



# SLOVENSKI STANDARD

## SIST EN 1741:2001

01-april-2001

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g]ž\_]XYi ^c`dfUj c\_c]bc`bU'fUj b]bc`Y'Ya Yb]c]j

Determination of shear strength for out-of-plane forces of joints between prefabricated components made of autoclaved aerated concrete or lightweight aggregate concrete with open structure

iTeh STANDARD PREVIEW

Bestimmung der Schubtragfähigkeit von Fugen zwischen vorgefertigten Bauteilen aus dampfgehärtetem Porenbeton oder haufwerksporigem Leichtbeton bei Belastung rechtwinklig zur Bauteilebene

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Détermination de la résistance au cisaillement des jonctions entre les éléments préfabriqués réalisés en béton cellulaire autoclavé ou en béton de granulats légers a structure ouverte, sous l'effet de forces agissant en dehors du plan des éléments

**Ta slovenski standard je istoveten z: EN 1741:1998**

### ICS:

91.100.30      Beton in betonski izdelki      Concrete and concrete products

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EUROPEAN STANDARD

EN 1741

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 1998

ICS

Descriptors: concrete, cellular concrete, aggregates, reinforcing materials, prefabricated elements, joints, mechanical tests, shear tests, determination, shear strength, test specimen

English version

## Determination of shear strength for out-of-plane forces of joints between prefabricated components made of autoclaved aerated concrete or lightweight aggregate concrete with open structure

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This European Standard was approved by CEN on 25 March 1998.

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.



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 177 " Prefabricated reinforced components of autoclaved aerated concrete or light-weight aggregate concrete with open structure", the secretariat of which is held by DIN.

In order to meet the performance requirements as laid down in the product standards for prefabricated components of autoclaved aerated concrete and of lightweight aggregate concrete with open structure, a number of standardized test methods are necessary.

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 October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998 .

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.

## 1 Scope

This European Standard specifies a method of determining the shear strength for out-of-plane forces of joints between prefabricated components made of autoclaved aerated concrete (AAC) according to prEN 12602 or light-weight aggregate concrete with open structure (LAC) according to prEN 1520.

## 2 Normative references

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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.

EN 678	Determination of dry density of autoclaved aerated concrete
EN 679	Determination of the compressive strength of autoclaved aerated concrete
EN 992	Determination of dry density of lightweight aggregate concrete with open structure
EN 1353	Determination of moisture content of autoclaved aerated concrete
EN 1354	Determination of compressive strength of lightweight aggregate concrete with open structure
EN 1356:1996	Performance test for prefabricated reinforced components made of autoclaved aerated concrete or lightweight aggregate concrete with open structure under transverse load.
prEN 1520	Prefabricated components of lightweight aggregate concrete with open structure
prEN 12602	Prefabricated reinforced components of autoclaved aerated concrete

### 3 Principle

The shear strength of longitudinal joints between prefabricated AAC- or LAC-components for forces acting perpendicular to the plane of the components is determined by applying a vertical line load along the middle-axis on top surface of a horizontally positioned section of a component. The loaded section is supported at both longitudinal edges. At least one of these longitudinal supports consists of an adjacent component section connected to the loaded section by a joint of the type to be tested. The load is increased continuously or in steps until failure of the joint occurs.

The test can be carried out without lateral restraints (case A) or with lateral restraints preventing in-plane displacements normal to the joint (case B).

### 4 Apparatus

- a) a saw for cutting components and test specimens;
- b) a testing machine or jack, capable of applying a vertical compressive load without shock continuously or in steps. The precision of the machine or jack and of the load indication shall be such that the failure load can be determined to an accuracy of  $\pm 3\%$ . The measuring range shall be such that the failure load is higher than one-tenth of the range used;
- c) calipers and/or a rule, capable of reading the dimensions of the test specimens and the joints to an accuracy of 1 mm;
- d) devices according to figures 1, 2, and 3 for loading and supporting the test specimen;
- e) a weighing equipment, capable of determining the mass of the sections to an accuracy of 5 kg;
- f) steel plates and rollers according to figures 1, 2, and 3;
- g) device for measuring the relative vertical displacement between the joined sections (optional).

### 5 Test specimens

#### 5.1 Sample

The sample for the preparation of the test specimens shall be taken in such a manner that it is representative of the product to be investigated. In the case of AAC, the direction of rise of the mass during manufacture shall be marked on the components.

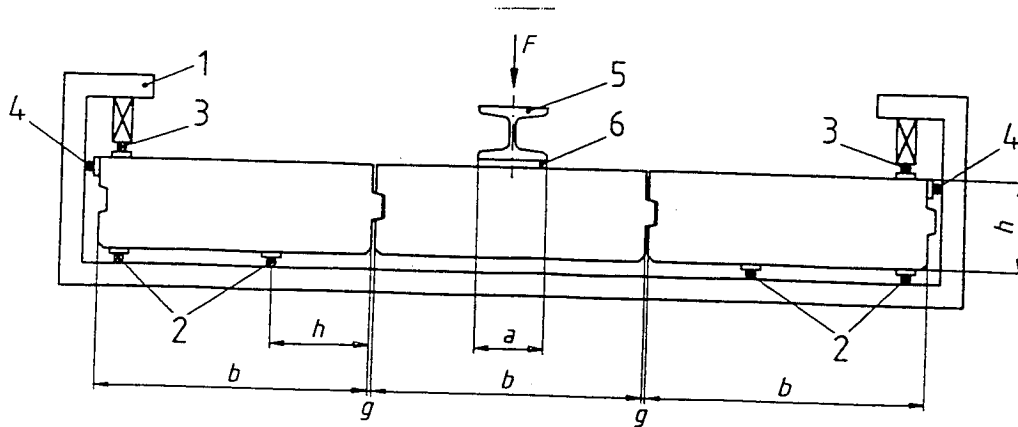
#### 5.2 Shape and size of test specimens

A test specimen normally consists of an arrangement of three sections taken from prefabricated components with standard width and thickness which shall be joined in the intended manner (see figure 1). The length of the sections shall be equal to their width. For certain investigations test specimens consisting of two sections may be used (see figures 2 and 3).

#### 5.3 Number of test specimens

A test set shall consist of at least three test specimens, each normally made of three sections taken from the same component (see figure 1).

When testing an asymmetric joint between two sections, two test sets with different arrangements of the sections with respect to loading and supports shall be carried out (see figures 2 and 3).



$$a = b - 2h \geq 100 \text{ mm}$$

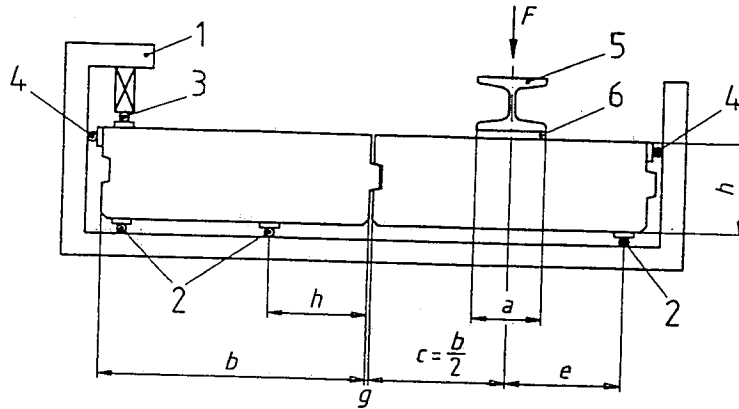
$g$  is the maximum permitted gap

- |                            |  |
|----------------------------|--|
| 1 Support frame            | 4 Lateral supports (only in case B)    |
| 2 Moveable support rollers | 5 Load distribution beam               |
| 3 Upper supports           | 6 Soft fibre board or equalizing layer |

**Figure 1: Arrangement of standard shear test**  
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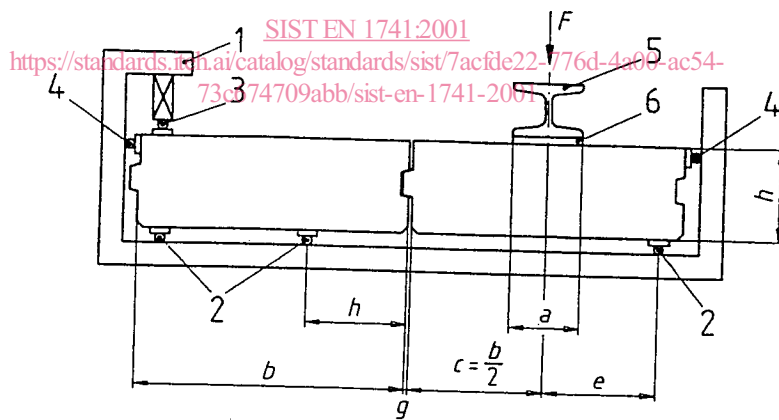
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$$a = b - 2h \geq 100 \text{ mm}$$

- |                            |  |
|----------------------------|--|
| 1 Support frame            | 4 Lateral supports (only in case B)    |
| 2 Moveable support rollers | 5 Load distribution beam               |
| 3 Upper supports           | 6 Soft fibre board or equalizing layer |

**Figure 2: Arrangement of one-sided shear test (type 1)**  
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- |                            |  |
|----------------------------|--|
| 1 Support frame            | 4 Lateral supports (only in case B)    |
| 2 Moveable support rollers | 5 Load distribution beam               |
| 3 Upper supports           | 6 Soft fibre board or equalizing layer |

**Figure 3: Arrangement of one-sided shear test (type 2)**



## 5.4 Preparation of test specimens

AAC components shall be allowed to cool for at least 2 d after autoclaving before being assembled.

LAC components shall be at least 21 d old before being assembled and at least 28 d at testing.

The sections shall be cut to length from the components by means of a saw.

Before jointing, length, thickness, and width of the sections shall be measured. The shape and dimensions of the longitudinal faces adjacent to the joint (e.g. tongue and groove) shall also be determined.

If the components or sections are frozen or cold, they shall be stored with sufficient space between each other at room temperature for at least 2 d before jointing.

The sections shall then be arranged on a support frame according to figure 1, 2, or 3. Each support consists of a roller with a diameter of 20 mm or more and a steel plate between the roller and the section. The supports shall extend over the full length of the test specimen. The steel plates shall have a width of  $(50 \pm 2)$  mm and a thickness of at least 10 mm. The section on which the load is applied shall be weighed prior to being jointed.

The gap between the assembled sections shall have the maximum width permitted by the manufacturer.

If a dry jointing system is used (e.g. tongue and groove joint), the sections shall be simply laid together without additional fixing.

In the case of joints to be grouted with mortar or concrete, the sections shall be placed in position and fixed temporarily together in at least two places before grouting. After hardening of the grouting material the restraint shall be removed.

Grouting shall be performed according to the instructions of the manufacturer of the components. The grouting procedure (including e.g. any prewetting of the concrete adjacent to the joint), the recipe, consistency, and the temperature of the grouting material shall be recorded in the test report.

A grouted joint shall be protected against moisture loss under plastic foil immediately after grouting and cured at room temperature for at least 7 d before the test.

## 5.5 Conditioning of test specimens

The test specimens shall be kept at room temperature before and during testing. The mass related moisture content of the concrete at testing shall be at least 10 % for AAC and at least 5 % for LAC. This shall be checked after the shear test (see 6.2).

NOTE: When in doubt about the moisture content, this can be estimated in advance by testing related samples of material.