of fresh mortar from the mason's board to make mortar prism specimens, to determine the flow value in accordance with **prEN 1015-3** and to determine the air content in accordance with **prEN 1015-7**. Use the prism specimens to determine the mean compressive strength at the time of testing the masonry specimens in accordance with **prEN 1015-11**.

6 Apparatus

6.1 The testing machine used to apply the shear loads and precompression shall comply with the requirements given in **table 1**. The testing machine shall have adequate capacity but the scale used shall be such, that the ultimate load on the specimen exceeds one fifth of the full scale reading. The machine shall be provided with a load pacer or equivalent means to enable the load to be applied at the rate specified.

6.2 Apparatus capable of measuring the cross-sectional area of the specimens to an accuracy of 1%.

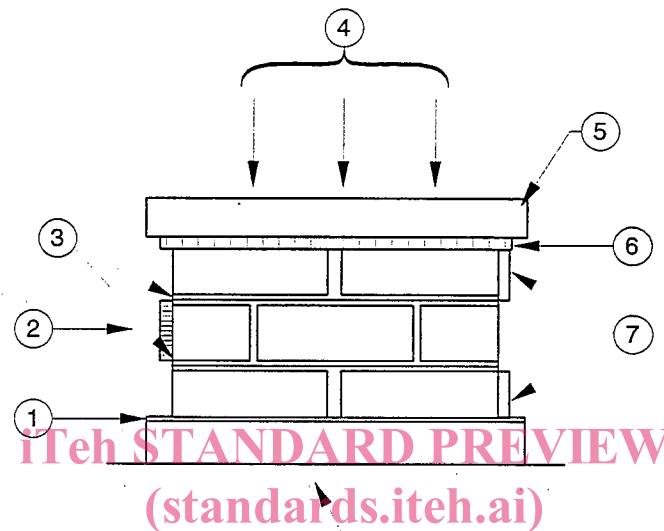
Table 1 - Requirements for testing machines

| Maximum permissible repeatability of forces as percentage of indicated force | Maximum permissible mean error of forces as percentage of indicated force | Maximum permissible error of zero force as percentage of maximum force of range |
|--|---|---|
| 2,0 | ± 2,0 | ± 0,4 |

7 Preparation and curing of specimens

7.1 Preparation of masonry specimens

Prepare at least nine specimens in the format shown in **figure 1**. The length of the specimens shall be greater than 400 mm and less than 700 mm. The height to width ratio (h/w) shall be greater than 2 and there should be at least one vertical joint per course.



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| | | | | | |
|-----|-------------------------|-------------|--|------------|--------------|
| Key | 1 | Straw-board | 2 | Shear load | |
| 3 | Damp proof courses | 4 | Compressive load | 5 | Upper platen |
| 6 | Load spreading material | 7 | Rigid abutments to restrain top and bottom courses (adjustable to allow for minor variations in masonry) | 8 | Lower platen |

Figure 1 - Testing arrangement

The damp proof course shall be sandwiched between layers of mortar. Frogs and perforations shall not be exposed at the end of the specimen but turned in.

Build the specimens on a flat horizontal surface. The units shall be laid so that a final mortar joint thickness of 8 mm to 15 mm representative of masonry with conventional mortar joints, of 1 mm to 3 mm representative of masonry made with thin layer mortar joints is attained. The masonry unit shall be checked for linear alignment and level using a set-square and spirit level. Excess mortar shall then be struck off with a trowel. The procedure shall be repeated for the top unit(s).