
8 c`c Yj Ub^Y'ghf]ybY'fXbcgh]`a YX'fUh`] b]a]d`Ugha]j Y d`Ughb]` Y'Ya Ybhcj `]n
Uj hc_`Uj]fUbY[U'W'] UghY[U'VY'rcbU'U]'VY'rcbU']n`UA _Y[U'U[fY[U'U'n'cXdfhc
glfi _h fc

Determination of shear strength between different layers of multilayer components made of autoclaved aerated concrete or lightweight aggregate concrete with open structure

Bestimmung der Scherfestigkeit zwischen verschiedenen Schichten mehrschichtiger Bauteile aus dampfgehärtetem Porenbeton oder haufwerksporigem Leichtbeton

Détermination de la résistance au cisaillement entre les différentes couches d'éléments multicouches réalisés en béton cellulaire autoclave ou en béton de granulats légers a structure ouverte

Ta slovenski standard je istoveten z: EN 1742:1998

ICS:

91.100.30 Beton in betonski izdelki Concrete and concrete products

SIST EN 1742:2001**en**

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EUROPEAN STANDARD

EN 1742

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 1998

ICS

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

English version

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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.

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

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

Contents

	Page
Foreword	3
1 Scope	3
2 Normative references	3
3 Principle	4
4 Apparatus	4
5 Test specimens	6
5.1 Sample	6
5.2 Shape and size of test specimens	6
5.3 Number of test specimens	6
5.4 Preparation of test specimens	6
5.5 Measurement of test specimens	6
5.6 Conditioning of test specimens	6
6 Testing procedure	7
7 Test results	7
8 Test report	8

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ENTRINSKI BROJ IZDAVANJA



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.

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1 Scope

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This European Standard specifies a method of determining the shear strength under short-term loading between the different layers of prefabricated multilayer components made of autoclaved aerated concrete (AAC) according to prEN 12602 or lightweight aggregate concrete with open structure (LAC) according to prEN 1520.

This test method is suitable only for evaluation of conformity purposes during production of multilayer components.

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.

- | | |
|--------------|--|
| EN 1353 | Determination of moisture content of autoclaved aerated concrete |
| 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 between different layers of a multilayer component is determined by applying a horizontal compression force acting in the longitudinal direction of the component (or a section thereof, see 5.2) at one end face on the bottom layer, while the component is laid in a horizontal position on two roller supports near its ends. The component is supported at the opposite end at the top layer to prevent horizontal displacement and uplift. The shear strength is calculated from the resulting shear force acting in the plane of the component at fracture, divided by the measured length and width of component.

4 Apparatus

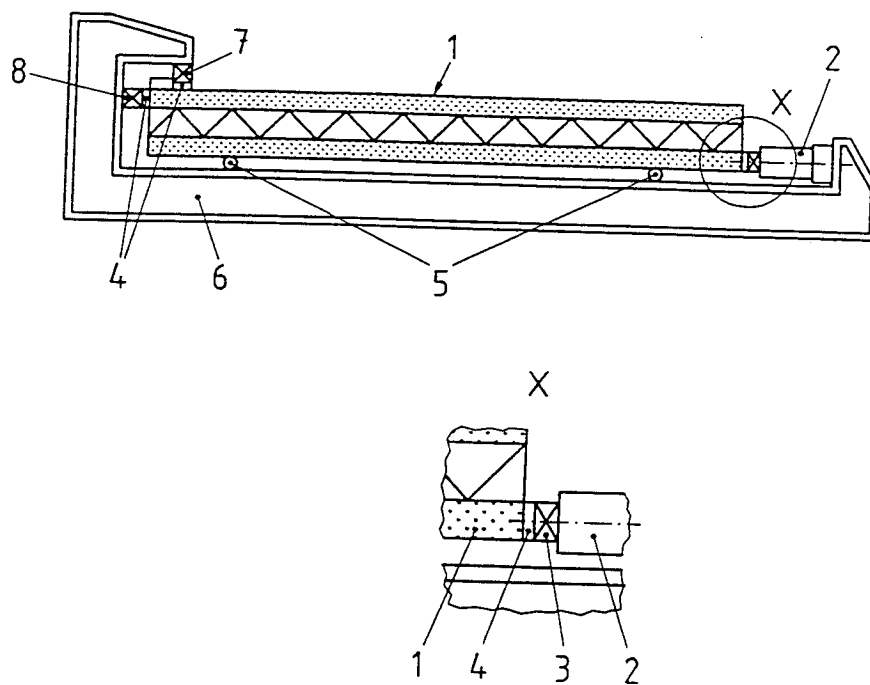
- a) a saw, capable of cutting test specimens from big reinforced components;
- b) length measuring devices (e.g. calipers and/or metre), capable of measuring the dimensions of test specimens to an accuracy of 1 mm;
- c) a support frame with rollers (diameter at least 40 mm) and adjustable supports according to figure 1;
- d) a jack, capable of applying a compressive load without shock. The precision of the 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 upper limit of the range.
- e) (if required) a load cell placed between the jack and the support frame, capable of recording the compressive force with the accuracy and within the range specified in d);
- f) (optional) a device for measurement of displacements between individual layers.

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- 1 Test specimen
- 2 Jack
- 3 Load distribution beam
- 4 Soft fibre board (intermediate layer)
- 5 Moveable rollers
- 6 Support frame
- 7 Upper support (adjustable)
- 8 Horizontal support

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Figure 1: Typical test set-up

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.

5.2 Shape and size of test specimens

The test specimen usually consists of a whole multilayer component or a section thereof. Preferably, the length of the test specimen should be between (2 and 3) m and its width between (0,5 and 1,0) m.

Components with width over 1,0 m may be cut in longitudinal direction, components with length over 3 m may be cut to a length of (2 to 3) m.

5.3 Number of test specimens

Three test specimens shall be tested, unless otherwise specified in a relevant European Standard.

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5.4 Preparation of test specimens (standards.iteh.ai)

If necessary, test specimens shall be cut from larger components by means of a saw.

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5.5 Measurement of test specimens

The length of the test specimens shall be measured along the centre lines on the surfaces of both outer layers. The width (not including the width of any tongue) shall be measured over the whole thickness of the test specimen at a distance of 100 mm from both ends. In addition, the thicknesses of the individual layers shall be measured, mainly to ascertain that there are no significant deviations from the nominal values. Significant deviations shall be noted in the test report.

5.6 Conditioning of test specimens

The components shall be allowed to have the minimum curing time prescribed by the manufacturer.

At the time of testing the mass related moisture content of the outer layers shall be between (10 and 40) % for AAC and at least 5 % for LAC. This shall be checked after the shear test on test specimens taken from the central parts of the outer layers. The determination of the moisture content shall be performed according to EN 1353 in the case of AAC and according to clause 7 of EN 1356:1996 in the case of LAC.

The temperature of the test specimens shall be in equilibrium with that of the test premises, but shall never be below 0 °C at the time of test.

6 Testing procedure

The test specimens shall be placed in the support frame on two rollers and positioned in such a way that the entire end face of the top layer is in contact with the horizontal support. Between the horizontal support and the end face of the top layer an intermediate layer of soft fibre board with a width equal to the thickness of the top layer shall be inserted. The support frame shall be provided with a device capable of preventing uplift of the end of the test specimen during application of the test load. Support conditions are shown in figure 1.

The load shall be applied to the end face of the bottom layer at the opposite end of the test specimen. It shall be carefully centred in relation to the longitudinal axis of the test specimen and the centre plane of the bottom layer and shall be evenly distributed over the full width of the test specimen by means of a sufficiently rigid steel section and an intermediate layer of soft fibre board with a width equal to the thickness of the bottom layer.

The load may be applied continuously or in steps. The loading rate shall be such that the failure load is reached after about 3 min.

If required, the displacement between the individual layers should be measured at the ends of the test specimen as a function of the applied load.

After the shear test the moisture content of the bottom layer and the top layer shall be determined as specified in 5.6.

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7 Test results

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The shear strength between the different layers shall be calculated using equation (1):

$$\tau = \frac{4F}{(b_1 + b_2) \times (l_1 + l_2)} \quad \dots(1)$$

where:

τ is the in plane shear strength, in newtons per square millimetre;

F is the failure load, in newtons;

b_1, b_2, l_1, l_2 are the values for the width and the length of the test specimen determined in accordance with 5.5, in millimetres.

The shear strength of the individual test specimens and the mean value shall be expressed to the nearest 0,01 N/mm².